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Englische Vorträge des 8. International Symposium Advances in Legal Medicine (ISALM)

English Abstracts of the 8th International Symposium Advances in Legal Medicine (ISALM)

O 1
Psychedelics, entactogens, and psychostimulants: how can we tell the difference?

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The rapid proliferation of "research chemicals" has presented a challenge to regulators and those charged with enforcing drug laws. This presentation will attempt to outline approaches that may allow a more ready understanding of the molecular features that define the pharmacological classes known as psychostimulants, entactogens, and psychedelics. The most easily synthesized class of molecule is the substituted phenethylamine, with substituents placed at various locations on the aromatic ring, and on the side chain.

The "generic" phenethylamine structure (**Fig. 1**) embodies features of all three pharmacologic classes. In general, molecules with oxygen atoms (e.g. methoxy) at the R2- and R6-positions may be immediately suspect as potential psychedelics. These substituents prevent the molecule from being a substrate for the monoamine reuptake carriers for NE, DA, and 5-HT. The most common feature of the psychedelics is a 2,5-dimethoxy substitution pattern, where R4 can be a wide variety of hydrophobic substituents. Ra can be H or CH_3, with the former being less potent and of shorter duration, whereas the latter are more potent and have a longer lasting effect. Variations on this theme will be discussed. Defining a boundary between psychostimulants and entactogens is much more difficult because the mechanism for both of these classes involves release of stored neuronal monoamine transmitters. Psychostimulants predominantly seem to involve the dopaminergic and noradrenergic systems, whereas entactogens bring into play a major action on serotonergic systems. These extent to which these three monoaminergic systems are involved appears principally to determine whether the compound is a stimulant, more like methamphetamine, or an entactogen, and more like MDMA (ecstasy). A discussion will be presented as to how to generally make such assessments, based on pharmacology and structure-activity considerations.

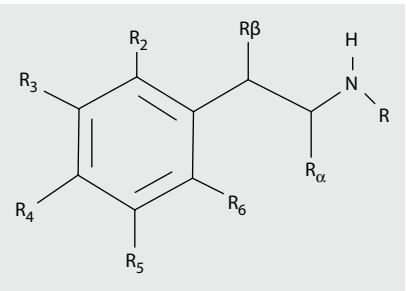

Fig. 1 ◀ "Generic" phenethylamine structure

O 2
Coordination of forensic autopsy laboratory system to visualize the pathophysiology of death: updated concept and routine casework

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Introduction. Forensic medicine has a long tradition of social contribution through routine casework based on research activities to develop, improve and sophisticate the procedures as well as to establish an autopsy database. In addition to conventional procedures, diagnostic imaging procedures, including CT, have become popular, and recent studies have incorporated the concepts of post-mortem biochemistry, combined with immunohistochemistry, for pathophysiological investigation of death, and molecular biology for genetics of sudden death and intoxication. Furthermore, ongoing studies are accumulating autopsy data on the molecular pathology of death. Here we present perspectives on the updated concept of the coordinated forensic autopsy laboratory system to investigate the pathophysiology of death in routine casework.

Methods. Serial autopsy cases were investigated within the framework of our routine casework, involving sample collection, and laboratory work and data analyses. Laboratory investigations included CT, biochemistry, immunohistochemistry and molecular biology beside conventional procedures.

Results. Post-mortem CT demonstrated pulmonary morphology representing the terminal respiratory status, including hypoventilation due to edema, and hyperventilation in hypothermia and metabolic acidosis, more clearly than autopsy findings. Biochemistry mainly detected systemic metabolic deterioration and organ tissue damage; however, immunohistochemistry and molecular biology demonstrated individual tissue damage and dysfunction that were characteristic of the cause of death, partly in relevance to clinical laboratory findings.

Conclusions. These observations suggest the coordinated use of post-mortem CT morphology, biochemistry and molecular pathology in the updated concept of the forensic autopsy laboratory system to be useful to enforce conventional findings and visualize the pathophysiology of death.

O 3
Sudden unexpected death in the early newborn period – an underestimated problem?

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Introduction. Following the back-to-sleep campaigns, SIDS (sudden infant death syndrome) rates worldwide dropped dramatically over the last two decades. However, little is known about SUDI (sudden unexpected death in infancy) in the newborn period. Many epidemiologic SIDS studies systematically exclude the newborn period, which is explained by the general SIDS definitions. According to the so called San Diego definition, a "typical" SIDS victim is older than 21 days. However, the Department of Legal Medicine in Hamburg observed a cumulation of newborn SUDI cases in 2010, when three out of four SUDI cases were younger than 7 days, two of them occurring within the birth clinic. Bed sharing or co-sleeping might play an important role as a risk factor in this particular age group. On the other hand the so called "Baby friendly hospitals" (a WHO supported initiative) encourage mothers to co-sleep with their babies beginning from the day of birth in order to promote or facilitate breast feeding. Hypothesis: Bed sharing is an important risk factor for sudden unexpected deaths in the newborn period and therefore should not be recommended in the birth clinic.

Methods. For the gathering of data a standardized questionnaire is distributed in all German speaking Departments of Legal Medicine. In a retrospective approach all SUDI cases of newborn children up to 7 days are analyzed. Special attention is directed to the sleeping situation (e.g., did the mother co-sleep with her baby? Was the baby covered with its mother's blanket when it was found dead?).
Results. So far only the data of the Department in Hamburg have been analyzed (state: April 2011). It shows that within 10 years (2001–2010) 7 cases of SUDI in the newborn period occurred. In all of these cases the babies co-slept with their mothers at the time of death (resp. circulatory arrest). The results of the survey will be demonstrated.
Conclusions. The preliminary results show, that co-sleeping might be overrepresented in sudden unexpected deaths in the newborn period.

O 4
Accidental mechanical asphyxia at infant age – documentation maintained by German Forensic Institutes for the years 2000–2008

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Introduction. Accidents form one of the highest risks for children. Still, accidental asphyxia is represented in only few medical publications. As a result, a systematic analysis of all documented cases of accidental asphyxia in Germany over the years 2000–2008 was conducted. The goal of this analysis was to identify avoidable patterns of accidental asphyxia, providing recommendations for increased product safety and possible precautions.
Methods. A detailed retrospective analysis of 91 relevant autopsy reports from 23 different German forensic institutes was performed. The cases covered all existing reports in connection with accidental asphyxia from the participating institutes. A variety of demographic and morphologic data was systematically captured and analysed.
Results. The ratio boys to girls was 2,1 to 1,0. The age spread was from 1 day to 14 years with an average age of 5.9 years. Nearly half the cases (45.1%) were children of school age. In 46.2% of the cases, the cause of death was strangulation. In 11 of those cases there was suspicion of suicide. In 30.8% of all cases, the cause of death was suffocation with the majority resulting from thorax compression. In 23.1% of all cases, cause of death was aspiration, with the majority through aspiration of objects.
Conclusions. The majority of the cases would have been avoidable. Incidence could be reduced by two major precautions: increased product safety and education of parents of potentially fatal risks. Recommendations are given specifically towards children's beds, toys, children's high chairs, playpens and jungle gyms.

O 5
Investigation of amphetamines induced rhabdomyolysis and its genetic background

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It is known that methamphetamine (MA) causes rhabdomyolysis, myoglobinuria, and acute renal failure. We conducted an immunhistochemical study on the kidney of 22 forensic autopsy cases in which MA had been detected. In addition to the measurement of concentration of MA, immunohistochemical staining of myoglobin, HSP70, 8-OH-dG, 4-HNE, and SOD offers important information, such as rhabdomyolysis, to the diagnosis of MA poisoning. Then, we analyzed potential rhabdomyolysis-susceptibility genes in 18 autopsy cases of methamphetamine abusers. We examined mutations in the ryanodine receptor 1 (RYR 1), carnitine palmitoyltransferase II (CPT II), the very long-chain acyl-CoA dehydrogenase (VLCAD) and cytochrome P450 (CYP) 2D6 genes. Different RYR1 mutations causing amino acid substitution were identified in two cases. In the CPT II gene, there was new mutation in one case and there were mutations without changing its activity in 17 cases. In the VLCAD gene, there were mutations without changing its activity in 6 cases. In the CYP2D6 gene, 3 cases were homozygous for CYP2D6*10 which is associated with significantly reduced metabolic activity, while 2 cases carried an previously unreported different missense mutation. RYR1 mutations and new CPT II mutation identified in this study were not observed in control group. Genetically analyzed 18 cases were also investigated immunohistochemically to diagnose the possibility of rhabdomyolysis. However, there were no significant mutation reduced the enzyme activity in the suspected cases of rhabdomyolysis. These data suggested no obvious relationship between those genetic mutations observed in this study and rhabdomyolysis.

O 6
Variability of mitochondrial DNA mutagenesis in human blood – a pilot study

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Introduction. MtDNA mutations are known to accumulate with age in postmitotic tissues and have also been detected in blood and bone marrow. The aim of this study was to investigate whether mitochondrial mutations in blood are a consequence of (chronological) age – and thus a possible means of age determination –, or are mainly influenced by exogenous factors.
Methods. We analyzed mtDNA mutagenesis in blood of ten healthy persons over a time period of six month. We also monitored potential mutagenic influences (e.g. smoking, alcohol consumption etc.). Blood was drawn biweekly, and total mtDNA/nucleus-containing blood cell and deleted mtDNA were determined.
Results. We observed a strong intraindividual variation of mtDNA copy number and deleted mtDNA. Whilst mtDNA deletions were detectable in all investigated individuals at some point of the investigation, an age related increase of deletions could not be seen. A significant decrease of mtDNA copy number together with an increase in mutated mtDNA was found in a pregnant proband.
Conclusions. Taken together, mitochondrial mutagenesis in blood seems to be a very variable process and is rather influenced by exogenous factors than by the chronological age of an individual.

O 7
Future prospects in crime scene investigation – SNP analyses for (meta-)population differentiation in trace DNA

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Introduction. Predicting the geographical origin and externally visible characteristics such as eye or skin colour of an unknown individual just by investigating trace DNA found at a crime scene is a recent hot spot in forensic research. Momentarily it has no influence on casework in Germany because it is not allowed to investigate phenotypic characteristics from anonymous samples found at a crime scene. Nevertheless, if no identification is possible using conventional STR typing it could be helpful to gain additional information that tells something about the physical appearance of a suspect or possible victim.

Methods. Sixteen different SNPs selected from the literature because of their apparent association on population origin and/or eye and skin colour have been combined in two highly sensitive SNaPshot analyses. The differentiation power of the assays was determined by an analysis of more than 500 people from Northern Europe, North Africa, Sub-Saharan Africa, Near East, Turkey and Balkan states. In addition, artificially degraded DNA from simulated crime scenes has been included in the study.
Results. Both SNaPshot assays showed a detection threshold down to 50PG DNA allowing the successful typing of trace DNA in all cases analysed. Thereby, we found striking differences in the obtained SNP patterns when comparing persons from the different (meta)populations investigated.
Conclusions. Due to the high sensitivity of the presented SNaPshot assays it is possible to gain more information even out of highly degraded or only minute amounts of DNA. There are several cases in which this analysis might help to identify a victim or to find a suspect, especially if witness reports point to a possible origin from Africa or the Near East.

O 8
Differences in infant and child mortality in 7 counties in Northrhein-Westfalia

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Introduction. The state of Northrhein-Westfalia has – since many years – the highest infant and child mortality in Germany. Within the state there are huge differences: some counties have a rate of 2 per 1000 live births, while others have 8 per 1000 LB.
Methods. To be able to formulate hypotheses why the infant mortality is so different, the authors selected all death certificates from children up to 6 years from 7 selected counties over a three year time period. The three counties with the lowest infant mortality, two with an average mortality and the two with the highest infant mortality were selected.
Results. Out of 697 death certificates, 290 were excluded because the infants/children were from an other community. 407 death certificates were analyzed. Of those 234 were stillbirth or died on the same day. 30 infants died within the first 7 days (early neonatal mortality) and 24 died after 7 days but within 28 days (late neonatal mortality). After the 28th day and within the first year 63 infants died. Of these infants 10 died of SIDS, 5 died with the cause unclear and 9 still died because of prematurity. After the first year and under the age of 6, there were 46 infants the majority had a congenital heart disease.
Conclusions. Many of the death certificates were incomplete and incorrect. The major cause of death was prematurity. SIDS was reported in 10 cases and unknown in 5 cases in the first year.

O 9
Pregnancy-related deaths in forensic autopsy cases

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Introduction. Pregnancy-related deaths are a serious problem in so called less developed countries. In Germany, suchlike events are relatively rare and might lead to a medico-legal investigation, e.g. due to medical malpractice charges.
Methods. The archive has been reviewed for cases of pregnancy-related deaths that have been autopsied at the Institute of Legal Medicine in Giessen, Germany, during the last two decades. In every case, medical history, autopsy findings, results of toxicological investigations and histological findings, as far as carried out, were evaluated.
Results. A total of 14 cases of pregnancy-related deaths have been autopsied during the investigation period. The causes of death included pulmonary embolism, intracerebreal haemorrhage, pericardial tamponade, infections and birth incidents.
Conclusions. In cases of pregnancy-related deaths, autopsies are essential to clarify the cause of death and to decide if alleged medical malpractice is substantial.

O 10
Cardiac injuries of car drivers due to traffic accidents

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Introduction. Cardiac injuries have serious consequences and my have a fatal outcome. Traffic accidents may cause very severe blunt injuries on drivers. Cardiac contusions of drivers represent potential complications with fatal arrhythmia or heart failure without previous symptoms. Investigation of chest trauma of traffic accident victims needs a multidisciplinary diagnostic procedure.
Methods. There were 264 fatal motor vehicle accidents among car drivers evaluated in the forensic autopsy material between 2001 and 2010.
Results. Our results showed a significant proportion of cardiac traumatic injuries and contusion. In four cases a detailed anatomical and pathomorphological examination was performed. Post-mortem investigation detected a cardiac haemorrhage in the right and left atrial walls and in the pars muscularis of the interventricular septum. Histological examination revealed numerous haemorrhagic foci infiltrating the surrounding working cardiac muscle and conduction system with the involvement of the descending left bundle branches.
Conclusions. Size and location of blunt cardiac contusion during traffic accidents may cause ventricular arrhythmias and fatal outcome. Based on our results we emphasize that post-mortem histological examination of the conduction system in all fatal motor vehicle accident cases may substantially improve the accuracy of post-mortem diagnosis and may assist preventative strategies. Fast and accurate diagnosis of trauma patient is highly important. Cardiac injuries require a multidisciplinary team work with cardiologists, surgeons, trauma specialists and forensic pathologists.

O 11
Fracture of both superior horns of the thyroid cartilage due to accidental fall

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Introduction. The analysis of laryngohyoid injuries within living victims can be a very important tool for the understanding and forensic assessment of neck injuries. This case report presents an uncommon accidental fracture of both superior horns of the thyroid cartilage after a fall against a table.
Methods. A 55-year-old woman was admitted to an ENT clinic with painful swallowing and dysphonia. She reported to have tripped and fallen against a table, with her neck hitting the edge of the table. In the consequence, laryngoscopic, MR and CT imaging have been performed.
Results. The examination revealed an intralaryngeal hematoma and a fracture of both superior horns of the thyroid cartilage.
Conclusions. Fractures of the thyroid cartilage and/or the hyoid bone, especially if they occur bilaterally, are usually connected to choking, strangling, or hanging. The fact that suchlike injuries can also be caused by accidental falls should be taken into consideration when in-

terpreting autopsy or examination findings and should encourage ENT departments to share these cases with departments of Legal Medicine.

O 12
Legal implications of decubitus as indicator for the quality of nursing care

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Introduction. Our society is characterized by many signs of dramatic obsolescence. This fact leads to an increase of patients who are chronically ill, multimorbid, or mentally limited. Several of those patients are dependent on nursing care, either domiciliary/ambulatory care, or even in a nursing home. The quality of the nursing is differently judged, for the patients and any other person involved, it is rather difficult to find out if nursing is comprehensive and according to the existing standards.

Many of the patients are not able to express themselves anymore, so one is dependent on outer signs of inadequate nursing, such as insufficient personal hygiene, extreme malnutrition, or visible changes/inflammations of the skin. That is why the decubitus turned out to be an important indicator for nursing quality. If the diagnosis is "decubitus" the questions are:

– was inadequate nursing the reason for the origin of the decubitus?
– if treatment or nursing had been adequate, would or should the improvement of decubitus/pressure sore have been better?
– is a (criminal)complaint to be reported, and who is ultimately responsible and liable for the damage?

Methods. Complaint: if a decubitus has been diagnosed, the treating physician is, due to his oath of confidentiality, not allowed to give any information about it without consent. The situation is different, when the decubitus turns out to be so severe that there is a concrete suspicion of a crime, or other patients are in danger of inadequate nursing, too. If the decubitus is noticed by a medical examiner within the framework of a clinical autopsy, or the second inspection of the corpse (in case of cremation), the oath of confidentiality does not prevent him from giving information, because he acts by virtue of legislation, and because he had no relation to the patient, which is considered to be the foundation for an oath of confidentiality.

Results. *Criminal law consequences:* in case of a culpably caused decubitus the statement of facts of one of the bodily injury offences (§§ 223 ff StGB) could be fulfilled. If the patient died after having the decubitus a case of homicide (§§ 211 ff StGB) could also be fulfilled. But in most of the cases denial of assistance (§ 323 c StGB)is main focus of attention. Regarding the above crimes prosecution is abandoned in almost every case due to the requirement of causation. Because of the complexity of the human organism, it is almost impossible to predict with a probability bordering on certainty the success of a treatment (BGH NJW 1984,661). *Civil law consequences:* in civil law, liability aims at the payment of indemnity or compensation. The contract between the nursing home/institution and the patient provides the basis for the liability. The nursing home/institution owes the patient an adequate nursing/treatment, but not a special success, such as the restoration of health. Even if the nurse acted with intent, it does not have any effect on the contract/relation. In the center of attention is undisputably the documentation of the treatment and nursing. If the documentation is incomplete, or does not even exist at all, this leads to a reversal of the burden of proof, now the institution has to prove that the nursing/treatment was adequate and according to the standards.

Conclusions. The decubitus combines various problems, many different factors do play a role, and every case needs to be judged separately. There is no universal solution. Still the increasing number of appeals shows how sensitive the topic is, and that things must be improved. The cooperation between the IfR and the Hamburg Care Association (Hamburgische Pflegegesellschaft, HPG) aims at better quality and transparency in nursing, which would ultimately mean an improvement for everybody involved, but especially for the patients.

O 13
Deaths due to physical restraints in nursing care

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Introduction. Physical restraints are used primarily in cases of patients at a higher risk of falling, those requiring special care, with high motor activity, provocative behavior patterns as well as the intention of doing themselves harm, i.e. a risk of suicide. The incompetent and incorrect application of physical restraints can cause injuries of varying degrees, occasionally even leading to the death of the person thus restrained. A comprehensive investigation of such deaths, and the transparency this will give us, is our prime motivation.

Methods. From 1997 to 2010, a total of 27,353 autopsies were conducted at the Institute of Forensic Medicine in Munich. All deaths (n=26), traceable to physical restraints were analyzed retrospectively.

Results. While three patients under physical restraints died a natural death, and one did so through suicide, in 22 patient cases death could be traced back to the respective restraints alone (11× strangulation, 8× thorax compression, 3× lowered position of the head). In almost all cases of residents/patients (n=19) the restraints were incorrectly fastened or makeshift. Despite the correct application of an abdominal belt in the case of one resident, this led to strangulation.

Conclusions. To avoid deaths of this nature it is highly recommended from a forensic standpoint to exhaust the choice of alternatives to freedom-restraining measures. Should direct-contact restraints still be unavoidable choice, these must be fastened according to regulations and the restrained party be more closely observed.

O 14
I. Persistence of biological traces in gun barrels: an approach to an experimental model

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Introduction. Traces of backspatter in gun barrels after homicidal or suicidal contact shots can be valuable sources of forensic evidence. Yet, a systematic investigation of the persistence and durability of biological traces in gun barrels is lacking. Our aim was to generate a reliable model to emulate blood and tissue spatters in gun barrels generated by contact gunshots at biological targets.

Methods. In our study, we evaluated three different models: a gelatine based model with embedded blood bags, a model based on a spongious matrix soaked with blood and covered with a thin plastic membrane and a head model consisting of an acrylic sphere filled with gelatine and with blood bags attached to the sphere under a thin silicone layer. The sampling procedure was identical for all three models: several contact shots were fired through several types of guns and blood samples were collected after each shot by carefully probing the front and back end of the respective gun barrel with a sterile swab thereby avoiding to touch the muzzle. DNA was then extracted and quantified and up to 20 different STR systems were amplified to generate a DNA profile.

Results. Although sampling and amplification results were heterogenous between the models all models succeeded in delivering full STR-profiles even after more than one shot. Moreover, all models tended to understate the amount of blood spatter generated by contact gunshot as compared to real instances of repeated gunshots from casework routine.

Conclusions. Herein we present the heterogenous results from our model evaluation.

O 15
II. Persistence of biological traces in gun barrels: analysis after suicidal shots and subsequent firing

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Introduction. In suicidal shots typically the gun is held against the head with muzzle contact. In part of the cases endoscopic inspection showed biological traces in the barrel. PCR analysis yielded positive results in more than half of all cases. The aim of the following prospective investigation was to analyze if biological traces in barrels of suicidal fire arms were eliminated by subsequent firing.
Methods. After autopsy sterile swabs were used to collect samples from the anterior part of the barrel avoiding the muzzle. To refine the study, another swab was used to also collect sample from the posterior part of the barrel entering from the rear end. Then one shot was fired with the weapon using the same ammunition as in the suicidal shot. Thereafter the sample collection procedure was repeated. DNA was extracted using magnetic beads, quantified, and amplified using several multiplex-PCR-kits for STR amplification (ESI/ESX, NGM-SE, MiniFiler).
Results. In all 9 cases of suicide the result was positive: between 6 and 20 of 20 tested STR systems were successfully amplified. In 5 of 6 samples taken from the posterior part of the barrel sufficient STR systems for identification purposes could be amplified. No DNA was found in 3 cases after one shot had been fired. In six cases between 6 and 20 STR systems were amplified successfully. Notably, in one case results were better, with more STR systems amplified, after the cleaning shot.
Conclusions. The influence of the wiping process inside the barrel is discussed.

O 16
DNASF: a statistical package to analyze the distribution and polymorphism of STR loci in a heterogeneous population

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Introduction. Short Tandem Repeat (STR) markers are moderately repetitious DNA segments serving as a core sequence for the human identification. Their use as identification markers involves many technical and statistical issues. DNASF (*DNA Statistics for Forensics*) is a package of statistical programs specifically designed to analyze the STR polymorphism in a heterogeneous population.
Methods. *DNA Forensics*, a component of DNASF developed in *Visual Basic*, can compute a number of forensic parameters used to estimate the forensic utility of STR loci through allele frequency data. In this software each individual is defined on the basis of his/her paternal ethnicity and mother tongue. The parameters include genetic diversity, unbiased heterozygosity, shannon information index, polymorphism information content, probability of exclusion and power of discrimination. Other components include Microsoft excel worksheets which can compute statistical tests and parameters used frequently to analyze STR polymorphism. A worksheet *DNA AF* can compute the frequency and total numbers of alleles, homozygotes and heterozygotes of a locus, sample size and total no of chromosomes and a number of forensic parameters from genotype data. Other worksheets can perform the test of non random association between the loci, test of homogeneity of STR allelic distribution between the populations/subpopulations and independent sample t-test to detect a significant difference of STR allelic distribution between two populations/subpopulations.
Results. Each component of DNASF is made user friendly and provided with a set of instructions/user guide. All the component programs are loaded on DNASF webpage.
Conclusions. The package will facilitate statistical analyses of STR data for researchers working on heterogeneous populations.

O 17
Microfluidics meet forensics – screening assay for common European animal families

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Introduction. Microfluidic reaction platforms offer great potential for biomedical applications by enabling a precise control of minute liquid volumes in microstructured channels and reaction chambers. Opportunities for forensic genetics are enhanced sensitivity by reduced reaction volumes, and the chance of developing "Lab-on-a-chip" devices with integrated sample analysis and detection, also reducing the risk of contamination. To transfer the benefits of microfluidic technology to forensic genetic applications a highly sensitive *real-time*-PCR(qPCR)-based screening assay for common European animal families was projected running on a microfluidic polymer foil disk ("LabDisk") which is processed on a standard Rotor-Gene thermocycler.
Methods. The assay was designed to appropriately meet the needs of forensic genetic analysis and microfluidic demands. It includes a pre-amplification step using primers universally amplifying short fragments of the mitochondrial *12S rRNA* and *cytochrome b* genes also enabling a double-check. Animal families are detected in a nested qPCR employing family-specific primers with an intercalating dye, and melting curve analysis. The assay was tested on a preliminary centrifugal microfluidic disc.
Results. The assay allows screening for common European animal families/species (e.g. Bovini, *Sus scrofa*, Caprinae, Cervidae, Canidae, Felidae) and discrimination from human biological samples. Using an intercalating dye is adequately specific, sensitive, and cost-effective compared to TaqMan probes.
Conclusions. Forensic genetics may benefit from centrifugal microfluidics. The "LabDisk" approach offers the possibility to pre-load lyophilized assay components before sealing it prospectively enabling fully integrated and automated "ready-to-use" analysis.

O 18
Genetic variability and off-ladder allele of 15 autosomal STR-loci of Powerplex 16 system in the Yunnan Han population of China

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The Powerplex 16 system is widely applied in Chinese forensic laboratories. Using the Powerplex 16 system to detect the alleles of Yunnan Han population, we found that some alleles of this population are out off the ladder, called the off-ladder allele. In order to evaluate some off-ladder alleles and to get basic population-genetic indices for its use in forensic practice in the Chinese Han population, the allele frequencies and statistical parameters for 15 short tandem loci (TPOX, D3S1358, FGA, CSF1PO, D5S818, D7S820, D8S1179, TH01, vWA, D13S317, D16S539, D18S51, D21S11, Penta D, and Penta E) in the Powerplex 16 system were

analyzed in 20,204 unrelated individuals from the Han population of Yunnan Province in China were investigated. The allele frequencies were 0.000025 to 0.522743. According to the manufacturer's instruction the off-ladder alleles are discovered in 14 gene loci, totally 30 off-ladder alleles, in which 15 have not been reported yet. Most off-ladder alleles are in the FGA locus, the alleles in FGA and Penta E had higher frequencies: 0.01906 and 0.01732. The discovery of these off-ladder alleles has significance for the daily work in forensic biology. The observed and expected heterozygosity, power of discrimination, polymorphic information content, the combined matching probability, the power of exclusion, and the other population-genetic indices were calculated.

O 19
Sudden death in type II Diabetes mellitus – a possible role of nodal apoptosis

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Introduction. Diabetes is known to be associated with an increased risk for sudden cardiac death, often due to an arrhythmic event (usually, but not always ventricular fibrillation). Apoptosis has fundamental roles in the development of the electrical conduction system, but is increasingly recognized to be involved in numerous cardiovascular events.
Methods. Using histological and immunohistochemical techniques we try to demonstrate the involvement of the caspase apoptotic pathway in death mechanisms.
Results. We document a plausible mechanism for the development of bradyarrhythmia/atrioventricular blocks in diabetic cardiomyopathy where the caspase apoptotic pathway is involved.

O 20
Molecular pathology of posttraumatic pulmonary edema in forensic autopsy

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Introduction. The lung is vulnerable to trauma; pulmonary edema starts quickly as part of the systemic response. The present study investigates the molecular pathology of pulmonary edema in forensic autopsy cases of various fatal injuries.
Methods. Autopsy cases of blunt head injury (n=14), other blunt injury (n=18) and sharp instrument injury (n=16), as well as acute cardiac death (ACD, n=15) for controls, were examined (total n=63; within 48 h post-mortem; survival time, <48 h). TaqMan real-time RT-PCR was employed to quantify mRNA expressions of aquaporin-1, 5 (AQP-1, 5), matrix metalloproteinase-2, 9 (MMP-2, 9), claudin-5 and intercellular adhesion molecule-1 (ICAM-1).
Results. In sharp instrument injury cases, the subacute death group, which had higher lung weight, showed higher AQP-1, MMPs, claudin-5 and ICAM-1 mRNA levels than the acute death group. In non-head blunt injury cases, lung weight was higher in subacute deaths, which showed higher MMP-9 mRNA than acute deaths. In blunt brain injury cases, subacute deaths showed higher MMP-2 mRNA levels without a significant increase of lung weight, compared to acute deaths. ACD cases had higher lung weight than acute injury death cases, but the above-mentioned markers remained low.
Conclusions. The present study suggests different mechanisms of pulmonary damage after injuries, involving the increased permeability of microvascular endothelia, damage to extracellular matrix (ECM) and endothelial tight junctions, and inflammatory responses of pulmonary endothelia; these responses were most evident in sharp instrument injury, milder in bunt injury with a difference between head and non-head injury, and insignificant in ACD.

O 21
Molecular autopsy: case studies of sudden unexplained death

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Introduction. (SUD) At autopsy about 4% of sudden deaths remain unexplained, a quarter is suspected to be related to inherited cardiac diseases. In the present study arrhythmia-related genes in cases with unexplained sudden death were investigated.
Methods. Using polymerase chain reaction, denaturing high-performance liquid chromatography and direct DNA sequencing, mutation analysis was conducted for six LQTS related genes (*SCN5A, KCNH2, KCNQ1, KCNE1, KCNE2, KCNJ2*) and 18 Exons of the *RyR2* gene encoding the cardiac ryanodine receptor.
Results. In the cases presented the cause of sudden death of a 33 years old woman and 20 years old boy was not elucidated by autopsy. Using post-mortem-molecular screening, the LQT-3 associated mutation Il768V was identified in the cardiac sodium channel gene SCN5A of the woman. This defect seems to be of heterozygous nature. Voltage clamp studies on the expressed ion-channel revealed that this mutant enhances the recovery from the inactivation state of the channel, which increases the channel availability. Thus, this mutation alters the "window" that is critical to maintain the plateau phase of the cardiac action potential. In the case of the boy, a novel missense mutation in the KCNJ2 gene (coding effect A371G) encoding the inwardly-rectifying potassium channel was detected. Mutations in this channel are very rare and are associated with LQT 7 (Anderson-Tawil syndrome) and the short LQT-syndrome.
Conclusion. An accurate diagnosis derived from molecular autopsy may provide the pathogenic basis for SUD and establish the cause of death. Research on the genetic basis of sudden cardiac death and investigating the molecular mechanism that lead from the gene defect to the clinical phenotype will help to prevent sudden cardiac death.

O 22
Molecular analyses of long QT and Brugada syndromes in SIDS cases by Sequenom MassArray® system

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Sudden Infant Death Syndrome (SIDS) is the major cause of infant mortality in industrialized countries and discussed to be a multifactorial disorder, influenced by potentially predisposing genetic factors. Developments in molecular genetic testing have led to the theory that inherited cardiac disorders such as the long QT and Brugada syndromes may play important roles in the appearance of SIDS. The majority of relevant mutations is identified in the three genes KCNQ1, KCNH2 and SCN5A. We analysed a total of 40 SIDS cases that occurred in the

catchment area of the Institute of Legal Medicine, Cologne between 2005 and 2010. Each of the included cases revealed negative results at autopsy, toxicology, histology and – by definition – fulfilled the criteria of SIDS. 433 mutations of the main three genes were investigated in 38 multiplex reactions by Sequenom MassArray® system to enlight a possible association of SIDS and congenital cardiac arrhythmias.

O 23
Value of PSA- and AP-tests performed on post-mortem swabs from the genital and anal region

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Introduction. Prostate-specific antigen (PSA) and acid phosphatase (AP) tests are used as a screening method for the presence of semen in forensic medicine, although post-mortem application of PSA and AP-tests might be limited.
Methods. PSA-tests, AP-tests and microscopic examinations were performed on swabs from 100 deceased (80 males, 20 females). In each case, swabs from different defined localizations were examined (males: glans, urethra, perianal region, anal; females: vagina, perianal region, anal).
Results. In males, PSA and AP-tests showed positive results in 15% (anal) to >70% (urethra), while microscopic examination revealed presence of semen almost exclusively in the genital region (glans and urethra) in up to 38%. In females, 1 case showed a positive testing for PSA and AP in the perianal region, while all other swabs and the microscopic examinations were negative.
Conclusions. PSA- and AP-tests on post-mortem swabs from the genital and anal region of male cadavers are of limited informative value concerning the presence of semen and/or questions concerning preceding sexual activity.

O 24
Immunohistochemical detection of human sperm in post-mortem forensic samples utilizing the Sperm HyLiter Kit

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Introduction. An important evidence of sexual assault (SAE) is the detection of spermatozoa in forensic samples, confirming the ejaculation of sperm. In general, microscopic inspection of SAE forensic samples following histological standard sperm-staining techniques (e.g. hematoxylin/eosin (H/E) staining) has to face the difficulties that (i) these staining methods are not sperm-specific and (ii) depend on the classical morphology of the sperm for a successful identification. Therefore, false-positive cells may be "recognized" as sperm or "real" sperm cells might be overlooked. Recently, the commercially available SPERM HY-LITER™ Kit has been shown to improve the specificity as well as the sensitivity of histological sperm detection by utilizing a human sperm-specific antibody coupled to a fluorescent dye under various conditions [1].
Methods. Here, the SPERM HY-LITER™ Kit was employed to test the application of this immunohistochemical detection system in *post-mortem* forensic samples obtained from oral, rectal, vaginal and urethral swabs.
Results & Conclusion. Application of the SPERM HY-LITER™ Kit was shown to successfully detect sperm in different *post-mortem* forensic samples.

References
Miller KWP et al (2011) Journal of Forensic Sciences, Developmental Validation of the SPERM HY-LITER™ Kit for the Identification of Human Spermatozoa in Forensic Samples

O 25
Post-mortem endoscopy: an opportunity for a minimal invasive autopsy?

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Introduction. Autopsies ordered by the public prosecution department belong to the lawfully task of each forensic institution within Germany. Moreover, administrative and/or scientific sections take place. Due to the increasing non-consent of relatives caused by the idea of irreversible defacements of the deceased the frequency of these kind of sections have been decreasing permanently. As a result of these circumstances post-mortem endoscopy could create new ways towards the Minimal Invasive Autopsy, so called MIA.
Methods. At the forensic institute of the University Medical Center Hamburg-Eppendorf deceased with positive family consent for an autopsy got an esophagogastroduodenoscopy (EGD) and/or an endosonography (EUS) of the upper gastrointestinal passage within the scope of a pilot study. 15 deceased between 20 and 97 years were evaluated. The Post-mortem Interval (PMI), the time between death and endoscopy ranged between 4.5 and 23.5 hours.
Results. In 12 of 15 cases a total gastroduodenoscopy has been completed. Leftovers in the stomach in two cases and a so called fishhook-stomach in one case anticipated complete gastroduodenoscopy. Following pathological findings have been verified: Refluxesophagitis (3), GI-bleeding caused by duodenal ulcer as well as cardia rupture (2), MALT-lymphoma of the stomach (1), Extraction of gastric secretion was taken for toxicological tests in one case of intoxication. In 4 of 15 cases an additional endosonography of the upper GI tract took place. Ultrasound imaging of mediastinal adjacent structures and vessels as well as pancreas, bile duct, liver, left kidney and left suprarenal gland was feasible. In one case a pancreas carcinoma sonographically appearing as low echo density mass in the corpus region and additionally positive lymph nodes could be identified. In 2 of 15 cases an endoscopic inspection of the abdomen and peritoneum as well as a biopsy of the liver and peritoneum via trans-gastric access could be realized.
Conclusions. The post-mortem endoscopic assessment of esophagus, stomach and duodenum describes one step to the target of MIA. Endoscopic ultrasound enlarges the spectrum and evaluation of adjacent organ and tissue structures. New access points via the GI passage enable the endoscopic evaluation of intraabdominal and mediastinal organs.

O 26
Virtual endoscopy of chest and abdomen injuries

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Introduction. Injuries by accidents and by diagnostic and therapeutic procedures are often difficult to demonstrate. Clinicians are more used to Diagnostic Imaging than to photos and descriptions obtained in autopsy. It is intended to show that Virtual Endoscopy has the potential to demonstrate injuries due to trauma in the chest and abdomen, and that this form of visualization may contribute to therapy planning and to quality control of diagnostic and therapeutic procedures.
Methods. The own material (3000 post-mortem PMCT since 2008) has been reviewed. Virtual Endoscopy (Osirix TM) was applied to visualize injuries of the chest and the abdomen, when air had entered

or when decay gas had had developed, and the inspection of the organs in the chest and the abdomen became possible.
Results. In the chest, ruptures of the lung, the pericardium, the heart, and the thoracic wall could be visualized. In the airways foreign bodies could be seen. In the heart lesions of the valves, the septum and the myocardium could be demonstrated. In the abdomen, perforations of the intestine were observed by virtual endoscopy.
Conclusions. Virtual Endoscopy offers the clinician the inspection of a local trauma due to an accident, a disease or to a diagnostic or therapeutic procedure. It can be performed when air or decay gas are present, it is possible too, to inject air to perform Virtual Endoscopy. The treating clinician encounters a site similar to that of an operation. After surgery or invasive procedures, the physician can compare the visualized findings with those he wanted to achieve or with those that he wanted to treat. This is different to the comparison with findings obtained in autopsy.

O 27
Evaluation of the cardiac damage in cases of fatal traumatic brain injury

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Introduction. Alterations of the cardiovascular function in cases of severe traumatic brain injury (STBI) have been reported and investigated in experimental and clinical settings. Numerous pathophysiological mechanisms have been indicated as responsible of the cardiac damage i.e. massive catecholamine discharge or hypoxemia. Also the acute rise of the pulmonary arterial pressure is considered as an important mechanism of cardiac damage in cases of STBI, however in the literature we could not find any specific study dealing with the pathomorphology of the right ventricle and the comparison between the right and left ventricular cardiac damage in such cases.
Methods. In this study we investigated a group of 21 cases of fatal traumatic brain injury (6 f, 15 m, mean age 42.6 y) compared to a group of 19 cases of fatal pulmonary thromboembolism (12 f, 7 m, mean age 59.9 y) and to a group of 21 cases of hanging (7 f,14 m, mean age 48.1 y). In each case samples from both ventricles were stained with HE and a series of signs of fresh cardiac damage was investigated (hypereosinophilia, contraction bands, fragmentation of the fibers, wawing, myocytolysys, nuclear discoloration, interstitial edema). Furthermore we also investigated and compared the expression of the immunohistochemical markers Fibronectin and C5b-9.
Results. The results show a tendency to a prevalent right ventricular damage.
Conclusions. These results are discussed in the light of the literature.

O 28
Forensic aspects of post-mortem histological detection of amniotic fluid embolism

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Introduction. Amniotic fluid embolism (AFE) continues to be one of the most feared and devastating complications of pregnancy. Over 50% of postpartum patients who had AFE exhibited a profuse haemorrhaging as the first symptom of an AFE leading to a clinical diagnosis of atonic uterine bleeding. A detection of AFE has every now and then a relevant implication on medico-legal aspects of intrapartum or postpartum maternal death, occurring many days after birth. The diagnosis of AFE may explain an unfavourable train of events, which led to the death and discharge the medical staff from the accusations by relatives. A reliable diagnosis of AFE can be made only on histological examination. However there are only isolated reports in the literature concerning the detection interval of amniotic fluid elements after their transfer into the lungs. The object of this study was therefore to determine how long after the onset of clinical symptoms the elements of amniotic fluid may be detectable in the pulmonary circulation.
Methods. Between 1996 and 2010 post-mortem examinations were performed on 31 women who died intrapartum or postpartum. The medical records were studied for gestational age, the mode and complications of delivery as well as a cause of death in every case of maternal death. In some cases information about the clinical presentation, for example the narrations of relatives with regard to the onset of symptoms, was extracted from the investigation files. A toxicological examination and alcoholometry were performed to identify a potential intoxication. Samples of lung, brain, heart, liver, kidney, uterus and placenta from every woman were examined histologically. Sections were routinely stained with H&E, EvG, prussian blue staining, PAS and LFB-PAS. Immunohistochemical staining was performed for the optimal visualisation of the amniotic fluid components and their localization.
Results. Amniotic fluid embolism was diagnosed in 9 women (30%). The mean age of the women was 32 years (median 32 years). The maximum survival time of the women with AFE and also the detection interval of AF in the pulmonary vasculature was 36 h. In the lungs of the women who did not die on AFE, amniotic fluid components were not found.
Conclusions. In women, who die some days or even weeks after delivery as a consequence of a haemorrhagic shock following postpartum genital bleeding ensuing from uterine atony, AFE should be considered as a cause of a coagulopathy. Evidence for a physiologic occurrence of AFE was not found.

O 29
In blood we trust! – Five years of bloodstain pattern analysis at Frankfurt-University

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Introduction. In Germany, investigators and courts have increasingly recognized the importance of bloodstain pattern analysis at crime scenes in recent years, resulting in its increased use.
Methods. All 46 expert opinions on bloodstain patterns from the Institute of Forensic Medicine at J. W. Goethe University, Frankfurt/Main, Germany, from 2006 to 2010 were retrospectively analyzed and their significance for legal appraisal and jurisdiction was examined by reviewing relevant investigation and court records (n=36).
Results. Of 46 victims 43.5% (n=20) were female and 56.0% (n=26) male, average age: 44.6 years. Offenders were female in 8.9% (n=4) and male in 91.1% (n=42) cases, average age: 35.5 years. In 30.4% of the cases (n=14) blunt force, in 43.5% (n=20) sharp force, in 26.1% (n=12) a combination was applied. Offenders using blunt force were all male. 39.1% (n=18) of the cases happened during wintertime (December to March). 80.4% (n=35) of crime scenes were indoor. In 35 cases (76.1%) the course of action was reconstructed. Courts followed these results unreservedly in 26 cases (74.3%). In the remaining cases courts did not refer directly to the expert opinion, however, did not present a contrary view.
Conclusions. The expert analysis of bloodstain patterns at crime scenes plays a key role in reconstructing the crime and is thus an important link in the chain of evidence in assault and homicide cases. The synoptic assessment of the injuries and bloodstain patterns by a forensic physician is essential.

O 30
Fungi in autopsies – a potential health hazard?

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Introduction. Fungi can lead to severe infections even in the immunocompetent host. Also several filamentous fungi may elict hypersenisitivity e.g. asthma. During forensic autopsies no special safety precautions are taken, when fungal growth is noted, due to missing safety standards. The aim of the present study was to evaluate, which fungi can be found during autopsies, and whether these fungi may be a health hazard for the examiner.
Methods. The study represents a review of the literature of pathogenic fungi found on exhumed corpses, mummies, and on bodies found in the environment.
Results. Fungi identified to the species level and belonging to the risk group 2 were *Acremonium strictum*, *Aspergillus flavus*, *Aspergillus fumigatus*, and *Pseudallescheria boydii*. Some authors identified the fungi only to the genus level. Fungi identified to the genus level including genera with species belonging to risk group 2 were *Candida* sp., *Fonsecaea* spp., *Monilia* spp., *Penicillum* spp., *Phialophora* spp., and *Trichosporon* sp. Fungi identified to the genus level including genera with species belonging to risk group 3 were *Cladophialophora* spp. and *Scopulariopsis* sp.
Conclusions. Pathogenic fungi found in forensic autopsies can belong to the risk group 2 and could possibly belong to the risk group 3. These fungi may cause severe infections in humans. Further studies on fungi found in a forensic background are warranted, with a particular attention on the identification of the fungi to the species level.

O 31
Challenging the authority of the autopsy in coronial investigations

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Introduction. The central purpose of this paper is to address the tension between legal and medical discourses within the coronial/medico-legal system. In the context of a death investigation, medical expertise, manifest through the knowledge gained in an internal autopsy, is positioned as contributing the more valuable facts of the case, especially when contrasted with the evidence gathered at the scene of the death. We challenge this taken for granted understanding of medical knowledge in three ways: first, we examine the aspects of the history, philosophy and consequences of the processes by which the medical model gained its current dominance; second, we challenge the assumption that internal autopsy adds value to the death investigation, by utilising data from our own research in Australia; and finally, we engage with the debate about the purpose of a coronial/medico-legal investigation and role of an internal autopsy within that system.
Methods. In 2006 all closed paper Queensland Coronial files for 2004 were examined by a team of non-medical researchers. A range of information was coded, from predictive capacity at autopsy to objection raised by families along with the mre traditional such as number and type of deaths, region where the death was investigated and the place where the body was found. These 2500 deaths were then coded and placed in a large data base.
Results. In this paper the relevant results are that, non-medical researchers are able to predict, with a large degree of certainty and without the need for internal autopsy, both the manner and cause of death in death by suicide and death by accident (91.6% and 99.1% respectively).
Conclusions. It may be time to rethink the reflex use of internal autopsy within the coronial system.

O 32
The French eHealth policy

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Introduction. France's health system relies on multiple actors such as health insurance, more than 300,000 professionals including general practitioners, pharmacists and laboratories; 4000 hospitals representing more than a million of employees. In 2000, the World health Organization considered the French health system as the best worldwide. Still, major gaps remain in terms of access due to social and geographical disparities. With a deficit exceeding Euros 11 bn, health expenditures grow faster than national wealth. In 2004, the French Government announced a national healthcare information technology (IT) program, composed of: the Sésam Vitale Smartcard and France's Electronic Health Record (EHR) – the "Dossier Médical Personnel" (DMP). France is one of the forerunners in the European Union designing a legal framework adapted to the use of eHealth with Denmark, England, Estonia, Finland, Norway, Scotland, Slovak Republic and Sweden. This paper gives an overview of the French e-Health Policy till March 2011 concerning the governance of eHealth (1), the deployment of eHealth applications (2) and of the infrastructures (3).
Methods. It seems that the development of this lead market, which the European Union has supported for many years, is gaining momentum. In January 2009, President Sarkozy declared that telemedicine is a national priority. Prime Minister Fillon asked legislator Pierre Lasbordes to make national policy recommendations. In November 2009, the French Representative formulated 15 recommendations in his report to the Ministry of Health on e-Health development. The Hospitals, Patients, Health, territories Law (or Bill Bachelot) is the first stage of the Hospital 2012 Plan, launched by French President Sarkozy, which aims at revamping of the French health care system. The bill aims for guarantee a better and equal access to care for all French people, whatever their geographic location. Article 78 amended the French Public Health Code and confirms telemedicine's legal basis (Art. L 6316-1 of the Public Health Code). A national telemedicine plan will be adopted by the end of 2011.
Results. The centre-piece of the French healthcare IT program is its national web-based electronic health record (EHR) program. The French DMP will deliver patient care and patient safety benefits and cut fraud and save the state Euros 2–3 bn per year. According to the forecasting institute OPECST, the cost of rolling out the DMP throughout all French hospitals and general practice surgeries may actually exceed Euros 10 bn. The DMP is administered by ASIP Santé, responsible for planning the program, selecting vendors and supplier management. The DMP is also overseen by the National Council for Information and Liberty (CNIL), a government body concerned with civil liberties and data protection. The phase of piloting and testing of concepts has largely passed and the system is being rolled-out since December 2010 like in the Netherlands, where the general practitioners' record is already in use regionally, but a national federation of data is still pending.
Conclusions. The interest to use eCards as a token for professional ID and as access means to eHealth systems has increased considerably in recent times, from only 7 countries reporting such activities in 2007 to 18 in 2010. The healthcare professional card in France is currently shifting from being based on an older numéro ADELI (*A*utomatisation *DE*s *LI*stes), a 9 digit identifier for all healthcare professionals including social workers and psychologists – which is composed from administrative data and stored currently on the healthcare professional card (CPS) – towards a system where the ID is provided through a recently installed "Distributed repository of healthcare professional data" (RPPS). The distribution of the new eCard for healthcare profession-

als, which provides higher ID security through electronic access to the RPPS, has already begun for certain groups of healthcare professionals such as hospital doctors. ASIP Santé plans to distribute 800,000 new cards to health professionals (including pharmacists and midwives). The health professional shared directory ensures the reliability of personal data contained on the cards.

O 33
Cuticular muscle attachment sites as species determination tool in blow fly larvae

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Introduction. The essential task of forensic entomology is the calculation of the post-mortem interval (PMI) based on insects and their larvae collected from the body found at a crime scene. Blow flies are among the first colonizers, the age of their larvae therefore correlates closely to the PMI. Interspecific morphological similarity of the larvae and differences in growth rate make species determination an essential requisite for an exact PMI calculation.
Methods. A new method for species determination in third instar larvae is introduced, based on light microscopic visualization of the cuticular attachment sites of a limited number of transversal muscles. After removing the muscles and staining the cuticle the attachment sites become visible as laterally symmetrical segmental clusters of dark "dots".
Results. The patterns of five clusters, located in the 2nd, 3rd and 4th segment, show sufficient differences to allow reliable separation of larval *Lucilia sericata, Lucilia illustris, Calliphora vomitoria* and *Calliphora vicina,* the most common saprophagous blow fly species in Europe.
Conclusions. Species specific muscle attachment sites enable forensic entomoologists to determine the species even in damaged or discolored larvae.

O 34
Molecular identification of forensically important fly species in Germany using COI barcodes

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Introduction. DNA-based insect identification has become a routine and accurate tool in medicolegal entomology. In the present study we demonstrated the utility of the mitochondrial DNA *cytochrome oxidase I* gene "barcoding region" as universal marker for molecular identification in forensic entomology.
Methods. Eighty specimens belonging to 13 forensically important Diptera species originating from Frankfurt am Main, Germany were analyzed (*Calliphora vomitoria*, *C. vicina*, *Lucilia sericata*, *L. ampullacea*, *L. silvarum*, *L. caesar*, *L. illustris*, *Phormia regina*, *Protophormia terraenovae*, *Parapiophila vulgaris*, *Hydrotaea dentipes*, *H. similis*, *H. ignava*).
Results. Intraspecific variation ranged between 0–1.17% and interspecific variation occurred between 1.17–15.21%. The overlap in divergence percentages is due to high intraspecific variation within the piophilid fly *Parapiophila vulgaris* and the low interspecific nucleotide divergence of the recently evolutionary separated sister species *Lucilia caesar* and *L. illustris*. However, all species formed distinct monophyletic clades.
Conclusion. The COI barcode is suitable for clear differentiation and identification of forensically relevant Diptera in Germany.

O 35
Morphological and histological tools for the age estimation of necrophagous blowfly pupae

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Introduction. The estimation of the post-mortem interval in forensic entomology is based upon the calculation of immature insects, mainly blowflies, which are developing on the decomposing body. About 50% of this immature development is spending in the pupal stage of the fly, which is still difficult to handle regarding its age estimation. We present morphological and histological milestones for the pupal development for two important forensic blowfly species, *Calliphora vicina* and *Lucilia sericata*.
Methods. We reared *Calliphora vicina* and *Lucilia sericata* at 25°C. Pupae were treated different regarding the following procedures. Pupae every 24 h in about 70°C hot water, the shells were removed with scalpel and forceps and pictures were taken. At the same time other specimens were weighted and a third group was fixed in formalin, cut in 7 µm slices and stained with hematoxylin and eosin.
Results. We give character sheets for the pupal morphology of both species, defining and describing 10 morphological milestones for pupal development like the colorization of the eyes and the development of the body bristles. Additionally, we quantify the loss of weight during metamorphosis (up to 20.9% for *C. vicina* and 15.9% for *Lucilia sericata*), analyzing the larval nucleus volumes during the first day of histolysis (reduction of about 25%) and counting the adipocytes during pupal development (reduction of ca. 40% for *L. sericata* and ca. 52% for *C. vicina*).
Conclusion. This preliminary study introduces new tools for estimating the different stages of the pupa. Further experiments will consider more temperatures and evaluate the characters in field studies.

O 36
Automated identification of male cells on samples from victims of sexual assault

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Introduction. Detection of sperm in crime scene samples is an important step in the process of confirming sexual assault in cases of rape. Manual screening of microscope slides is time-consuming and labor-intensive. This holds especially for slides which contain only a small number of sperm cells. Automation can save time and lead to significantly shorter case processing times. Here we present a system for unattended detection of sperms as fast, yet reliable alternative to the tedious visual sample inspection.
Methods. The automated slide scanning platform Metafer was used as a basis for a microscope-based sperm detection algorithm. Cells are identified based on morphology and color. Detection of sperms is possible either in samples stained with Kernechtrot Picoindigocarmine (KPIC or *Christmas Tree*) stain or in fluorescent samples.
Results. Results showed that sperms are reliably detected in samples with various qualities. Additionally each target object is documented as gallery image, connected with data on quality and with coordinates of the cell. Users can re-locate cell positions for visual inspection. Coordinates can be linked to a laser microdissection system to easily extract cells from samples for subsequent analyses.
Conclusions. Imaging automation for sperm detection, based on the slide scanning platform Metafer, can be a huge time saver for forensic analyses. In addition the comprehensive documentation lets results be verifiable and thus be more reliable than manually obtained findings.

O 37
Thanatopractical processing of decayed corpses and bodies recovered from water in order to improve the quality of fingerprints

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Introduction. Even in times of fast and ongoing development of molecular genetic methods fingerprints are often used to identify unknown corpses. Advanced decay may considerably complicate or even preclude the commonly used method of fingerprinting by softening of the finger pads and formation of washerwoman's skin. Thanatopractical processing allows morphological reconstruction of even advanced decayed bodies by extracting fluids from the body's tissue and restoring the antemortem volume and tenseness.
Methods. To address the question how and to what extent thanatopractical processing can improve the fingerprinting in advanced decayed bodies we investigate the quality of fingerprints in such cases after preparation of the decayed tissues by thanatopractical methods.
Results. Within approximately one hour after the treatment (15 minutes at best) we were able to take fingerprints of all the decayed fingers of all deceased. The condition of the finger pads did not change for at least 5 hours. The analysis of the fingerprint sheets by authorized dactyloscopic experts of the State Office of Criminal Investigation showed the applicability of the gathered fingerprints for identification purposes. Furthermore, the fingerprints were applicable for data entry into AFIS (Automated Fingerprint Identification System).
Conclusions. The application of thanatopractical processing is a promising approach to improve the chance of identification by fingerprints even in cases with advanced decay.

O 38
Estrogens in human remains. A new method for forensic science?

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Introduction. During an excavation of a medieval churchyard in Völklingen (Germany) eight individuals with grave goods were found. These grave goods archaeologically characterised the individuals as women who died in childbed. Near the pelvic girdle of two of the individuals bones of fetuses were recovered. Therefore the question arose whether the other six women also died due to complications during pregnancy or childbirth. This can only be answered by analytical methods. During pregnancy the blood serum of a woman shows increased estradiol values. These should also be represented in the bone matrix.
Methods. From the eight potential women in childbed and 18 control individuals bone samples were taken. To draw an external comparison samples from two women with fetuses in their pelvic girdle as well as one woman and man from a medieval cemetery in Hettstedt (Germany) were also taken. Additionally from both sites soil samples were analysed for their estradiol content to exclude contaminations. The bone samples were prepared following a revised method developed by Zierdt (2005). Estradiol was extracted and the concentration was detected by radioimmunoassay.
Results. Three of the four women with foetuses and five of the eight potential women who died in childbed as well as two women from the comparison group showed estradiol-content over 100 pg/ml. The estradiol content of the comparison group showed lower values between 30–60 pg/ml.
Conclusions. The results of the chemical analysis show that it is possible to identify women who died during their pregnancy or in child bed with this applied chemical method. The influence of diagenetic processes and other factors (e.g. pathology) will be discussed. In the future this new method can help answer questions in forensic and historical context which seemed to be unresolvable so far.

O 39
Myoglobin – its availability in forensic medicine

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Myoglobin (Mb) is a heme protein, which exists in the cytosol of striated muscle and plays an important role in the supply and storage of oxygen in this tissue. This protein was crystallized from the equine muscle in 1932 and the 3-dementional structure of sperm whale Mb was clarified firstly among proteins in 1958. This globular protein consists of 153 amino acids, which sequence was clarified in many animal species including human, and has a small molecular weight of approximate 17,500. In the end of 1970s, the development of radioimmunoassay made it possible to detect a minute amount of Mb in blood and it has been introduced in the clinical laboratory investigation for the diagnosis of myocardial infarction. In the field of forensic medicine, it was pointed out in 1970s that blood Mb level increased post-mortem. After that, its concrete concentration in the blood or other body fluids of the corpse, post-mortem diffusion into the interstitial tissue or neighboring organs, stability in some poor conditions, e.g. putrefaction, and some other issues were discussed to evaluate the meaning of analyzing this protein for the forensic diagnosis –determination of the cause of death, estimation of the time after death, examination of stains left at crime scene, etc. In the lecture the availability of qualitative, semiquantitative or quantitative analysis of Mb in autopsy materials or biological stains in forensic medicine and sciences is presented.

O 40
Signaling pathway of macropinocytosis by methamphetamine in human neuroblastoma cells

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Introduction. The acute and chronic abuse of methamphetamine (METH) causes serious adverse events in humans. In forensic toxicology, although drug analyses for METH in various tissues have been established, molecular mechanisms of tissue injuries by METH remain to be elucidated. We previously showed that macropinocytosis, which is an endocytosis, by METH treatment might play an important role in neuronal cell death. In this study, we investigated the molecular mechanisms of macropinocytosis by METH.
Methods. We used retinoic acid-differentiated human neuroblastoma SH-SY5Y cells. In viability assays, METH (7 mM) was added directly into the culture medium and incubated for 24 h. For fluorescence microscopy, cells were treated simultaneously with METH and 70 kDa FITC-dextran for 2 h. Transient transfection was performed using lipofectamine 2000 and GFP fluorescence was observed under a fluorescence microscope. Cells were assessed for the activations of cathepsin L by western blotting assays.
Results. We found that macropinosomes were colocalized with GFP-Ras and GFP-Rac1 during METH treatment. Both Ras inhibitor, farnesylthiosalicylic acid (FTS), and Rac1 inhibitor, EHT1864, inhibited the formation of macropinosomes by METH. Proteolytic activation of cathepsin L was decreased by METH treatment. These events were

partially inhibited by nocodazole, a microtube interfering reagent. Nocodazole also significantly decreased METH-induced cell death.
Conclusions. These results show that METH may cause cytotoxic effects by inducing lysosomal dysfunction through Ras and Rac1-mediated macropinocytosis in cultured neuronal cells. Our results will render basic information for METH-induced neurodegeneration and cell death in relation to forensic histological and biochemical examinations.

O 41
Molecular pathology of apolipoprotein E4 in human brain with regard to traumatic stress

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Introduction. Apolipoprotein E (ApoE) is known as a marker of degenerative diseases of the brain; however, there appears to be poor evidence regarding the responses to acute traumas. The present study investigates the molecular biological response of ApoE to fatal insults.
Methods. Tissue specimens were collected from the parietal lobe, hippocampus and midbrain substantia nigra of forensic autopsy cases (n=129): injury (n=40), mechanical asphyxia (n=18), drowning (n=6), intoxication (n=12), fire fatality (n=22), hypothermia (n=6), hyperthermia (n=7), acute cardiac death (ACD, n=5), and other natural diseases (n=13). TaqMan real-time RT-PCR was employed to quantify $ApoE_4$ mRNA expression, and neuronal immunopositivity was also examined.
Results. Apo-E_4 mRNA level was higher in the midbrain than in other sites, without post-mortem change, gender-related difference or age dependency at each site. The expression in the midbrain was lower for ACD than for other groups, and an especially a high level was detected for fire fatality, hypothermia and hyperthermia. These groups also showed a higher level in other sites, whereas ACD cases had a lower level. The expression was low in the parietal lobe for mechanical asphyxia, but was high in the parietal lobe and midbrain for head injury; however, there was a decrease in parietal lobe level depending on survival time ($R=0.702$, $p<0.05$). Neuronal $ApoE_4$ immunopositivity showed large case variation, independent of the cause of death.
Conclusions. The present study suggests up-regulation of $ApoE_4$ in the brain after traumatic stress, which was most evident in the midbrain and for traumas involving thermal stress.

O 42
Post-mortem CT-angiography versus conventional autopsy: what's the best?

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Introduction. Post-mortem CT-angiography (PMCTA) has been introduced into forensic investigations during the last years. It gives findings and documentation with the opportunity of consulting the data later. Conventional autopsy gives responses to the cause of death but provides limited possibilities for a second examination. This study compares these two procedures and defines findings that can be detected exclusively by one of them.
Methods. The study was performed retrospectively by comparing radiological and autopsy reports of 50 forensic autopsy cases. PMCTA was performed using a modified heart-lung machine and the oily contrast agent Angiofil®. All autopsy and radiological findings were extracted from the reports for statistical analysis.**Results.** Our study shows that the results of PMCTA and conventional autopsy are very similarly. However, some findings can better or exclusively be visualized with one of them. PMCTA shows a higher sensitivity for skeletal and vascular lesions. Conventional autopsy does not detect small bone fractures and the exact source of bleedings in places with anatomically limited access. However, it gives more information about organ morphology and remains the only way to diagnose a vital vascular occlusion.
Conclusions. Generally, PMCTA and conventional autopsy are showing similar results. However, both techniques present specific advantages and disadvantages that have to be known in order to correctly interpret the findings and to define the indication for PMCTA. The recently introduced post-mortem CT-angiography can reveal important findings, not visible at conventional autopsy. However, some diagnosis such as vital vascular occlusion should still remain autopsy-diagnosis rather than radiological ones.

O 43
Are you allowed to scan? Legal requirements for clinical-forensic imaging

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Introduction. Radiological imaging establishes new possibilities in forensic medicine. Particularly, the implementation of radiologic imaging applications into the field of clinical-forensic medicine opens up new perspectives for the evaluation and documentation of injuries, and for the securing of evidence by the experts. However, the judicial quality of medico-legal findings won by radiologic imaging does not only depend on medical and/or radiologic drawbacks and opportunities. Their value in court is primarily defined by legal requirements.
Methods. Legally, there are important differences between imaging for the purpose of clinical diagnostics on one hand and for exclusively forensic reasons on the other hand.
Results. Purely forensic scanning has to meet higher requirements: The scan has to be ordered by a public prosecutor who needs the authorisation from a judge. Therefore, it is necessary, that the considered imaging method meets the required legal criteria: For the use of x-ray or computed tomography (CT) the rigid laws and provisions concerning radiation protection have to be brought into focus, which merely permit the application of ionising radiation only for medical purposes. Therefore, the clinical-forensic practice of Magnetic Resonance Imaging (MRI) as an examination method without ionising radiation seems to be highly advantageous for judicial purposes.
Conclusions. In the practical example of a case study and its possible variations an overview of the Austrian legal framework in the field of clinical-forensic imaging will be given and discussed.

O 44
Correlation of forensic examination and radiology for the detection and characterization of traumatic scalp injuries using clinical cerebral MSCT and multiplanar reconstruction

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Introduction. The purpose of this prospective study was to evaluate the rate of detection and classification of traumatic soft tissue injuries of the head using clinical multislice computed tomography (MSCT) and to compare it with an external forensic examination.
Methods. 31 patients (22 females, 9 males; mean age 72.7 years; age range 21.1–96.1 y) with scalp injuries after blunt head trauma and clinically indicated cerebral MSCT-scan underwent an external examination with documentation of the morphological appearance and localization. The MSCT-data were read and evaluated by a board certified

radiologist blinded to the results of the external examination using axial images as well as multiplanar reconstruction (MPR) tools for an exact report of external and internal pathological findings of the head. The results of the radiological and forensic report were compared and analyzed.

Results. The forensic examination detected 34 soft tissue lesions. The radiological report described 37 pathological findings of which 19 concerned the soft tissue of scalp and face, and 18 were intracranial lesions and fractures. Our results show an agreement in 54.8% of all external findings. Regarding morphological criteria all lacerations and 70% of the hematomas were correctly identified radiologically, whereas the diagnosis of swellings and abrasion was difficult. 28 findings were diagnosed only externally of which 15 were superficial abrasions.

Conclusions. Depending on morphological criteria, size and location of soft tissue injuries of the head the forensic-radiologic evaluation of clinical MSCT scans is a valuable method to retrospectively supplement external forensic examination in living persons after traumatic incidents.

O 45
Visualization of myocardial infarction in post-mortem CT-angiography

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Introduction. Multiphase post-mortem CT-angiography (MPMCTA) permits to visualize the vascular system of the head, thorax and abdomen in detail which allows performing vascular diagnosis with very high sensitivity. This advantage can be used to examine coronary arteries in cases of sudden cardiac death. In some of those cases, a pathological enhancement of the myocardium can be observed that may correspond to the morphological finding of myocardial infarction. The aim of this study is to investigate the possibility to identify a myocardial infarction by MPMCTA.

Methods. We investigated retrospectively 10 cases of myocardial infarction on which a pre-autopsy MPMCTA has been performed. In all cases the diagnosis was performed by macroscopic and histological analyses. MPMCTA was executed using the oily contrast agent Angiofil and following a standardized protocol. The presence or absence of myocardial enhancement and its distribution was investigated by a forensic pathologist together with a board certified radiologist.

Results. In all cases a pathological enhancement (mean Hounsfield Units ≥100) of the myocardium was observed in regions which correlated with the localization of the infarction. While the arterial phase mostly showed a diffuse enhancement of the concerned myocardium, it was more concentrated in the subendocardic layer during the venous and dynamic phase.

Conclusions. By investigating the presence and distribution of a pathological enhancement of the myocardium, it is possible to recognize myocardial infarction after MPMCTA with the contrast media Angiofil. This presentation describes the aspect of the radiological image and compares it to macroscopic and histological findings.

O 46
Emergency medicine techniques at autopsy – update

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Introduction. Emergency medicine procedures require invasive iatrogenic manipulations on the patient, which are to be evaluated at autopsy regarding their correct execution.

Results. Within this field of medicine, apart from well-known procedures (endotracheal intubation, chest tube drain insertion, external chest compression and cannulation of central and peripheral veins) also increasingly alternative techniques are established, especially concerning supra- and infraglottic emergency airway management tools (laryngeal masks, laryngeal tubes, combitube), the application of pharmaceutics (intraosseous infusion systems) or the management of haemorrhagic shock (tourniquet, pelvic sling).

Conclusions. We give an overview of current emergency medicine techniques in order to access their autoptic evaluation.

O 47
Liability for medical negligence in Australia – the wheel turns full circle

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Introduction. An important requirement resting on a doctor to avoid an action for negligence is to provide his/her patient with sufficient information to make an informed decision as to whether to submit to treatment or not. The test to determine whether this requirement was met or not was formulated in the famous "Bolum rule". The Bolum rule was accepted as part of Australian Common Law and served as the test for adequate disclosure until the High Court decision in Rogers v Whitaker (1992) 175 CLR 479.

Methods. In order to give effect to the Bolum rule it required the court adjudicating the matter to defer to the evidence given by a peer group of the defendant doctor. If the evidence so led was credible the court would duly defer to their professional opinion. The downside of this was the influence of so-called "rogue experts" and the paternalistic protection of "brother" doctors by their peers to the detriment of their patients. The decision by the High Court of Australia in Rogers v Whitaker swept away the Bolum rule. The court declined to defer to the evidence led by the organised profession. This rejection of Bolum brought Australia into line with practice in Canada and the USA. This state of affairs continued until the catalyst decision of the High Court in Cattanach v Melchior (2003) HCA 38. In this case the High Court by a slender majority of 4–3 dismissed the defendant's appeal. He had been found liable of negligence in the court-a-quo for a negligently performed sterilization. The trial judge awarded "damages" for birth and confinement and costs of raising the child until it turned 18.

Results. The Legislature in Australia reacted strongly and decisively to the Melchior decision by passing the Civil Liability Act 2003 QLD. Section 49A of this Act stipulates that following the birth of a child due to a failed sterilization: "A court cannot award damages for pure economic loss arising out of the costs ordinarily associated with rearing or maintaining a child."

Conclusions. Thus by limiting a Court's discretion to reject peer evidence from fellow doctors this legislation returns Australia back to adhering to the Bolum rule. A retrogressive step in my opinion and one which panders to the insurance lobby.

O 48
Unusual complicated diaphragmatic hernia

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Introduction. Obstructed congenital diaphragmatic hernia is rarely seen in adults and commonly misdiagnosed.

Methods. This is a case-report of an obstructed congenital diaphragmatic hernia of a man that involved a large part of the abdominal contents. The patient was brought to the hospital after complaining of gastric pain and vomiting. Examination revealed only gastric tenderness. He was treated gastritis and was planned for discharge. Later on his

general condition worsened. An X-ray showed an unclear radioopacity at the left chest and mediastinal shift to the right. The patient lost conscious and was declared dead after a long reanimation.

Results. Autopsy showed a large diaphragmatic hernia filling most of the left chest cavity and shifting the mediastinum to the right. The Hernia was containing the whole stomach, the proximal dudenum, the distal 11 cm of the illeum, about 68 cm of the large intestine (the whole ascending colon and half of the transverse colon) as well as the attached omentum and mesentery. The organs were fixed in their location and partially twisted. There was a ruptured chronic ulcer at the fundus of the stomach as well as 3 dudenal ulcers. Inside the hernia there was 700 ml of thick brown muddy stomach content and there were signs of early peritonitis.

Conclusions. There exist few case-reports about obstructed congenital diaphragmatic hernia in adults but none described the involvement of such a large portion of the GI-tract. Treating-teams should be more suspicious in cases of acute abdomen with atypical Chest X-ray findings.

O 49
Current development of pressure ulcer prevalence in Hamburg

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Introduction. In all civilized countries the proportion of very old people increases constantly. Changes in medical care and in the elderly care are connected with this situation. Because of this we examined the conditions under which people in Germany (Hamburg) "ages". In a prospective study the pressure ulcer grade III and IV (SHEA classification) are documented during the second inspection of the corpse in cooperation with the Hamburg care association (Hamburgische Pflegegesellschaft, HPG). The results are compared with previous studies of the Institut für Rechtsmedizin Hamburg-Eppendorf (since 1999) in order to show the development of pressure ulcer prevalence.

Methods. In the crematoria Öjendorf, Stade, Lüneburg and Tornesch all decubitus lesions grade III or IV of Hamburg deceased (>60 years) are documented prospectively using a documentary form during the second inspection of the corpse. About 200 cases of pressure ulcers can be expected in the current study period of one year. The decubitus lesions are evaluated for localization, wound care, place of death and the deceased's medical history. In addition, the results are compared with the results of the HPG and unusual cases are followed up.

Results. The results demonstrate the following trend of decubitus ulcer prevalence grade III and IV: The group of people, who are older than 80 years, is to 2/3 affected. Furthermore, the results show that there are more pressure ulcers with increasing age. Possible connections for a higher grade decubitus lesion are presented: for example, socioeconomically deprived have more decubitus lesions than other people.

Conclusions. Strategies to avoid pressure ulcer are developed. Furthermore, we expect to evaluate the interdependencies, complementarity and vulnerability concerning the system in cooperation with the HPG. Altogether the results of this study can optimize the preparedness of care attendants and the medical treatment situation of very old people can be improved.

O 50
Post-mortem evaluation of brain disorder and detection of ABO blood group antigens by immunohistochemistry

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It is sometimes difficult for forensic pathologists to evaluate the brain disorder such as schizophrenia or dementia at autopsy. We examine the hippocampus formation using immunohistochemical staining at the cases in which information about brain disorder of an individual was obtained from the police at the autopsy. Ten years ago we firstly reported the existence of the spherical carbohydrate deposits, which were completely different from corpora amylacea, in the molecular layer of the dentate gyrus in the hippocampus formation obtained from individuals with schizophrenia or cognitive disorder. In this presentation I will show the carbohydrate deposits detected by lectin staining, and 3D figures of senile plaques stained by antibody against beta-amyloid in hippocampus formation. I will also show the detection technique of ABO and its related antigens in human tissues. The technique was developed during my stay in Münster, Germany.

O 51
Bone marrow-derived stem/progenitor cells in wound age determination

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Introduction. Skin wound healing is am orchestrated biological phenomena consisting of three sequential phases, inflammation, proliferation, and maturation. Various kind of cells are involved in the process of wound repair, and this short and simplified overview of wound healing can be adopted to determine wound vitality or wound age in forensic medicine.

Bone marrow cells and skin wound healing: Several lines of accumulating evidence demonstrated that bone marrow-derived stem cells/progenitor cells were essentially involved in tissue repair including skin wound healing. Bucala and colleagues found a new population of bone marrow-derived progenitor which expressed both leukocyte (CD45, CD13) and mesenchymal antigens (collagen I, fibronectin); they are called "fibrocytes" with a potential for the differentiation to myofibroblasts. In unwounded specimens, CD45+/Col I+ fibrocytes were not detected. A dual-positive fibrocytes were initially detected in skin wounds with a post infliction interval of 4 days, and their number increased in lesions with advances in wound age. Asahara have found endothelial progenitor (precursor) cells (EPCs). EPCs are positive for certain cell surface markers, such as CD133, CD34, and low concentrations of VEGF receptor-2. Our experimental evidence suggests that these cells can participate in angiogenesis during skin wound healing. Here, we would like to propose the detection of EPC could give significant information for wound age determination. Collectively, the detection of several kinds of bone marrow-derived stem/progenitor cells would be useful for wound age determination.

O 52

Forensic application of intrarenal aquaporin-2 expression for differential diagnosis between freshwater and saltwater drowning

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Introduction. Aquaporins (AQPs) are a family of homologous water channel proteins. In this study the expressions of AQP1, 2 and 4 were immunohistochemically examined in kidney samples to evaluate their forensic applicability to differentiate between freshwater drowning (FWD) and saltwater drowning (SWD).
Methods. Kidney samples were fixed in 4% paraformaldehyde solution buffered with neutral phosphate-buffered solution (PBS; pH 7.2), and embedded in paraffin for sectioning (4-6µm). Hematoxylin and eosin (H&E) staining was carried out for routine histological analysis. For immunohistochemical analyses, deparaffinized sections were immersed in 0.3% H_2O_2 in methanol for 30 min to eliminate endogenous peroxidase activity, followed by incubation with PBS containing 1% normal serum corresponding to the secondary IgG and 1% bovine serum albumin (BSA) to reduce nonspecific reactions. The sections were incubated with rabbit anti-human AQP1 pAbs (1:2000), goat anti-human AQP2 pAbs (1:1000), or rabbit anti-human AQP4 pAbs (1:1000) at 4°C overnight. The immune complex for AQP1 and AQP4 was detected with Envision+ goat anti-rabbit labeled polymer HRP (Dako Cytomation, Kyoto, Japan) at room temperature for 1 hour. AQP2-positive signals were detected with the LSAB system (Dako Cytomation).
Results. AQP1 was expressed in the proximal tubules and glomeruli, and AQP4 was localized in the collecting ducts. However, there were no significant differences in AQP1 and AQP4 expressions among FWD, SWD and control groups. Immunohistochemically, AQP2 was predominantly expressed in the apical plasma membrane of the collecting duct principal cells in all kidney samples of FWD and SWD. Morphometrically, AQP2 expression at the apical plasma membrane of collecting ducts was significantly enhanced in SWD group, compared with FWD and control groups. On the other hand, AQP-2 expression was significantly lower in FWD group than in control group. Moreover, in drowning cases, there was no correlation between post-submersion intervals and AQP expression.
Conclusions. Finally, post-submersion intervals between 0.5 and 30 h had no significant affects on intrarenal AQP expression. Thus, when we encounter drowning cases without sufficient supportive data for FWD or SWD, immunohistochemical analysis of intrarenal AQP2, in conjunction with other markers, will greatly contribute to the differential diagnosis of FWD and SWD.

O 53

Immunohistochemical examination of intracerebral aquaporin-4 expression and its application for differential diagnosis between freshwater and saltwater drowning

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Introduction. When drowning is diagnosed, further differentiation is also an indispensable aspect of forensic practice with respect to determination of freshwater drowning (FWD) or saltwater drowning (SWD). There are many studies on differentiation between FWD and SWD. In the present study, we immunohistochemically examined AQP1 and AQP4 expression in human brain, and discussed its suitability for post-mortem differentiation between FWD and SWD.
Methods. Human brain samples were collected from 70 autopsy cases including 22 freshwater drowning (FWD), 26 saltwater drowning (SWD) and 22 non-drowning cases as controls. Then, immunohistochemical study combined with morphometry was carried out in order to examine the differential expression of AQP1 and AQP4 in the brain samples.
Results. Immunohistochemically, star-shaped cells bearing highly branched processes, often surrounding blood vessels, showed positive reactions for AQP1 and AQP4 in FWD, SWD as well as control groups. Additionally, With double-color immunofluorescence analysis, AQP1- or AQP4-positive cells could be identified as GFAP-positive astrocytes. Moreover, AQP1-positive reaction was also observed in blood vessels. Morphometrically, there were no significant differences in AQP1 expression in astrocytes or in blood vessels among the three groups. In contrast, the average value of AQP4-positive astrocytes was significantly higher in FWD cases than in SWD and control groups. Moreover, AQP4 expression was significantly lower in SWD than in the control group ($p<0.05$). Moreover, there was no significant correlation between post-submerged interval and AQP expression in drowning cases.
Conclusions. Immunohistochemical analysis of intracerebral AQP4 expression would be useful for differentiation between FWD and SWD.

O 54

Medicolegal and clinical significance of rib fracture due to the collision of the scapula: shoulder scapula rib type of injury

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Introduction. We sometimes encounter at medicolegal autopsy of dead bodies an injury at a distant point from the position where an impact force acted. We examined autopsy cases with rib fracture due to external impact force at the back region which was transmitted through the scapula.
Methods. We have examined eight cases with rib fractures by the collision of the scapula. The age of subjects was 47 to 84 years old, seven cases were males and one female. The causes of death were homicide, traffic injury and falling down. We have checked the site and number of rib fracture.
Results. The total number of rib fractures in each case was one to eight. The site of rib fractures was mainly at the dorsal wall in the thoracic cavity close to the vertebral column, and adjoining ribs were broken. There are mostly poor findings of injury on the skin surface. However, multiple rib fractures, which occurred in some distance from the collision site of the external force on the skin surface, was observed in a victim with a slight bruise on the suprascapular region.
Conclusions. An external blunt trauma on the back region of the chest causes a rib fracture through the collision of the scapula. The rib fracture transmitted from the scapula with impact of the shoulder (SSR Type) seems to be significant not only in medicolegal practice but also in the examination at a hospital.

O 55

Artefacts of post-mortem angiO CT

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Introduction. Multiphase post-mortem CT angiography has become a routine examination in the Institute of Legal Medicine in Lausanne. The results of this investigation are contributing to the medico-legal expertise. Therefore, the correct interpretation of the radiological images is of highest importance. But do post-mortem tissues react in the same way as living tissues to contrast agent? Does the perfusion produce any artefacts?

Purpose. The purpose of this study was to index and identify these artefacts on different predefined sites.
Methods. The presented retrospective study was performed on the data of 50 post-mortem multiphases CT-angiographies. Artefacts were identified and reported separately for each of the three phases of angiography (arterial, venous, dynamic) by an advanced radiologist. Statistic analysis compared localization and number of artefacts between the three phases.
Results. The most common artefact is the non-perfusion of parts of the cerebral venous system, followed by the formation of a layer between the contrast agent and remaining blood in the lumen of specific vessels, mostly the thoracic aorta. An enhancement or edematisation of the gastric mucosa could be observed regularly
Conclusions. In order to better interpret post-mortem CT-angiography, it is important to know the artefacts that can appear by using this technique. Our results show that artefacts are reproducible which makes them easily identifiable. Our study is the first to define in a systematic way these artefacts which should be known by physicians interpreting such examinations.

O 56
Post-mortem computed tomography and computed tomography angiography in the evaluation of cranial and spinal injuries in victims of motor vehicle accidents

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Introduction. Motor vehicle accident victims can suffer from multiple lesions which cannot always be detected by the classical forensic examination of the body. CT scan and CT angiography could then be used for this purpose, in order to identify those failing information.
Methods. Between October 2008 and December 2010, 45 consecutive victims of motor vehicle accidents underwent whole body CT scan. 22 of them also underwent whole body CT angiography, by using femoral intra-arterial and intravenous injection of contrast media. The lesions concerning the cranial and spinal regions were analyzed and compared with autopsy examination.
Results. 37 of 45 victims showed involvement of the cranial and spinal regions. CT scan identified skull fractures in 18 victims, skull base fractures in 19, maxillary and facial fractures in 16, fractures of the cervical spine in 12 and of the dorsolumbar spine in 18, subarachnoid haemorrhage in 19, intraventricular, cerebral and subdural haemorrhages in 9, and cerebral edema in 8. Autopsy failed to identify all cervical spine fractures and the detail of complex fractures of skull base and maxillary region. CT angiography identified traumatic dissection of intracranial carotid artery in 4 victims, of the external carotid artery branches in 3, and of distal intracranial arteries in 2. None of these lesions were identified on autopsy. 4 victims showed aortic trauma.
Conclusions. Post-mortem CT scan and CT angiography allow a precise detection of multiple lesions in the cranial and cervical region not visible during autopsy, particularly cervical fractures and cranio-cervical vascular trauma.

O 57
Post-mortem arteriography – own experiences

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Introduction. To obtain additional information based on post-mortem CT arteriography examination. The Chair of Forensic Medicine of Jagiellonian University Medical College in Kraków is the first forensic medicine institute in Poland applying post-mortem imaging techniques.
Methods. Routine post-mortem CT examinations have been carried out from the year 2009, reaching over 140 cases. Previously only native (without contrast medium) CT had been performed. However, from the beginning of the year 2011, the research programme post-mortem CT arteriography was started.
Post-mortem MSCT arteriography had been applied using a specially prepared, self-made pumping machine. In cases of traffic accidents victims the contrast medium (hydrophilic or hydrophobic) was given to the lower limbs. In cases of stab wounds victims, the contrast was given to the whole body. In both types of examination the access to the femoral vessels had been used. Post-mortem MSCT had been performed prior to a conventional forensic autopsy, with the slice thickness 0.75 mm for the head and neck and 1.5 mm (or 1.0 mm) for the remaining parts of the body. DICOM files obtained from the CT acquisition were analyzed using a computer program Osirix, with the implementation of cross-sections and three-dimensional (3D) reconstructions.
Results. The results are presented in the form of selected cross-sections and 3D animations, confronted with photographs taken during conventional autopsies.
Conclusions. Analyses and reconstructions based on post-mortem CT arteriography has shown that such technique is able to broaden not only the diagnostic capabilities of conventional forensic medical examination, but post-mortem native CT.

O 58
Post-mortem MSCT examination: reconstruction of bullet tracks of the head including multiple reflection of the projectile

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Introduction. To obtain additional information by virtual reconstruction and visualization of bullet tracks of the head based on post-mortem MSCT examination.
Methods. Routine post-mortem CT examinations were carried out from the year 2009 at the Chair of Forensic Medicine of Jagiellonian University Medical College in Kraków, including all the cases of firearm and post-explosion injuries. In such cases acquired CT data are the basis for cross-sections and three-dimensional (3D) reconstructions and animations for the purpose of visualization of projectile tracks. In selected cases, DICOM files obtained from CT acquisition with the slice thickness 0.75 mm for the head and neck, were analyzed using a computer program Osirix, with the implementation of cross-sections and three-dimensional (3D) reconstructions and animations.
Results. The results are presented in the form of selected cross-sections and 3D animations.
Conclusions. As shown on presented examples, reconstructions of bullet tracks based on post-mortem MSCT in firearm injuries of the head should be recommended as a golden standard in forensic medical investigation.

O 59
Examination of ballistic head models by magnetic resonance tomography

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Introduction. The conventional analysis of ballistic gelatine is performed by transillumination. This might be difficult if head models are to be examined. The usefulness of computed tomography (CT) had

been shown by previous research. The aim of this study was to find out if magnetic resonance tomography (MRT) can facilitate the examination of head models.
Methods. Four head models were prepared: acryl hollow spheres, 14 cm in diameter each, were covered with a 3 mm thick layer of silicone. These spheres were filled with 10% standard gelatine. The head models were shot at 4°C using a pistol (calibre 9×1 mm9) loaded with expanding bullets. The shooting distances varied from 4 m to muzzle contact. The head models were examined with a Siemens Sonata MRT. Then the gelatine core was removed from the sphere. The bullet track was photographed and cut into consecutive slices of 1 cm thickness which were scanned optically. Images were analyzed on a personal computer with AxioVision and the DICOM viewer.
Results. The disruption of the gelatine within the head model could be shown by MRT. The air filled star like tears were well contrasted against gelatine. The evaluation of the gelatine cracks along the bullet track in MRT images and optical scans gave comparable profiles with a significant difference between shots from distance and those with muzzle contact.
Conclusions. However, reliable measurements in MRT images are only possible within the first three hours because the tears are resealing and thus vanishing in MRT.

O 60
Myocardial infarction visualized by post-mortem 3T magnetic resonance imaging – do we see the sudden cardiac death?

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Introduction. Recently, post-mortem 3T magnetic resonance imaging (pmMRI) has been introduced into forensic routine practice in Zurich. Cases with a history indicating a possible natural cause of death by cardiac failure undergo a pmMRI examination with special focus on the heart.
Methods. So far 100 pmMRI examinations of the heart were performed in situ using adapted T1-, T2- and proton density weighted sequences with and without fat suppression and in short axis orientation. The pmMRI examination was prior to autopsy, which was performed the following day. Cardiac dissection at autopsy was adapted to imaging by slicing in base parallel slices. Correlation of myocardial autopsy finding to imaging findings was carried out. Correlation of imaging findings to coronary autopsy findings was performed as well. Histology (H&E, CAB, EvG) was used to confirm morphological and imaging findings.
Results. The appearance of chronic, subacute and acute infarction visualized by post-mortem 3T MRI will be presented. A further series of cases will be introduced that showed myocardial MR findings that well correlated to sudden coronary events detected at autopsy but that lacked myocardial findings at autopsy and histology. These cases were interpreted as peracute ischemic events appearing as a sudden cardiac death.
Conclusions. Myocardial infarction can be detected by 3T pmMRI and age staging of the infarction is possible. Post-mortem 3T MRI may visualizes the affected myocardial tissue in sudden cardiac death even when macromorphology and histology still remain without pathological alterations.

O 61
Heat shock protein expression (Hsp 70) in kidneys in sudden infant death

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Introduction. In industrialized countries sudden infant death is the most common cause of death in children in the first year of life. The most known risk factor is sleeping in prone position, but also hyperthermia seems to be an important factor. However, pathognomonic findings of pre-mortal hyperthermia do not exist, only the circumstances of discovery, e.g. high ambient temperature, warm clothing or covering, increased body temperature or sweating may be indicative. It is known that in case of stress, including thermal effects on the body, the expression of heat shock proteins increases as a cell stress response.
Methods. Renal tissue was examined in 54 cases of sudden infant death. In all cases competitive pathomorphological and chemical-toxicological findings could be excluded. These cases were compared to 29 deaths of fire or fire-related heat.
Results. In all cases of sudden infant death the expression of Hsp70 was negative, in contrary to the positive reaction of Hsp 70 in all cases of the reference group.
Conclusions. The cause of lack of expression of Hsp 70 in cases of sudden infant death is discussed.

O 62
Expression of heat shock protein (Hsp) 27 and 70 in various organ systems in case of the death due to fire-related effects

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Introduction. Heat shock proteins are formed under physiological conditions and in case of cellular stress (even by thermal influence). In 1962, heat shock proteins were firstly described in relation to heat. It should be verified whether a quantitative change in the expression of heat shock proteins 27 and 70 occurs in relation to the survival time in death cases due to fire and whether this can be detected by immunohistochemistry.
Methods. 53 death cases comprising short and long survival times were compared with a control group (100 cases) showing various causes of death, but without effects of hypo- or hyperthermia and possibly increased pre-mortem stress. Heart, lung, kidney and tissue from the central respiratory tract were examined. The immunohistochemical reactions were allocated semiquantitatively to a 4-degree scale.
Results. Tubular cells, blood vessels and tissue of the central respiratory tract were found to be tissues responding rapidly to hyperthermic effects in fire deaths showing high graduations. Hsp 27 and 70 are expressed rapidly following exposure to heat. A certain correlation between the levels of Hsp 27 and 70 expression (as a function of the organ examined) and the survival time after fire exposure was found.
Conclusions. The validation of Hsp-expression represents a useful support of the current methods used in order to determine the vitality in fire deaths, but heat shock proteins are also found to be expressed in other causes of death, but showing a different expression pattern.

O 63
Answering questions about the inherent limitations in paediatric forensic pathology

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Introduction. The misinterpretation of a pathologist's findings potentially leads to miscarriages of justice. Recent inquiries in paediatric

forensic pathology highlight the importance of understanding the inherent limitations of this field.
Aim. To develop a conceptual framework that describes the inherent limitations of paediatric forensic pathology relevant to the investigation of a child's death.
Methods. A collaborative interdisciplinary group comprising a forensic pathologist, internal medicine physician, criminologist and public health fellow worked iteratively to develop a framework. This group discussed and debated case where intentional harm is under consideration such as battered baby syndrome, head injury from short falls and separate existence.
Results. The fundamental premise of the framework is that determining the cause (including the manner) of death is made by contributions from several professional groups, i.e., death investigators, pathologist, experts and judiciary who interact with each other in a context that is influenced by the legal system, societal expectations and the available scientific research knowledge. Six domains may influence interpretation of the pathologist's findings: the training and pathologist's approach, work environment, scene information, conduct of the autopsy, scientific research studies and perspective of person using the information. The spectrum within each domain is explored to illustrate the inherent limitations in paediatric forensic pathology; and the challenges facing pathologists to ensure different professional groups interpret the pathology findings within their limitations. A series of questions to assist pathologists prepare for the different professional groups who may not understand the limitations in paediatric forensic pathology was formulated.
Conclusions. The boundaries of forensic pathology must be understood by non-pathologists to optimise the judicial investigation and findings

O 64
The situation of the judicial authentication disputes on forensic medicine in China

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Nowadays more and more judicial authentication disputes have been happening in forensic judicial expertise work in China. Therefore, the possible reasons leading to it, basing on the authors' working experience, and the possible effective ways of preventing the judicial authentication disputes on forensic work should be discussed. The paper introduces three cases on judicial authentication disputes, discusses the current forensic judicial dispute situation existed in China, and illustrates the relevant common reasons. Effective ways of preventing the judicial authentication disputes on forensic work are suggested.
In the author's opinion, the common reasons leading to a forensic judicial dispute may be as follows. The forensic judicial dispute appears due to the result of an unsatisfactory forensic judicial expertise work itself and may come from the forensic procedure due to the normal body damage by a forensic examination and autopsy. A forensic judicial dispute will also appear due to absence of „forensic informed consent" in a forensically identified case and due to the confines or limitations of the identified situation or the current forensic work. Finally, a forensic judicial dispute may occur due to different opinions from the different specialties of the forensic institutes, and the imperfections of the current judicial system.
About the treatment of preventing from a forensic judicial dispute should be as follows. We should always remember the forensic identifier's duty and responsibility as a forensic practitioner. We should also know that at any time judicial mistakes may occur in forensic work and will lead to a judicial dispute. We must study hard and continuously in order to keep our professional skills and we must sign up the relevant appointment certificate and other documents before the forensic work. At any time we should do not forget the „informed consent" issue in forensic work. Communicating with the relatives of the deceased is often a good way for preventing judicial disputes by the family members. We need to appeal to the nation and its government departments for providing sufficient funds to strengthen forensic medical post-mortem examination under the relevant judicial condition. I insist that in our nation an identification-grade system should be effectively established. The title of a technical or professional post system for the judicial identification and the evaluation committee of professional titles should be established immediately in China. We should ask the Chinese government to improve the regular qualification-checking and examining system, both for individuals as well as the institutes. Finally, as an urgent request to the government the activity of collecting fees for forensic judicial identification and any other judicial work should be banned..
In our opinion, any judicial cause should be a public cause serving the public. The phenomenon of young identifiers and newly established institutes dominate the forensic identification system by trade bribing and must be changed.

O 65
The results and reflections of young teachers' training in „the national premier course construction on forensic pathology"

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Course construction in the comprehensive medical university is very important for undergraduate teaching evaluation. In the procedure of a course construction, teachers' training is very important. Therefore, as a comprehensive medical university, the Kunming Medical University has done a lot in teachers' training, especially in young teachers, which we believe is one of the most important tasks of course-construction. In the last five years, the course of „Forensic Pathology" in Kunming Medical University has got the fame of „National Premier Course on Forensic Pathology", which was issued by the Chinese Education Department in 2007. The paper discusses the history of young teachers' training of „The National Premier Course Construction on Forensic Pathology" in Kunming Medical University and the results and the reflections of young teachers' training in the forensic field.

O 66
The present situation of judicial expertise system in China

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Judicial expertise is a process to verify facts by technical means, which is the premise of impartial judicature. With the promulgation and implementation of „The Decision on the Management Problem of Judicial Expertise" (the short form known as „The Decision") issued by the Standing Committee of the NPC, the direction of the Chinese judicial system is established. Over several years practice, we have achieved some experience, but there are still many problems with the forensic science system in China such as the management system, the implementation system of judicial expertise and the application system of identification, which restricts the justice.

1. Justice

In order to realize the justice, the main bodies of the judicial administration organs, identification institutes and subjects of judicial expertise opinion should keep its own respective function of independence.

It is especially necessary to keep the identification institutions and judicial expert witness independent. „The Decision" requires that the above three institutions should be independent, but the judicial expertise agencies established by the criminal investigation organs are not registered by the judicial administration organs which results in the overlapping of the judicial prosecution and the judicial expertise activities. Meanwhile, the right for starting the appraisal procedures of the criminal investigation organs has been enlarged and the clients right of applying for the appraisal is deficient. This affects the ascertainment of facts and results in the reduction of both public confidence in expert opinion and procedural efficiency.

2. High Efficiency

Nowadays, there are many factors restricting judicial expertise efficiency. The first one is the difference of ability and credibility of forensic science practitioners. The second is that the technical standards and specification are outdated or not unified. Thirdly, all kinds of judicial expertise agencies do not perform the same judicial expertise procedures. This leads to the repeated appraisals or different judicial expertise conclusions for the same fact, which wastes judicial resources. Therefore, it is necessary to improve the current situation of judicial expertise in our country. The accreditation of the laboratories and inspection bodies is an important way.

3. Authority

The judicial administration organ is only given the right of registration and administration of the identification institutes and the appraisers, therefore it is impossible to reach the authority of judicial expertise administration system. Because the access and selection mechanism of judicial expertise agencies is less perfect, it leads to disorder, competition and it has serious impacts on the authority of the judicial implement system.

The cross-examination pattern consisting of the party, agent, identification subject and expert auxiliary is unsound, the quality of expert opinion cannot be improved and facts cannot be accurately evaluated.

O 67
Gene expression changes after chlorpromazine administration in mouse heart

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Several chloropromazine (CPZ)-related deaths have been suspected in forensic autopsies, but these are difficult to identify precisely because only low concentrations of CPZ can usually be detected. Patients on CPZ therapy exhibit various cardiovascular diseases, such as arrhythmia and cardiomyopathy. Thus, we investigated the mRNA expression of Immediate Early Genes (IEGs), which were induced before any other genes, after single and chronic CPZ administration in mouse heart. We showed that the single treatment induced IEGs such as *C-Fos*. This induction was not observed after repeated administration suggesting that the transcriptome is altered after the chronic administration. So, we examined the transcriptome after the chronic CPZ administration with microarray-analysis. The analysis revealed that the expression of many transcriptional factors, metabolic enzymes and potassium channels (PCs) related genes changed. The PC related genes were classified into rapid and slow types. Our findings showed that the expression of the slow PC channel related genes increased, and on the contrary, the amount of the rapid type decreased after the treatment. Although QTP happened as CPZ is dragged into the human ether-a-go-go (HERG) channel, which is one of PCs and inhibits its function, our qualitative alterations of PC indicated that QTP might be induced. Thus, we assumed that not only did CPZ inhibit the function of HERG channel directly, but also the long-term CPZ treatment might transform the gene expression inducing QTP. Additionally, these results could explain the sudden death with the low or absence CPZ concentration after chronic CPZ therapy.

O 68
Molecular pathological approaches to pathophysiology of death in routine forensic casework: present observations and outlook

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Introduction. The core of forensic pathological research is in development and practical application of medical/biological technology in casework; the major task is to establish human autopsy database for investigation of death. Previous studies have established the concepts of post-mortem biochemistry, combined with immunohistochemistry, for functional investigation of death and molecular biology of genetics of sudden death and intoxication. Here, we present our ongoing studies and an outlook on systematic investigation of molecular pathology of death in routine forensic casework.

Materials and Methods. Serial autopsy cases were investigated within the framework of our routine casework, involving sample collection, laboratory work and data analyses, approved by the institutional ethics committee. RT-PCR was employed for quantification of mRNA in tissue specimens, and the data were comprehensively analyzed with regard to the age and gender of subjects, post-mortem interval, survival time and cause of death.

Results. Quantification of mRNA of the following biomarkers in the brain, heart, lung, kidney and skeletal muscle demonstrated substantial post-mortem stability and differences depending on the cause and process of death, including 'functional deaths': pulmonary surfactants and cytokines, natriuretic peptides in the myocardium, brain apolipoproteins, and factors involved in systemic responses to ischemia/hypoxia and water/electrolyte disorder. These findings were used to enforce and explain pathology in routine casework by comparative analyses of serial cases.

Conclusions. These observations suggest that the adequate use of molecular pathology along with biochemistry is a promising measure for pathophysiological investigation of death as part of sophisticated forensic laboratory system in forensic pathology.

O 69
Wound age estimation by simultaneous detection of cytokines in human dermal wounds with a multiplex bead-based immunoassay

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Introduction. Dermal wound age provides forensic pathologists with valuable information for the reconstruction of crime scenes and determination of the cause of death. The aim of this study was to examine a method of wound age estimation based on multiplex cytokine analyses.

Methods. We collected samples of human skin from dermal injuries including incised wounds, stab wounds, and lacerations. A Bio-Plex conventional assay kit for 8 cytokines (IL 2, IL 4, IL 6, IL 8, IL 10, GM-CSF, IFNγ, TNF α) and 9 cytokines (IL 1β, IL 5, IL 7, IL 12P 70, IL 13,

IL 17, G-CSF, MCP 1, MIP-1β) was run following the manufacturer's instructions.
Results. IL 5, IL 10, IL 12P 70, IL 13, IL 17, GM-CSF, IFN-γ, and TNF-α increased from the early phase; IL 6, MCP 1 exclusively in the middle phase; and IL 1β, IL 2, IL 4, IL 8, G-CSF, and MIP 1β from the middle phase to the late phase. IL 7 decreased from the early phase.
Conclusion. The results of the present study suggest that multiplex cytokine analysis at the wound site can be useful for wound age estimation. In addition, multiplex data obtained from the same sample with a single method would demonstrate more accurate interactions of cytokines during dermal wound healing. Although the present study was oriented to practical forensic pathology, the data obtained would be informative for various fields of medicine.

O 70
Evaluation of subcutaneous hematomas in clinically used MRI-sequences

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Introduction. Clinical imaging is not focused on lesions of the subcutaneous fatty tissue because they have no therapeutic consequence. Nevertheless, in forensic medicine these findings are important for the reconstruction of blunt trauma. The aim of our study was to evaluate to which extent frequently used clinical MRI-sequences can be used to document subcutaneous lesions.
Methods. 25 persons (18 females, 7 male, mean age 29.4 y) with an externally visible hematoma on the thigh underwent an external forensic examination with exact documentation of size and position using a body coordinate system and an MRI-scan at 3T (TimTrio, Siemens Healthcare) with a clinical protocol (T1, T1fatsat, T2, T2fatsat, TIRM) and using a surface coil. Radiological data were evaluated by a board certified radiologist blinded to the external documentation regarding the presence and grading of lesions, size, and location.
Results. In most cases (n=20) radiological evaluation identified the external findings correctly using the sequences with fat saturation, while in those without fat saturation only 17 lesions could be found. In 8 cases additional muscle injuries were detected. Grading of the lesions was limited in MR images due to artefacts and inhomogenous fat saturation. Additionally, in 5 cases external and radiological diagnosis did not correlate.
Conclusions. The results show that the use of clinical MR sequences allow the documentation of additional findings complementing external forensic examination in living persons. However, correlation of externally and radiologically visible lesions could be optimized by the adaptation of sequences for forensic purposes.

O 71
MRI as a new technology for forensic age estimation?

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Introduction. Routine forensic age estimation is usually based on an X-ray of the hand and an orthopantomogram to judge the state of the third molars. However, the use of X-ray is not permitted in many countries if no medical indication exists. MRI is a non-invasive medical imaging technique that can provide high resolution images of the teeth using a standard scanner setup at 3T.
Methods. For the optimization of the protocols 6 healthy volunteers were scanned on a 3T Magnetom (Tim Trio, Siemens, Erlangen) scanner. The subjects were positioned head first supine with their jaws fixed between a pair of CPC coils (Noras, Hoechberg, Germany). Three different sequence types were evaluated and imaging parameters were adjusted to yield optimal image quality. The sequences under investigation were turbo spin echo (TSE, 2D and 3D), VIBE and CISS.
Results. Two dimensional proton density weighted TSE sequences provided the best image quality (TR=7000, 3 averages, acq. time=10 min). 3D acquisitions with similar acquisition time yield either less image intensity (short TR) or enhanced blurring (long TR and high turbo factor). Furthermore, they are rather prone to motion artifacts. Image quality of VIBE suffers from the fact that it is based on gradient echoes and therefor prone to magnetic field fluctuations which often occur in the dental region (susceptibility artifacts). The CISS images show high signal intensities but image quality can be impeded by banding artifacts. Severity of the artifacts is substantially increased by metal braces. The achieved spatial resolution was 0.6×0.6×1 mm.
Conclusions. Our results indicate that it is possible to acquire high quality images of the third molars suitable for forensic age estimation in a standard clinical MRI setup.

O 72
Alterations of magnetization transfer ratio in traumatic brain injury

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Introduction. Axonal demyelination can be found as a consequence of head trauma and verified on a micro-structural level. Certain quantitative magnetic resonance imaging (MRI) parameters such as magnetization transfer ratio (MTR) reflect the degree of axonal myelination and could therefore improve diagnosis for survivors of traumatic brain injury (TBI). For implementation of MRI in clinical-forensic assessment of TBI we compared MTRs and microscopic findings of myelin sheaths in white matter (WM) regions of deceased with and without TBI.
Methods. Deceased subjects without (n=10) and with TBI (n=4) caused by traffic accident or fall up to 4 days prior to death underwent MRI of the brain within 64h post-mortem. Balanced-steady-state-free-precession and 3D-spoiled FLASH sequences were used to calculate MTRs in corpus callosum, frontal, temporal and occipital WM. Entire brains were formalin fixed. Using Luxol fast blue staining axonal density and thickness of myelin sheaths of histological specimens from corresponding WM regions were graded. T-Test and Mann-Whitney-U-Test depending on value distribution were used to analyze differences in MTRs between TBI cases and controls.
Results. Significant increased MTR values in cortical WM regions and thinning of myelin sheaths as well as a decrease of axonal density were observed in all WM examined regions of TBI cases when compared to non-traumatic cases.
Conclusions. The method applied in our study confirmed detection of TBI-cases using quantitative MRI parameters. Detecting microstructural changes by means of MT-imaging could serve as evidence for existence of TBI predominantly in clinical-forensic injury expertise or if histological tissue specimens are missing.

O 73
Increasing cerebral edema in the post-mortem period: results from sequential imaging

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Introduction. The finding of cerebral edema during autopsy is thought to be due to a breakdown of endothelial junctions which form the blood-brain barrier already happening before final death. This allows normally excluded intravascular proteins and fluid to get into the cerebral extracellular space in response to trauma, tumors, focal inflammation, late stages of cerebral ischemia and hypertensive encephalopathy. We investigated if this phenomenon continues even after
Methods. The extent of cerebral edema was evaluated longitudinally in 60 deceased (sudden deaths/ fatalities from intensive care). MSCT scans were started in each series as early as possible after death and then repeated in a 6-hour sequence up to a period of 24–96 hours.
Results. During the first 12–24 hours an increase of cerebral edema was found in the majority of cases, predominantly in sudden death cases. This could be shown by narrowing of cerebral sulci, increasing pressing of the parietal region on the internal calvarium, narrowing of the ventricles and of the incarceration of the brain stem. These findings were also confirmed by MRT sequential scanning in single cases.
Conclusions. The extent should depend on pre- existing cerebral edema at the time of death and should be due to the duration of cerebal ischemia as well as fluid content of the body, hydrostatic pressure and fluid transgression between different compartments. The possibility of a post-mortem increase of cerebral edema should be kept in mind when evaluating edema/cerebral weight at autopsy.

O 74
Comparison of a generic 3D reference model with a person-dependent whole-body MRI scan for presentation of clinical-forensic data

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Introduction. An intuitive reference visualization is crucial for presenting forensic findings from various sources including medical imaging devices and digital photographs. Thus, external findings from 2D images may be combined with internal findings from 3D MR/CT scans to provide a comprehensive presentation suitable for in court demonstration.
Methods. A 3D reference visualization model may be derived from a) a 3D multi-camera photogrammetric setup, b) a 3D whole-body MRI scan, c) a generic configurable 3D model which is adaptable to the subject. We compare advantages and drawbacks of these three methods, focusing on b) and c) due to their simpler setup. The main drawback of a) is the need for a hardware-intensive multi-camera setup, which is often not readily available. Additionally, 3D reconstruction is very time-consuming.
Results. Comparing whole-body MRI scans with a generic 3D model, the problems of the MRI-scan are: the scan is time-consuming, current clinical scanners show problems with very large or corpulent subjects, inhomogeneities leading to weak signal in thigh or arm regions, limited placement of the arms, deformation of the body back, and limited resolution. However, the drawback of the generic 3D model is a slight decrease in accuracy of the match between model and subject. This is compensated by the ease of use of method c), accompanied by automatic anonymization, since the original subject is not used for the generic model but only for the registered 2D and 3D data.
Conclusions. We show our presentation tool on an MRI data set involving internal and external findings of a hematoma, which are registered to a whole body MRI scan and a generic, configurable 3D reference model. It clearly shows the benefits of the generic model.

O 75
Wounds and weapons in civil war: findings in diagnostic imaging

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Introduction. At present, there are conflicts in the Arabian World. Injuries, often deadly, occur due to shots and explosions. Findings in diagnostic imaging shall be shown; possible conclusions shall be demonstrated.
Methods. The own collection had been reviewed for injuries, which correspond to those occurring in the Arabian World. The selection was made referring to media reports about the employed weapons and the resulting injuries.
Results. Gun shot wounds are often due to high velocity bullets fired by military weapons. These injuries have a characteristic pattern. Cluster bombs induce injuries typical for the content of their daughter bombs. Bombs and grenades cause injuries by fragments and pressure waves. IEDs and charges used in suicide attacks often contain nails and other metal components to kill and damage; they can be seen with diagnostic imaging which may help to recognise the attacking groups. In singular cases, diagnostic imaging may produce documents, which could serve as proofs in national and international prosecutions.
Conclusions. Diagnostic imaging creates documents, which may serve as evidence. Sometimes, examining survivors and corpses can obtain them, even after months and years have passed. However, this material is difficult (or even impossible) to get for scientific analysis, because the access will be limited for a variety of reasons. The analysis indicates that the use of forbidden arms like cluster bombs could be proven and information about the targeting could be extracted. Probably, this could contribute to judge the appropriateness and proportionality of previous actions.

O 76
Torture of the head: findings of diagnostic imaging

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Introduction. Previous torture and maltreatment serve as arguments by persons seeking asylum or residence permit. It is intended to show how Diagnostic Imaging may contribute in the evaluation of these cases.
Methods. In Chad and in Chile, persons were interviewed who declared having been tortured and maltreated. Their reports were analysed concerning the possibilities to show residuals with diagnostic imaging. Their radiographs were included in the analysis. Furthermore, in European rehabilitation centres for victims of torture, the files were reviewed with the same intention.
Results. Beating may cause fractures, cerebral bleeding, bleeding in the paranasal sinuses with the consequence of infections. Increased bone metabolism shows up in scintigraphy, oedema in MRI. Shots (Russian Roulette) leave marks. Introduced foreign bodies may show up. However, up till now, "white torture cannot be objectified with diagnostic imaging, this is all the more regrettable because this form of torture/maltreatment is quite common.

Conclusions. There is no definition of torture, which is commonly accepted. However, all definitions mention maltreatment as part of torture. Therefore, not the expert but the judge (or official) has to decide whether torture has occurred. The expert has to look for signs which indicate that torture has been inflicted. These signs have to be compared with the statements of the person, (i.e. age and pattern of signs of beating); furthermore they must be compared with what is known from the region and from the time indicated. Differential diagnosis has to include other reasons like accidents, self-harm, and initiation rites.

O 77
Investigation on heat-induced alterations of skeletal hard tissue microstructure using x-ray microtomography (micrO CT)

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Introduction. Burned human remains, often found after natural disasters or house fires, are the result of either direct contact with open flames or to high temperatures, destroying most of the forensic evidence that otherwise enables identification and recovery. Only a few methods have been reported that deal with the visualization of heat-induced alterations of the microstructure of bones and teeth. As a novel approach this study used micro-CT for qualitative and quantitative analyses of the heat-induced changes on skeletal hard tissues to various levels of thermal stress.
Methods. High-resolution scans (voxel-size 10.1–17.7 µm) were performed with two micro-CT scanners (SkyScan 1172 & 1174; SkyScan, Kontich, Belgium) on twelve extracted rat femora (Wistar Hann rats, 6 & 21 weeks old) and 18 isolated human molars before and after the thermal stress. The femora and teeth were subdivided into three temperature groups (400°C, 650°C, 800°C), whereas the thermal stress was simulated with electric furnaces. Three-dimensional models were computed with Amira 5.3.2 (Visage Imaging Inc., San Diego, USA), measurements were taken with ImageJ 1.4.1 and statistically analyzed with SPSS 17 (SPSS Inc., Chicago, USA).
Results. A temperature-dependent increase of heat-induced cracks was observed between the three temperature groups and the distributions and patterns of the heat-induced changes could be classified using the computed three-dimensional models.
Conclusions. The macroscopic heat-induced changes of this study correspond with previous observations of burned human remains but do also take into account the entire microscopic three-dimensional expansions of heat-induced alterations inside skeletal hard tissue, which offers a new approach to forensic investigations.

O 78
Morphometric shape analysis of the human ear: approaches via 3D surface-scans in the determination of sex

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Introduction. The potential usefulness of the external ear for biometric identification was first recognized by Bertillon in 1890. Over the last 120 years researchers investigated the potential of the human external ear shape for biometric differences or specific identification using various techniques. Our study evaluated the accuracy and limitations of 3D surface-scans of human ears for the analysis of sexual dimorphism. The results might be used in biometric recognition systems and forensic identification.
Methods. 29 three-dimensional surface scans of plaster mould casts (from Caucasian probands, average age: 25.3 years) were generated using a DAVID surface scanner 2.4.3 (DAVID Vision Systems GmbH, Germany). After scanning, 72 landmarks including 67 semilandmarks were set with Amira 5.2.0 (Visage Imaging Inc., San Diego, USA) resulting in five individual curves. The resulting data were analyzed with open source geometric-morphometrics software packages and statistical programs.
Results. In the determination of sex, analyzing every curve separately showed no statistically significant differences (using permutation test). However, a new kind of geometric morphometric data, the parabolic curve, could be applied in the analysis of complex structures treated by procrustes methods.
Conclusions. Due to the small sample this study does not allow an accurate description of sexual dimorphism of human ears. The plaster mould model showed very good accuracy in comparison to the ears' actual geometry. It could be shown that different surface curves can be extracted from these records; further experiments can now go forward on ways of extracting information from curves for biometric identification and other anthropometric applications.

O 79
No estimate of stature from sagittal or coronal suture lengths for Central European individuals

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Introduction. To date, a sufficiently accurate correlation between skull measurements and stature could not be found.
Methods. We measured the length of the sagittal and coronal sutures with a tape measure along with body height in the course of 117 autopsies (82 male, 35 female, age ranged from 15 to 96 years, mean value 52.8, median 51 years).
Results. The length of the sagittal suture with respect to body length yielded a correlation coefficient of only R=0.045 (p=0.617) in the regression analysis. Similar results were found for the coronal suture: in this case the correlation coefficient was R=0.015.
Conclusions. Our results suggest that neither the length of the sagittal nor the length of the coronal suture is suitable for a forensic estimation of stature for Central European individuals.

O 80
Virtual anthropology: development of multi-detector-computed tomography (MDCT) acquisitions protocols for bone imaging

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Introduction. The University Center of Legal Medicine in Lausanne has started a project for developing a forensic-anthropological database of virtual skeletons. The virtual bones are obtained by scanning bodies or isolated bones using multi-detector-computed tomography (MDCT). First studies concerning anthropological analyses on virtual bones have shown that special and standardized acquisition protocols are necessary. Our study presents the development and optimization of acquisition protocols for bones scanned in-situ and ex-situ.

Methods. MDCT acquisitions of humerus and femur were first performed in-situ on 8 bodies donated by an institute of anatomy. Afterwards, the bones were extracted and ex-situ acquisitions were performed using the same scanning protocol. Protocol in-situ: for developing an ideal acquisition protocol, 15 bodies were scanned with variable parameters. Protocol ex-situ: extracted bones were scanned with variable parameters and procedures (placing the bones in different surrounding materials). All the obtained images were compared and examined with an experienced anthropologist.
Results. The comparison of the in-situ and ex-situ bone images reveal the necessity of performing acquisitions with different protocols. The technical and physical constraints and difficulties are not the same, engendering different kind of artifacts. Best quality for ex-situ scans could be reached by introducing the bone into a copper cylinder.
Conclusions. In order to obtain virtual bones of high quality, specific MDCT protocols and procedures are necessary for bones scanned in-situ and ex-situ. These protocols permit to achieve suitable data for 3D reconstructions with minimal artifacts for the surface examination of bones and a high resolution for visualizing trabecular structure.

O 81
Dental age estimation: evaluation of MR sequences for the imaging of tooth development

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Introduction. Dental age estimation of living persons is usually based on an orthopantomogram to judge the development of the third molars. However, the use of ionizing radiation without medical indication is not permitted in many countries. Thus, the aim was to define an MRI scan protocol for the use of MRI as a non-invasive method without radiation exposure providing high resolution images of the teeth.
Methods. For the optimization of the protocol 6 healthy volunteers were scanned on a 3T Magnetom (TimTrio, Siemens, Erlangen) scanner. Subjects were positioned head first supine with jaws fixed between a pair of CPC coils (Noras, Hoechberg, Germany). Three different sequence types were evaluated and imaging parameters were adjusted to yield optimal image quality. The sequences under investigation were turbo-spin-echo (TSE), VIBE and CISS.
Results. 2D proton density weighted TSE sequences provided the best image quality. 3D acquisitions with similar acquisition time yielded either less image intensity or enhanced blurring, and were prone to motion artifacts. The image quality of VIBE suffered from the fact that it is based on gradient echoes and susceptible to magnetic field fluctuations which often occur in the dental region. The CISS images showed high signal intensities but image quality was impeded by banding artifacts. The achieved spatial resolution was 0.6×0.6×1 mm.
Conclusions. Our results show that high quality images of the third molars can be acquired in a standard clinical MRI setup. Whether signal-to-noise ratio and resolution meet the needs for dental age estimation still has to be investigated.

O 82
Dental age estimation in living persons: validation of reference data on mineralization and eruption

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Introduction. Estimation of dental age is an important part of forensic age estimation in living persons. As the quality of the values given in population-specific reference studies has a great impact on the estimation, the aim of this study was to validate reference data for wisdom teeth mineralization and eruption of a German population concerning the diagnosis of the age limit of 18 years in persons with known age.
Methods. Mineralization and eruption was evaluated in 305 orthopantomograms of Central European subjects aged 17.5–18.5 years. Dental age was estimated using reference data and compared to chronological age. Statistical methods were used to analyze the differences and to propose adjusted reference values.
Results. Estimation of dental age relying on mineralization resulted in overestimations of 2 years on average in 76% of the males and 82% of the females. Using eruption, all men and 75% of the women were overestimated by up to 7 years. The differences between estimated and chronological age in both men and women were associated with the mineralization and eruption stage, respectively. The higher the stage the higher was the risk of overestimation. The mineralization stages up to stage E were associated with underestimations. Using the proposed adjusted reference values resulted in more accurate estimations of dental age.
Conclusions. Validation of reference values for dental age estimation showed great overestimations resulting in high error rates with numerous persons being younger than the estimated dental age. Adjustments are proposed which reduce differences between estimated dental age and chronological age.

O 83
Asylum-related age assessment – basic considerations

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Introduction. Because of the increasing 'migration of the youth' into the EU-countries over the last ten years, age identification has become an important topic of the asylum procedure due to its legal significance. A series of European and national resolutions, acts and amendments deemed medical evidence its key argument, the recently updated "Recommendations for age estimation in living individuals" of the "German study group on forensic age diagnostics" has been widely accepted.
Conclusions. Within the Austrian context an expert report is considered the correct instrument to present facts and data, since court proof evidence has to be supplied assisting a trier of fact at any level of legal action. To be legally relevant such expert investigation must pay close attention to the respective regulations laid down in various Acts and High Court decisions. It must be pointed out, that specific problems connected with a reliable age differentiation within an asylum procedure are not finally answered. In the years to come the European Commission intends to contribute guidelines to the ongoing dispute with an 'Action Plan' that predictably will lead to a European wide standardized "Age identification protocol".

O 84
Morphological and immunohistochemical studies in non-accidental head injury in infants

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Introduction. Non-accidental head injury (NAHI) is the most common form of non-natural death in infants, encompassing signs of an acute diffuse encephalopathy together with subdural and retinal bleedings, often in a context of inappropriate or inconsistent history. There is ongoing controversy regarding the precise mechanisms of brain injury. We performed comprehensive morphological and immunohistochemical studies in a large cohort of NAHI victims and compared the result to controls to further analyze the possible mechanisms of brain injury.
Methods. 44 patients younger than 1 year of age with a diagnosis of NAHI from three institutions in northern Germany (Hamburg, Bremen, Rostock) were analyzed and comprehensive morphological and immunohistochemical studies were performed. We especially investigated immunohistochemical markers for early traumatic/ischemic neuronal injury (caspase-3, p53, tau-protein, amyloid-beta, MAP2c, beta-APP, alpha-synuclein). Results were evaluated semiquantitatively and statistically compared to age- and sex-matched non-NAHI-patients.
Results. The morphological analysis of the NAHI patients showed a highly significant association with subdural and retinal bleedings when compared to controls. Further findings in patients were skull fractures and contusional bleedings. There were no microscopic findings considered typical of diffuse axonal injury. The statistical analysis of the results of the immunohistochemical studies did not show significant differences for NAHI patients compared to controls.
Conclusions. The immunohistochemical profile of the brain tissue in NAHI-patients does not show significant alterations indicative of severe traumatic injury but is similar to findings in acute hypoxic-ischemic injury. Thus, our findings further support the theory that the mechanism of brain injury in NAHI-patients is rather hypoxic following an apneic event due to local damage to the lower brainstem.

O 85
Suicides in prison

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Introduction. Suicides in prison are a matter of great political concern.
Methods. Data were gathered from all cases of death that occurred in prison between 1993 and 2010 and that were autopsied in the Institute of Legal Medicine in Münster. In addition to the autopsy reports, the authors had access to the documents of the public prosecutors. 81 variables were analyzed, such as personal data, method of suicide, criminological data and circumstances of custody.
Results. The collected data included 68 cases of death. 30 inmates died a natural death, mostly myocardial infarct. 8 deaths were related to drug overdose. These have been excluded, as it seemed to be impossible to distinguish between an accidental overdose and suicide. One death was a murder case.. Ultimately, 30 suicides were analyzed. 97% of the suicides were male and 60% were aged between 20 and 39 years. 97% hanged themselves. One inmate committed suicide by electrocution. The most frequent device used was a belt (38%), almost 30% used a bed sheet. 37% had a migration background and 47% left a suicide note.
Conclusions. Suicide was the reason for almost half of the cases of death. The large proportion of young men was remarkable. A noticeable large number has a migration background.

O 86
Deaths in jails and prisons reported in documentation maintained by the forensic department of the health surveillance authority for the years 2006–2010

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Introduction. In accordance with Section 48 of Act 581/2004, persons who died in jails or prisons must undergo an autopsy. In Slovak jails and prisons, seven prisoners committed suicide, whilst 31 attempted to do so, in 2010. At that time, 1,464 accused and 8,467 convicts were recorded. In Slovakia, 32 people died in prisons and/or in police stations. As many as 165 convicts attempted suicide.
Methods. A retrospective analysis of the autopsy reports was performed which focused on people who died in prisons or police jails in a five-year period (2006–2010) in the Bratislava and Trnava regions. In these two catchment areas, prisons are in Bratislava and Leopoldov and the penal institutions are in Ilava, Hrnčiarovce nad Parnou and Leopoldov.
Results. From the total number of autopsied bodies (5,155) at our work place, 17 (i.e. 0.33%) died in jails. All of them were men and five of them died from natural death and twelve died from violent death. Their average age was 45 years. We highlight a case involving the suicide of a man from early 2011. The suicide (hanging) was recorded by a security camera placed in the place of preliminary detention.
Conclusions. A question arises in connection with the man hanging himself in the place of preliminary detention, whether or not it was possible to avoid his death.

O 87
Trends of suicide in Jeddah, Kingdom of Saudi Arabia

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Introduction. Jeddah is located on the coast of the Red Sea and is the main urban center of western Saudi Arabia and the second largest city in the Kingdom. All districts of Jeddah have a population of ~3.5 million, about half of them are foreigners.
Methods. A retrospective study was carried out on 183 suicide cases autopsied at the Forensic Medicine Center in Jeddah (from 2005 to 2010).
Results. Of these cases, 146 (79.78%) were males and 37 (20.21%) were females, and the ratio of males to females of 3.9:1. About 70% of the subjects (128 cases) were in the third and fourth decades of age. The largest proportion of suicides was among Indian and Southeast Asian populations, while Saudis constituted around 25% of the total number of the cases. Suicide by hanging was the most common method followed by falling from height and others. Presence of suicidal notes and post-mortem toxicological analysis were also studied. Other data were studied including jobs of the deceased, presence of known family problems, financial troubles and mental illness.
Conclusions. Despite the remarkable low suicide rate in Jeddah compared to other large cities of the Kingdom and compared with data worldwide, however, it is considered an alarm for more researches on social circumstances of these groups, and focusing on foreigners, especially laborers and housemaids. Psychological assessment should be performed before employment.

O 88
Poisoning cases due to the multiple drug ingestion

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Forensic toxicological evaluation of poisoning cases is usually performed by drug concentrations in blood, based on previous reports of cases. These evaluations of poisoning cases due to multiple psychotropic drug ingestion are large problems in the fields of forensic toxicology. Because the pharmacological interactions among the various drugs are complicated, and we have not enough case reports for the evaluation of multiple drug use. It has been reported that some kinds of psychotropic drugs are especially toxic when combined with ethanol. Since a large amount of ethanol depresses the function of the central nervous system including respiratory depression, and it also enhances the pharmacological effects of various drugs when taken together. We should pay more attention to the toxicity by combinations and interactions of the multiple psychotropic drugs, including ethanol.
The victims of the fatal poisoning, who have received intensive medical treatment for relative long intervals, may have lower blood concentrations of drugs and poisons due to these metabolism and excretion. Drug metabolism and excretion in a state of shock seems to be slower with a longer elimination half-life. Forensic estimation of drug concentration in the blood of the victim at the time of the incident, was quite difficult using conventional pharmacokinetic parameters. We should also pay close attention to the time course of drug metabolism and its pharmacokinetics under unusual pathophysiological conditions.

O 89
Determination of highly lipophilic substances in bodies after several years of earthgrave and interpretation of the analytical results

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Introduction. Considerable putrefaction, for instance after several years of earthgrave, means a substantial challenge for a forensic toxicologist. On the one hand various putrefaction products by degradation of organs and other tissues are found, on the other hand organic active agents as drugs or narcotics have been degraded more or less rapidly. In single cases also a novel formation of simply structured organic substances may have been occurred. If organic active agents are detectable, an interpretation of the analytical results is problematic.
Methods. We have investigated various cases after exhumation, among others also 5 cases after a stay time of up to 6 years in a in-ground grave, in which chlorprothixen (CPX) was detectable. The detection of CPX and its metabolites was performed by HPLC and for quantization the standard addition method. As far as a securing was successful during the autopsy, liver, lung, muscle, and brain were analyzed. Additionally water content and weight of the organs were estimated. The data were compared with those from the literature and from own cases of lethal intoxications without putrefaction.
Results. CPX was detectable, even if organs were hardly to be identified and water contents and organ weights had been altered dramatically. Under such conditions brain seems to be best qualified for a toxicological assessment. Above all the seclusion of the brain and according to this a not existing possibility of diffusion from the gastro-intestinal tract is advantageous. In addition data from tables relating to weight and water content of organs in the lifetime are important. It is to be assumed that during the loss of water lipophilic substances as CPX are washed out if at all then to a low degree but stay structured bound in the organic material. In the case of a loss of organic material it may be assumed for an estimation of the drug concentration during the lifetime that the active agent had been distributed in the whole brain mass. An estimated concentration in the range of values, which are found in cases of lethal intoxications without putrefaction, leads to the deduction, that a heavy intoxication has been taking place.
Conclusions. Even after stay of a corpse in an in-ground grave for several years, predominantly lipophilic substances are not only clearly detectable, but there is also a chance of estimating the degree of severity of intoxication. We demonstrate by means of example cases that such results are valid basics of criminal trials.

O 90
Which kind of drugs pass the placenta of pregnant women – a pilot study

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Introduction. For most drugs therapeutic blood-concentrations concerning adults exist. Corresponding data for children are very rare, and medication is usually calculated based on weight and/or age of the child. Furthermore, there are no sufficient data on whether different kind of drugs are able to cross the placenta.
Methods. Over a period of one year, 15 pregnant women with known or admitted drug use were selected. Blood of these women as well as umbilical cord blood was collected shortly before and during birth/caesarean, respectively. If available, meconium-samples were also collected. The samples were subjected to systematic gc/ms- and lc/ms-analysis.
Results. A variety of drugs (e.g. methadone, cannabinoids, lamotrigin, perazine) was found in both maternal as well as cord blood. In three cases methadone und in two cases cannabinoids were detected in both matrices, but only THC carboxylic acid was detected in cord blood. In one case the methadone concentrations in both sample types were nearly equal. In all cases in which coffee was consumed by the mother, caffeine was also detected in cord blood.
Conclusions. This pilot study shows that a variety of drugs is able to pass the placenta of pregnant women and can be detected in cord blood. Further studies with a greater collective of women with known drug use including analyses of fetal/infant samples (e.g. hair) as well as breast milk will yield additional information in the future.

O 91
Traffic accidents involving pedestrians: reconstructive value of spine injuries detected by post-mortem CT

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Introduction. Injuries caused by traffic accidents can be complex and extensive. Due to the highly dynamic course of actions, reconstructive questions may be a big challenge to investigators. Betimes it is difficult to differentiate a collision from overrun. We hypothesized that the existence of fractures from spinous and transverse processes could be helpful to distinguish both.
Methods. In a retrospective study we analyzed the post-mortem CT-data from pedestrian fatalities. We collected one group finally assessed as being overrun (5 m, 5 f, 18–86 y, mean 53 y) and a control group being hit but not overrun (7 m, 4 f, 31–89 y, mean 61 y). Secondary we compared the results with localization of fractures detected in routine autopsy.
Results. Cases in the overrun group showed 1–23 fractures of processes (mean 11.5) and 6 cases had bilateral fractures of partly opposite transverse processes. In the control group there were 6 cases without any fractures and 5 cases showed 1–9 injuries (mean 1.7). There were

no bilateral fractures of transverse processes in the control group. Autopsy only detected fractures of spinous processes in 2 cases from the overrun group.
Conclusions. Bilateral fractures of transverse processes may be a possible sign for an overrun. Unilateral fractures of the transverse processes are not specific. Post-mortem CT seems to be more sensitive for the evaluation of vertebral processes than conventional autopsy.

O 92
Death by trauma 2010: mortality and trauma mechanisms in Berlin, Germany

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Introduction. Trauma is the third common cause of death in the western countries, and continuous innovations in emergency trauma care managed to lower the trauma mortality in Germany considerably. Data from the German Trauma Registry (DGU) 2009 showed a constant decrease in trauma mortality for patients dying after hospital admission. However, German data concerning preclinical trauma mortality have not been systematically surveyed and analysed.
Methods. We conducted a prospective observational study of all trauma deaths in Berlin in 2010 (n=440). Police records, death certificates and autopsy files were analysed. Exclusion criteria were death due to underlying illnesses or complications not primarily associated with trauma.
Results. The autopsy rate was 60%. 64.3% were male with a mean age of 58±23 years and mean survival time of 45.2±127 hours. The predominant causes of death were polytrauma (45.7%), severe head injury (38%) and exsanguination (9.5%). Frequent trauma mechanisms were fall from height (32.7%), downfall (31.8%), and pedestrian versus train accidents (8.0%). 78.6% were blunt injuries, 13.2% penetrating, and 8.2% both blunt and penetrating. Death occurred on-scene in 58.6%, on intensive care unit in 33.2% and in the emergency department, the operating room or the ward in 2.7% each.
Conclusions. The majority of trauma deaths occur on scene. This calls not only for advanced research efforts in the field of preclinical trauma management and prevention, but also for further collaboration between forensic medicine and emergency trauma care to evaluate overall trauma mortality and gather solutions to improve survival.

O 93
Accidents using walking frames

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Introduction. The number of older adults using walking frames has increased significantly in recent decades. Consequently, there was an increase in accidents with walkers.
Methods. In a preliminary study autopsies from 2000 to 2010 were evaluated (Institute of Forensic Medicine, LMU, Munich). 31 deaths were identified as accidents in connection with the use of walking frames. The retrospective analysis of these cases was performed with regard to the circumstances and causes of death.
Results. The mean age of the subjects was 83 years (median 87 years). Women were 3 times more frequently affected than men. More than 50% of all accidents occurred on public places. The most accidents were exclusively due to fall events without external impact. The majority of injuries were localized on the head and hip.
Conclusions. Deaths associated with walking frames are obviously rare events. The injury patterns are similar to those usually observed in falls from a standing position without a walking aid. Specific walker-related injuries were not found.

O 94
A case of hypoglycaemic unawareness resulting in conviction for causing death by dangerous driving

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Introduction. The defendant who lived alone had developed hypoglycaemic unawareness. When driving along a highly familiar route, he became hypoglycaemic but managed to continue to drive for approximately 3 miles before leaving the road, killing a young boy and seriously injuring another boy. His defence of automatism due to hypoglycaemia was supported by prominent expert witnesses and at the first trial the jury was deadlocked. The second jury convicted him and he was sentenced to 3 years imprisonment, reduced to 1 on appeal against sentence.
Methods. The author interviewed the expert witnesses and defence lawyers (the prosecution lawyer was not available) and was given permission to access the relevant case papers by the defendant.
Conclusions. The author submits that the impact of unrecognized hypoglycaemic unawareness on the defence of automatism has not been fully appreciated. The case law on automatism also makes it very difficult for defendants to succeed with a defence of automatism due to hypoglycaemia, especially for crimes of strict liability.

O 95
Neuronal activity patterns in depression assessed post-mortem: which impacts have suicidality and unipolar-bipolar dichotomy?

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We present post-mortem results from the Magdeburg Brain Bank related to the evaluation of impaired activity of neuronal networks relevant for depression. Chronic changes in ribosomal DNA activity in neurons of prefrontal limbic regions, the amygdala, the striato-pallidal complex, and the serotonergic dorsal raphe nucleus have been revealed by quantitative evaluation of silver-stained nucleolar organising regions (AgNORs). The impact of processes leading to suicide has been accentuated in opposite to the weak influence of unipolar-bipolar dichotomy. Our results support the view that suicide and depression are phenomena of overlapping but distinct neurobiology. They suggest also that new specific therapeutic strategies are needed to prevent more effectively brain abnormalities related to suicide. Besides its importance for psychiatric research, the AgNOR investigation of brain structures may be relevant for the forensic diagnostics of suicide.

O 96
Sarcoidosis of the heart: a rare cause of sudden cardiac death

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Introduction. Sarcoidosis is a systemic disease of the connective tissue, and is associated with granulomae. Sarcoidosis is found in approximately 10 to 40 persons per 100,000 in Europe and the USA and is

therefore classified as a rare disease, with its cause still unknown. Lymphatic nodules, lungs, liver and spleen are commonly affected; only in about 5% is the myocardium involved.

Methods. We report a case of a 41-year-old teacher who died suddenly while taking a lesson, with the symptoms of sudden cardiac death. He died despite immediate reanimation. To determine possible hereditary risk-factors for his children, his wife commissioned an autopsy privately.

Results. Autopsy revealed large deposits in the myocardial tissue which appeared to be fatty tissue; these were also found in the spleen. Macroscopic abnormalities were not found anywhere else. The stored organ samples were further investigated in collaboration with the Institute of Pathology; a myocardial and spleenal sarcoidosis was diagnosed, which in an unusual manner had not spread to the lymphatic nodules or lungs.

Conclusions. Myocardial involvement in sarcoidosis runs at about 5%. The presumed lethal ventricular arrhythmias in the present case make it a rarity, as the literature indicates that only 5% of patients with a myocardial involvement suffer the symptoms. There is genetic disposition for sarcoidosis. The only gene identified to date (BTNL2) is not yet checked in routine medical screening. On behalf of the family we liaised with the Institute of Human Genetics for the provision of further specialised support.

O 97
Determination of ketone bodies post-mortem

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Introduction. The ketone bodies acetone, acetoacetate and β-hydroxybutyrate (β-OHB) have different importance in living humans. They show elevated levels in alcoholism, diabetes mellitus, malnutrition and hypothermia and lead to ketoacidosis. Although there are many fatal cases of alcoholics and diabetics without known cause of death after autopsy, histology and toxicological analysis, normally no determination of ketone bodies is carried out postmortally.

Methods. We analysed five different matrices (blood of the femoral vein, blood of the heart, urine, cerebrospinal fluid and vitreous humour) from fatal cases of alcoholics, diabetics, hypothermia and a control group and determined all three ketone bodies. Therefore we made use of the enzymatic conversion of β-OHB into acetoacetate and the thermic change of acetoacetate into acetone. The latter can be determined with head-space gas-chromatography/flame ionization detection. The method was validated according to the guidelines of the GTFCh.

Results. The method shows linearity for 1–3,000 mg acetone/l, 10–10,000 µmol acetoacetate/l and 10–30,000 µmol β-OHB/l. Precision data at two concentrations in each ketone body (acetone 5 mg/l and 500 mg/l, acetoacetate 50 µmol/l and 1,000 µmol/l, β-OHB 5 mg/l and 5,000 mg/l) were in accordance with the guidelines.

Conclusions. Differences in the ketone body concentrations and the ketone body sum will be presented. Data for exclusion of a ketoacidosis will be discussed for variable causes of death and for the different matrices.

O 98
Inhibition of 1,4-butanediol metabolism in human liver in vitro

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Introduction. The conversion of 1,4-butanediol (1,4-BD) to gamma-hydroxybutyric acid (GHB), a drug of abuse, is most probably catalyzed by alcohol dehydrogenase, and potentially by aldehyde dehydrogenase. The purpose of this study was to investigate the degradation of 1,4-BD in cytosolic supernatant of human liver *in vitro*, and to verify involvement of the suggested enzymes by means of gaschromatography-mass spectrometry. The coingestion of 1,4-BD and ethanol (EtOH) might cause complex pharmacokinetic interactions in humans. Therefore, the effect of EtOH on 1,4-BD metabolism by human liver was examined *in vitro*. Additionally, the influence of acetaldehyde (AL), which might inhibit the second step of 1,4-BD degradation, was investigated.

Methods. Samples of nine human livers were collected during autopsy within 72 hours after death. All extracts (cytosolic supernatants) were pooled. Photometric determination of protein concentrations was performed.

Incubations. For enzymatic degradation of 1,4-BD to GHB the incubation time and concentration of both cofactor (NAD) and protein were optimized. Reactions were started by addition of enzymes at 37°C. Inhibition of 1,4-BD metabolism at 6 different substrate concentrations by EtOH was investigated without inhibitor and at three different EtOH concentrations. Additionally acetaldehyde was employed as inhibitor. The IC50 of potential antidotes were determined at three different substrate levels. In another experiment the degradation of 5 mM 1,4-BD was investigated beside the formation of GHB. GC-MS: Analyses was performed on a Thermo Trace GC ultra gas chromatograph coupled with a Polaris Q ion trap mass spectrometer. Data Analysis: The enzymekinetic parameters Km, Ki, Vmax and IC50 values were determined in silico.

Results. GHB is formed almost as fast as the initial amount of the substrate is decreased in the *in vitro* assay. EtOH inhibited the conversion of 1,4-BD to GHB at different concentrations (3–80 mM). The enzyme kinetic data were fitted to a competitive inhibition model by a non-linear regression analysis yielding a sufficient correlation (R^2=0.965). Km, Vmax, and Ki were 5.5 mM, 10.0 nmol/min/mg, and 0.56 mM, respectively. Unlike EtOH its metabolite AL did not inhibit 1,4-BD degradation *in vitro*. Surprisingly, an increased formation of GHB was observed here. All tested antidotes inhibited the metabolism of 1,4-BD to GHB in cytosolic supernatant of human liver *in vitro*. In all used substrate concentrations, fomepizole (FOM) was the most potent inhibitor. This was significant compared to pyrazole (PYR) and disulfiram (DSF). PYR was less potent than FOM, but showed an almost complete inhibition of GHB formation from 1,4-BD at high concentrations like FOM. Saturation of the effects of Cimetidine (CIM) was not reached due to limited water solubility.

Conclusions. The metabolism of 1,4-BD is inhibited by EtOH in cytosolic supernatant of human liver *in vitro*, which confirms the thesis of potential pharmacokinetic interaction of both drugs in human. The almost complete inhibition of GHB formation caused by FOM suggests that ADH is the main enzyme for 1,4-BD degradation in our experiments and most probably in human. We showed that GHB is formed almost as fast as 1,4-BD is degraded. Thus, the first step of 1,4-BD metabolism is probably rate limiting. DSF inhibited the GHB formation up to 60%. This confirms the involvement of another enzyme in the degradation of gamma-hydroxybutyraldehyde. Another explanation for the incomplete inhibition by DSF might be a delayed onset of inhibition, since the mechanism of DSF seems to be based on the formation of an intramolecular disulfide bond. Inhibition of 1,4-BD metabolism appears reasonable in order to block the formation of central depressing GHB in case of an acute 1,4-BD intoxication. EtOH should not be used as an ADH inhibitor due to interactions between EtOH and 1,4-BD.

O 99

Automated mass spectral deconvolution and identification (AMDIS) of GC-MS screening data in forensic-toxicological casework

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Introduction. Gas chromatography-mass spectrometry (GC-MS) is a well-established routine screening analysis in forensic toxicology; however, the manual processing of raw data by an experienced analyst is very time-consuming. The present work evaluates a software-based approach using AMDIS for use in forensic, especially post-mortem, toxicology.
Methods. More than 60 post-mortem samples (blood, urine, tissues) were included in this study. Following solid phase extraction, chromatographic separation was performed using a HP-5MS column in a Perkin Elmer Clarus 600 system. Extracts were analysed without derivatization and after acetylation. Raw data were processed in parallel using AMDIS Version 2.69 and manual evaluation by an experienced analyst.
Results. Different operating modes of AMDIS were evaluated concerning their applicability in forensic toxicological analysis, and optimized settings will be presented. Using an optimized AMDIS on case samples, the number of proposed hits was approximately reduced by half compared to the simple mode, thus simplifying and speeding up the final revision process. To this point, no true hits as identified by manual analysis were missed in the software approach. While AMDIS was not judged to be generally superior to manual evaluation in terms of substance detection and identification, it did prove to be considerably less time-consuming than manual data revision (approx. 5 vs. 30 min.). Individual results will be presented and discussed in detail.
Conclusions. Optimized AMDIS analysis was shown to be a valuable tool for forensic GC-MS-screening, providing reliable results equivalent to – but much faster than – manual evaluation.

O 100

Estimation of γ-hydroxybutyrate (GHB) cO consumption in serum samples of drivers positive for amphetamine or ecstasy

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Introduction. There is no routinely toxicological analysis of γ-hydroxybutyrate (GHB) in cases of driving under influence (DUI), therefore consumption of this drug might be underestimated. Its consumption is described as often taking place in co-consumption with amphetamine or ecstasy.
Methods. 196 serum samples, collected by police during road side testing and found to be positive for amphetamine, methamphetamine, 3,4-methylenedioxyamphetamine (MDA), 3,4-methylenedioxymethamphetamine (MDMA) and/or 3,4-methylenedioxyethamphetamine, were analysed of GHB. Analysis was realised by LC/MS/MS in the multiple reaction monitoring (MRM) mode. Due to its polarity, chromatographic separation of GHB was achieved by HILIC column. To differentiate endogenous and exogenous levels of GHB, a cut-off concentration of 10 µg/ml was applied.
Results. Two samples turned out to be positive for GHB. One sample was positive for amphetamine and one for MDMA. Other amphetamine derivates were not detected but both samples were found to be positive for cannabinoids, additionally.
Conclusions. Thus, a relatively low (1%) co-consumption of GHB to amphetamine or ecstasy abuse can be assumed for the collective of this study.

O 101

Association of pharmacogenetic polymorphisms with opioid addiction

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Introduction. Opioid addiction is a major health and legal concern. Comparable to alcohol dependence, opioid addiction is supposed to develop through the interaction of environmental, physiological as well as genetic factors. The contribution of individual genetic polymorphisms to the vulnerability of opioid addiction is estimated to range between 40-60%. Nevertheless, the knowledge of predisposing genetic variants is still limited. Thus, the aim of the present study was to investigate, if polymorphisms in genes involved in opioid pharmacokinetics and pharmacodynamics (pharmacogenetic polymorphisms) are associated with opioid dependence.
Methods. For the present study, we recruited 142 opioid dependent patients of the Drug Addiction Outpatient Clinic of the Innsbruck Medical University and 142 healthy controls. In total, 24 genetic polymorphisms in 14 different genes directly or indirectly involved in opioid pharmacology (OPRM1, OPRD1 OPRK, COMT, STAT, MDR1, DRD2, GAL, SLCO1B1, SLCO1A2, MC1R, UGT2B7, 5-HTR1A, GRK3) were typed using a 24-plex PCR- Ion-pair reversed-phase high-performance liquid Chromatography-Electrospray ionization Mass Spectrometry (ICEMS) approach. The observed allele and genotype frequencies were compared between the two groups using Chi-square testing.
Results. The developed 24-plex assay allowed a convenient and successful characterization of the 24 polymorphic loci in both study groups. Statistical evaluation revealed that seven out of 24 polymorphisms exhibited significant frequency differences between the patient sample and the healthy controls ($p<0.05$). The frequency differences of two polymorphisms located in the gene GAL and OPRD1 where highly significant ($p=0.002$ and $p=0.007$).
Conclusions. We identified pharmacogenetic polymorphisms that may contribute to the individual vulnerability to opioid dependence.

O 102

Assessment of performance impairment due to psychoactive medicaments

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Introduction. The performance impairment by medicaments was assessed by means of a meta-analytic approach using published experimental studies and kinetics. Dose-dependent and concentration-dependent dynamics are depicted and discussed.
Methods. Experimental studies on hypnotics and sedatives, anxiolytic benzodiazepines, antidepressants, neuroleptics and antihistamines with at least one performance test under the effect of a medicament and kinetic experiments were included. According to defined criteria about 1,500 studies with about 34,000 test results were statistically evaluated.
Results. The meta-analytic approach had to be restricted to studies with single oral applications in healthy subjects. Including the calculation of kinetics for each substance a pharmacokinetic profile could be established: the dose- and time-dependent dynamics in terms of percentage of significantly impaired performance results. After a curve fitting, the results were compared with the equivalent impairment by known concentrations of alcohol. Thus, it was possible to present curves on the concentration-dependent dynamics of a substance (correlation between concentration and percentage of performance impairment). The performance results after multiple applications in healthy subjects

and studies with ill persons were assessed by reviews. The results seem to demonstrate less severe impairment.
Conclusions. It is possible to give dose-dependent recommendations regarding the duration of impairment in patients. The danger of agents can be compared with defined alcohol levels. Concerning reality it must be considered that the traffic-related danger of a medicament depends on more influencing variables than only on its performance impairment. The possible improvement of the underlying disease by the medication should be kept in mind.

O 103
On the forensic relevance of hypothermia in living persons

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Introduction. Several studies exist on the cooling behaviour of human corpses. They demonstrate the use of mathematical formulae to model the decline of the body core temperature and thus estimate the time of death. Evidently, these models are not valid to reconstruct the time of incident in living persons in the context of forensic questions, since the continuous blood flow of intact circulation may lead to accelerated body cooling. This hypothesis is supported by case reports as well as experimental studies e.g. on the efficiency of therapeutic hypothermia in the treatment of chronic schizophrenia from 1960.
Methods. The study presented contains quantitative facts on body cooling from patients of Jena University Medical Centre and from published case reports on hypothermia with quoted exposition times to low temperatures.
Results. First results of literature research and retrospective analysis of patient data are presented and possible influence factors are discussed. Furthermore, possibilities and limitations of data acquisition and evaluation are illustrated.
Conclusions. Since very few data on cooling rate of living persons are accessible and due to the sheer abundance of potential influencing factors, an empirical model in terms of a distinct mathematical cooling formula could not be derived. In practical work well documented case reports can be applied as references.

O 104
The influences of temperature on skeletal muscle post-mortem: a histological, fine structural and biochemical analysis in pigs

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Introduction. The structure and function of skeletal muscle is well-known in a true-to life state but little is known about its *post-mortem (pm)* characteristics. Therefore a study is performed analysing extra- and intracellular, enzyme-linked and protein-based degradation processes of limb skeletal muscle of pigs at two different storage temperatures (4° and 22°C) over 21 days *pm*.
Methods. Samples were taken at pre-defined points of time of the superficial area of the *M. biceps femoris* and (1) chemically fixated in a buffered glutaraldehyde solution for light- and electron microscopy, (2) physically fixated for immunohistochemistry and (3) snap frozen in liquid nitrogen for protein analysis. With respect to the points of time samples were analysed to obtain information about fine structural degradation patterns, enzyme activities and patterns of fragmentation of contractile, regulatory and cytoskeletal proteins as well as the pattern of appearance of calpains.
Results. Storage temperature has a major impact on the velocity of the degradation processes thus all processes proceeding 8–10× faster at 22°C than at 4°C. Enzyme activities last over more than 21 days *pm* at 4°C but with regard to certain enzymes staining intensities change fibre type specifically. Protein profiles show an overall decrease in size with the occurrence of fragmentation products.
Conclusions. Taken together all results indicate skeletal muscle as a stable compartment over a long *pm* time-frame with a wide variety of identifiable organelle, enzyme and protein degradation patterns and thus may provide an ideal sampling tissue for the delimitation of the approximate time of death.

O 105
Nasal ciliary motility; new tool in estimating the time of death

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Introduction. Determination of time elapsed since death is one of the most difficult issues in forensic medicine. Apart from body cooling, which is widespread used in the early post-mortem interval (PMI), supravital reactions are the most interesting post-mortem changes upon time of death estimation. Nasal ciliary motility was occasionally observed in post-mortem period but nobody has studied this phenomenon for forensic purposes. We aimed to evaluate the diagnostic usefulness of ciliary motility as a potential tool in estimating the time of death.
Methods. We obtained specimens of ciliated epithelium on 100 consecutive cadavers (age average 71,7 years) by scraping the external portion of nasal mucosa at three different post-mortem intervals: T1 (4–6 h), T2 (10–12 h) and T3 (>16 h). The samples were then smeared on the central part of a slide and an in vitro evaluation of ciliary movement was analyzed by phase-contrast microscopy. Ciliary beat frequency (CBF) was recorded and classified as: present (3–4 beats/s), hypo-valid (1–2 beats/s) and absent.
Results. Nasal ciliary motility continues after death. A statistically significant relationship between ciliary movements and increasing post-mortem interval was detected.
Conclusions. Post-mortem evaluation of nasal ciliary motility is a feasible option for estimating the time of death. Further studies are indeed requested, however we can join the observation of such phenomenon to body cooling, and other "scientific" methods, in order to improve the reliability of the estimated PMI for forensic purposes.

O 106
Woundballistic Evaluation of the TASER® XREP – ammunition

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Introduction. The Taser® XREP™ (eXtended Range Electronic Projectile) is a wireless electronic control device (ECD), shot from a 12-gauge shotgun. It delivers short high-voltage, low current energy pulses to temporarily paralyze a person. The aim of the present study was to analyze the ballistic injury potential of the XREP and to evaluate the kinetic energy flow during impact with a primary focus on the probability of skin penetration.
Methods. 20 rounds were fired from the Taser®X12 ™ shotgun into ballistic soap. The shooting distances were 1 m, 5 m, 10 m, 15 m, 20 and 25 m. A high speed camera, a photoelectric barrier and reference scale recorded the ballistic features of the XREP. The soap blocks were analyzed computertomographically (thickness 0,6 mm, collimation 0.6, pitch 0,35, 289KV) with the Osirix and the k-analyzer software.
Results. The average velocity of the XREP was v_0 67,0 m/s. The kinetic energy levels varied from 28 J (shooting distance 25 m) up till 52 J

(shooting distance 1 m). In all test series, the projectile penetrated the ballistic soap block. On impact the nose assembly did not get separated from the chassis and no electrical activation was registered. In an additional test, pig skin was used as a final target. Here, at a shooting distance of 10 m, the projectile reacted as indicated by the manufacturer and did not penetrate into the skin.
Conclusions. Upon impact, a skin penetration of the XREP cannot be excluded. However, it is very unlikely.

O 107
Drug-related deaths in the capital city of Slovakia and its vicinity

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Introduction. Using illicit drugs represents a serious health and social problem. Monitoring drug-related deaths and mortality rates among drug users is one of the essential indicators of the seriousness of drug-related problems.
Methods. The analysis of all deaths related to drug abuse in Bratislava and Trnava region in the years 1996 and 2010 was performed. According to the EMCDDA method the cases were divided into two groups: direct and indirect drug-related deaths. Statistical analyses were made by means of SPSS software.
Results. The criteria matched 459 cases, 3% of all autopsies. There were 53% of direct and 47% of indirect deaths. Males comprised 85% of all cases and females 15%. The age category ranging from 1 to 34 years represented 84% of cases. The most frequently detected substances were opiates and opioids in direct deaths in 86% of cases, in indirect deaths in 25%. The most frequent combination of substances were opiates and benzodiazepines and the combination of opiates, benzodiazepines and ethanol. In the Bratislava region there were 80% of all cases. Likely 47% of all cases were problem drug users.
Conclusions. Following the consensus between forensic specialists and toxicologists it is necessary to introduce standard guidelines for proper examinations, interpretation of findings and establishing diagnosis of drug-related deaths. For improving the quality of case monitoring it is required to extend indications of screening toxicologico-chemical examinations for defined risk groups in terms of death cause, age and history particularly in so-called indirect drug-related deaths.

O 108
Nonsteroidal anti-inflammatory drug use prior to death: outpatient characteristics and mortality rates in a large autopsy sample

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Introduction. Nonsteroidal anti-inflammatory drugs (NSAIDs) are associated with an elevated risk of gastrointestinal bleedings. It was the aim of this case-control-study to investigate this association in a large prospective autopsy study comprising more than 2000 autopsy cases. Additionally, other groups of therapeutic drugs were investigated, using data from thorough toxicological analyses as well as histology.
Methods. Based on sample size estimation, 400 cases and controls were evaluated at both institutes of forensic medicine in Berlin over a two-year-period.
Results. Ulcers were found in 6 cases in the oesophagus, in 26 deceased in the stomach, and in 40 cases in the duodenum. No differences according to age or sex were found. In about 40% of all patients with lesions, bleedings were identified as cause of death among the population of all lesions. The qualitative analysis detected NSAIDs in 7.6% of the autopsies. There was a significant association between NSAIDs and erosions with a risk ratio of about 3.0 ($p=0.011$). In the stratified analysis it could be seen that the association between NSAIDs and erosions was present only in the group of patients elder than 60 years (odds ratio: 4.9, $p=0.009$).
Conclusions. This study showed a significant elevated risk of gastrointestinal erosions for patients over 60 years of age under NSAID medication intake. The group of cases, which showed a combination of NSAID and PPI intake was too small to receive valid statistical data. Further research needs to be done to elucidate changes of the risk ratio of NSAIDs and erosions under additional PPI intake.

O 109
Ethanol concentration in breast milk after consumption of non-alcoholic beer

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Introduction. Even small amounts of ethanol can be disadvantageous for some individuals. Among these are breastfeeding women, who can transfer ethanol to the sensitive infant. To abstain from ethanol, but not from the taste of alcoholic beverages, non-alcoholic beer has become popular. According to regulations in Germany, these "alcohol-free" beverages may still have an ethanol content of up to 0.5 vol-%. To determine how much of this ethanol reaches the child a drinking experiment with non-alcoholic beer was performed and the breast milk analysed for ethanol.
Methods. After at least 5 days of abstinence from ethanol and the donation of a void breast milk sample, 13 healthy women drank 1.5 l of non-alcoholic beer each within one hour. After the end of drinking as well as 1 and 3 hours later breast milk samples were collected using electronic breast pumps. The milk was analysed for ethanol by HS-GC-FID and by an ADH-based method.
Results. In the samples that were gained immediately after the drinking period trace amounts of ethanol (up to 0.01 g/kg) were determined. In the other samples ethanol could not be found.
Conclusions. The consumption of non-alcoholic beer is innocuous for the breastfed infant.

O 110
Histopathology and drug abuse

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Introduction. Numerous tissue- and organ damages in cases of chronic and not only i.v. drug abuse are described in the literature but often can only be proved using conventional histological stainings and immunohistochemical techniques.
Methods. Tissue and organ samples, taken by autopsy following a long-term i.v. drug abuse were investigated microscopically in a retrospective study to identify drug-specific findings and, as far as possible, to graduate the damage.
Results. Microscopic findings include local so-called syringe-abscesses, inguinal fistula and fibrosis in axillary lymph-nodes. Lungs presented with partly hemorrhagic edema, microfocal deposits of siderophages, primarily acute pneumonia and cases of so-called junky-pneumopathy. Livers partly show chronic hepatitis, steatosis hepatis and single cases with acute hepatitis and peliosis hepatis as well as liver cirrhosis. Signs of heroin-associated nephropathy (HAN) including glomerulosclerosis, glomerulonephritis and interstitial nephritis were found. Additionally, there are cases of suspected myocarditis with an increased number of interstitial leucocytes, and a more or less severe cocain-associated cardiomyopathy. Eosinophil granulocytes in the

myocardium point to an acute drug-induced anaphylactic reaction as cause of sudden death. As incidental finding a hemochromatosis was found and one case with endocarditis.
Conclusions. Histological investigations are helpful to verify long-term i.v. drug abuse, to confirm clinical diagnoses and to reveal unusual causes of death as drug-induced cardiomyopathy, junky pneumopathy with heart failure, acute pneumonia, endocarditis or infarctions.

O 111
Absolute quantification of T1-, T2- values and proton density in regular post-mortem tissues with respect to temperature dependence

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Introduction. The purpose of the present study is to investigate regular post-mortem tissue T1- and T2-relaxation times as well as proton density values of unaltered organs and pathological alterations as a function of different corpse core temperatures.
Methods. In 80 forensic post-mortem cardiac 3 tesla MR examinations an absolute quantification sequence was included in short axis orientation. Prior to and after MR examination the core temperature was measured using a rectally inserted thermometer. Linear interpolation was used to assess the core temperature at scanning. Tissues such as liver, spleen, left ventricular myocardium, internal and subcutaneous fat seen in short axis images where analyzed for mean T1-, T2- and proton density values using a commercially available software for synthetic MR image generation. Pathological tissue alterations such as myocardial infarctions or steatosis hepatis were also quantified.
Results. T1, T2 and proton density values showed tissue specific combinations allowing for quantification based segmentation. Tissue alterations such as myocardial infarction present with specific T1, T2 and proton density values differing from regular myocardium. Mean T2 and PD values of analyzed tissues did not show significant temperature dependence whereas T1 values increased with increased core temperatures.
Conclusions. Absolute quantification of post-mortem tissues allows for a segmentation of different soft tissues and soft tissue pathologies in corpses. T1 values need to be interpreted with respect to the core temperature of the body. The quantification results indicate that pathologies such as myocardial infarction may be detected automatically by computer aided diagnosis tools in post-mortem MR examinations.

O 112
Changes of the palmar epidermal ridge configurations after treatment with Capecitabine (Xeloda ®) resp. Sorafenib (Nexavar®)

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Introduction. Palmar-plantar erythrodysesthesia (hand-foot syndrome, HFS) is a common adverse event in the context of treatment with cytostatic chemotherapeutics like capecitabine or sorafenib. Clinical symptoms include painful erythema, partially also blisters and ulcers of palms and soles, often preceded by paresthesia. One of the specific histological findings is a vacuolar degeneration of the basal layer. So far pathogenesis of HFS has not yet been sufficiently clarified.
Methods. HFS may have effects on the epidermal ridge configuration and therefore on the morphology of fingerprints. Our aim was to investigate these effects during and after cytostatic treatment. We took prints of all fingers and both palms at five different points of time from patients treated with capecitabine or sorafenib.
Results. First results show that severe courses of the disease may result in a preliminary complete loss of the epidermal ridge configuration at certain areas. So far only few patients completed the full study protocol, however it seems that restitutio ad integrum of the palm ridges cannot be expected for sure.
Conclusions. The finding of altered finger prints during and after the occurance of HFS is not only relevant for the investigating authorities, but also for the patients who undergo or underwent cytostatic chemotherapy. They should be informed about the risk of altered finger prints; a medical pass of the chemotherapeutic treatment might prevent them from difficulties in identification controls.

O 113
User-friendly post-mortem biochemistry

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Introduction. Since alcoholism and diabetes are frequent in Slovenia, it would be necessary to systematically perform post-mortem biochemical examinations in order to get an accurate insight in the frequency of fatal metabolic disturbances. Unfortunately, dealing with post-mortem biochemistry is time consuming while bringing few positive findings. In addition, there is considerable doubt about its reliability and critical values are not generally accepted. For all these reasons, the interest to perform it tends to decrease.
Methods. To encourage pathologists to perform post-mortem biochemistry we established a user-friendly computer-based system. In the latter, while typing the report during the autopsy, the first click registers the collection of biological sample, the second prints the appropriate sticker with a bar-code in PM room and the third sends an electronic order to the laboratory. So equipped, samples can be analyzed immediately when brought to the laboratory and the results are electronically sent back directly into the autopsy report. To find out if this logistic improved our efficiency in detecting relevant metabolic disturbances we compared our new findings with our previous findings, national statistics and data from literature.
Results. Over the period 2004–2008 we detected significant ketoacidoses in 0.62% of autopsies, which is in accordance with data on deaths of alcoholism in Slovenia. However, our efficiency in diagnosing deaths in diabetic coma (0.04%) was much lower than reported in Stockholm (1.11%). With the new logistics in 2010, we detected significant ketoacidoses at 0.88% and significant hyperglycemias at 0.49% of autopsies.
Conclusions. User-friendly logistics of post-mortem biochemistry can improve diagnostic.

O 114
Development and validity of a radiological alteration index; the RA-index

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Introduction. The objective of this study was to derivate and validate an index quantifying the state of alteration of bodies using post-mortem multidetector computed tomography (MDCT) imaging.
Methods. The RA (radiological alteration)-index, ranging from 0 to 100, quantifies the state of putrefaction analysing seven sites alone. It was derived from post-mortem MDCT data from 119 non-traumatically deceased people. One hundred additional scanned bodies (including 50% traumatically deceased) were retrospectively examined by two independent observers. Presence of gas on 82 sites was assessed by a radiologist, whereas a forensic pathologist only investigated the seven sites used for the RA-index.
Results. From the 100 cases analysed in the derivation set, 25 had a null A-index, 64 had a RA-index of 15 or less (no or slight putrefaction), 18 had a RA-index of over 30 (heart cavity full of gas), and 6 over 80 (invasion of gas to all tissues). The RA-index shows a high prediction power of the presence of gas in all 82 sites (Radj=0.843; $p<0.0001$). Even if assessment semi-quantitative evaluation of gas presence in each site showed moderate reliability (Cohen's kappa ranged from 0.406 to 0.781), the overall RA-index was very reliable ($ICC_{2,1}=0.945$; CI 95% 0.919–0.962).
Conclusions. This study shows that presence of gas from seven sites alone is a valid mean to measure the distribution of gas in the entire body. The RA-index is an easy to use instrument which remains reliable for non-experienced users and valid for non-traumatically and traumatically deceased.

O 115
Evaluation of biopsy robot iSYS1 in post-mortem, percutaneous biopsyin forensic medicine: preliminary results

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Introduction. Post-mortem computed tomography (CT) and magnetic resonance imaging (MRI) do not replace histopathology due to limited resolution and specificity. However, CT/MRI can exhibit an astonishing degree of sensitivity and thus, pathologic changes – even some that may be hard or impossible to detect at conventional macroscopy – can be detected. To support autopsy procedures and to avoid destruction of potential evidence the use of less-invasive post-mortem examinations such as CT- guided biopsies are the next step. Retrieval of biopsies of conspicuous findings in CT has the potential to increase informative value of the conventional autopsy, as small or subtle pathologic findings may be missed otherwise. The purpose of this study was to determine if the biopsy robot iSYS1 achieves an accuracy in biopsy retrieval comparable to the biopsy function of the Virtobot ® (robotic component of the Virtopsy platform).
Methods. The intended use of the iSYS1 robot is to function as a remote-operated positioning and guidance system during interventional procedures such as taking biopsies. It allows an accurate, image-guided needle positioning with an in-plane range of ±20 mm and an angulation range of ±35 degrees around a fixed pivot. We examined the feasibility of the system on real bodies.
Results. Our preliminary results indicate that the iSYS1 robot is suitable and accurate for post-mortem, image-guided biopsy retrieval. Further development and refinement certainly has to be done.

O 116
The diagnosis of drowning – from the classics to a possible new method – microbiological test

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Introduction. Drowning can be defined as death caused by submersion in a liquid. There are no autopsy findings which are pathognomonic of drowning. Diagnosis is usually made through exclusion. Also a number of tests have been developed over the years to determine whether a person has drowned – some of them standard but complicated and expensive, some easy and typical but nonspecific.
Methods. A critical concise overview of diagnostic methods, described in literature is presented – autopsy findings, morphology, biological and thanato-chemical methods, diatomeen test. Advantages and disadvantages are discussed. Since 1990 first attempts to use a microbiological test of victim's blood for the diagnosis of drowning were reported in Russia. In recent years, this method is in stage of refining and validation in Italy, Japan and Bulgaria.
Results. The reports are promising that microbiological blood sampling could be a good test for "true drowning", although still not statistically verified. There is a possibility for differentiation of findings for drowning in sea and freshwater.
Conclusions. The state of the present diagnostics is still not defining a single test for proof of drowning. A combination of autopsy findings and tests gives good, but often very expensive and time-consuming results. The microbiological test is easy, cheap and fast. It seems to become a promising tool for post-mortem diagnosis.

O 117
The pictorial representation of injuries suitable for presentation in court

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Introduction. As autopsy photographs are deemed unsuitable for showing to a jury, how can post-mortem injuries be represented in a format that is reasonably life-like yet retains an obvious diagrammatic quality? The diagrams should further be easily constructed using basic computing skills.
Methods. Male and female mannequins (provided by a department store) were photographed from multiple perspectives and the images stored on a computer. A database of diagrammatic images was compiled. The injury images could then be superimposed on the images of the mannequins to provide a representation of injuries identified and recorded at post-mortem examination.
Results. High -quality diagrammatic images of injuries were produced which could be appended to autopsy reports and also shown to jurors.
Conclusions. The images produced are of good-quality and will enhance the pathologist's verbal testimony in court, in the absence of actual autopsy photographs which are deemed unacceptable for viewing by jurors. The technique is relatively simple and the costs are almost negligible.

O 118
The coroner/medical examiner system in the United States

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Introduction. The Coroner/Medical Examiner system currently used within the United States of America has a brief but interesting history. This history will be explored, as well as how the current system has evolved. The future of forensic pathology and death investigation in the U.S. and around the world will be discussed.
Methods. The speaker is an American national with almost 8 years of experience working in one of the largest Medical Examiner offices in the world, the Los Angeles County Department of Coroner. He will use his knowledge and experiences of working in this office along with information he has gathered by researching the history of the Coroner system in the U.S. and other forensic pathology customs around the world.
Results. The Coroner/Medical Examiner system in the United States is a controversial system that often relies on the opinions and authority of non-scientific personnel in the investigations of crimes. This has led to some serious criticism within the U.S. and abroad. Some systems in other countries give too much authority to the police agencies in matters of forensic medicine.
Conclusions. If the global forensic medical community can learn about each other's systems it is possible that they can start a dialogue about the strengths and weaknesses that exist and develop a more uniform and standardized system that serves both their local communities and the world as a whole.

O 119
Experiences with informed consent for tissue donation

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Introduction. Despite an estimated number of 120,000 donor cards carried by 15% of the 850,000 deceased per year a shortage of organ and tissue transplants still exists in Germany. The actual supply of tissue transplants is not sufficient because the Last Will often is not carried out.
Methods. That is why the demand for every physician to ask for a deceased's Last Will has to be emphasized as the German Transplant Law requires and a network for tissue procurement has to be developed. Political interventions (Donor registry? More public campaigns?) to promote tissue donation in a clear and transparent way are also necessary. But the crucial point is to scrutinize the motives for or against donation. About 4000 deceased are admitted to the Hamburg Institute of Legal Medicine per year and since four years undergo a systematic analysis and documentation of their Last Will in an interview with the next of kin if including criteria for donation are fulfilled and a donor card has not been found.
Results. We present the process and the reasons why informed consent is granted or not.
Conclusions. If society takes up the challenge to increase donation knowing that there are not enough donors for the 30.000 needed tissue transplants per year then not only clinic collaborators and their responsible heads are in demand to ask for a deceased's Last Will concerning donation but also Institutes of Legal Medicine and Pathology.

O 120
Parameters characterizing the function of the immune system in infants and young children after vaccination

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Introduction. The TOKEN study was a three-year active surveillance study, sampling cases from 2005–2008. Its main objective was to investigate a possible temporal association between vaccination and sudden death in young children. One hypothesis was that deaths following vaccination could be triggered by pathologic immunoreactions.
Methods. Functional parameters characterising the immune system (IgG, IgM, IgD, IgA, specific IgE, C1 inactivator, C3, C4, TNF-α, IFN-γ, IL-1β, IL-6, IL-10, and IL-18) were determined quantitatively in serum in a total of 43 cases who had died during the first two years of life (15 cases had died within two weeks after vaccination).
Results. The investigations did not show any substantial differences between cases with and without defined causes of death, vaccinated or not vaccinated, except for such parameters which are associated with infection. Interestingly, one child who had died in the second year of life showed massively increased levels of IgG, IL-1β, IL-6, IL-10, and IL-18. We suppose that the death occurred as a result of a cytokine shock associated with septicaemia (41.2°C fever, tracheobronchitits, tonsillitis, severe dehydration). No vaccination was given prior to death.
Conclusions. Even with the extensive investigations done in the TOKEN study, not one single case showed clear signs of death due to vaccination. It would be helpful to have a bigger sample size. For the immunological investigations, age-related normal values need to be investigated as reference values.

O 121
Prevalence of alcohol, licit and illicit drugs in drivers responsible for traffic accidents with personal injury

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Introduction. In the EU Member States, concern about the role of drugs in driver impairment and traffic accidents has continuously increased. Driving under the influence of legal and illicit drugs is prohibited by the Criminal Act since 1999 in Hungary. Our on-going road side survey has shown a higher occurrence of these drugs than alcohol in the general driving population.
Methods. The occurrence of alcohol, legal and illicit drugs in drivers causing traffic accidents with personal injury was investigated in the County Csongrád, between 2008 and 2010. Alcoholic influence was investigated in all cases by assaying breath and/or blood alcohol. Blood and urine samples for toxicological analysis were also collected from drivers showing signs of impairment.
Results. There were 2127 traffic accidents with personal injury where the drivers were responsible in 1307 cases (61.45%). Alcohol was detected in 163 cases (12.47%), the average blood alcohol concentration (BAC) was 2.10 g/l. 15 persons (1.15%) were positive for legal drugs (tramadol 4, zolpidem 1, clonazepam 3, diazepam 3, alprazolam 1, temazepam 1, zolpidem + alprazolam 1). There were 13 cases positive both for alcohol and drugs. Illicit drugs were present in 10 (0.77%) cases (THC-COOH 5, amphetamine 3, morphine 2,), but impairment could be suspected only in 4 cases. All illicit drug positive cases were also positive for alcohol.
Conclusions. According to the results of the present investigation alcoholic impairment remained the most important risk factor of traffic accidents.

O 122
Detection of phosphatidylethanol species in dried blood spots by LC-MS/MS

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Introduction. Phosphatidylethanol (PEth) is currently under investigation as a promising biomarker to indicate alcohol misuse. The use of dried blood spots (DBS) for quantitative analyses can be traced back to 1913. Considering the advantages of DBS over conventional blood sampling we developed a method for the quantitative measurement of PEth species from DBS.
Methods. DBS and matching whole blood specimens (100µL, respectively) from 40 inpatients on alcohol withdrawal were analyzed for PEth 18:1/18:1 and 16:0/18:1 by LC/MS/MS following liquid-liquid extraction using phosphatidylpropanol 18:1/18:1 as internal standard. The approach recommended by Bland and Altman was used for comparison of the two methods.
Results. PEth 18:1/18:1 and 16:0/18:1 concentrations in whole blood ranged from 46.1 to 3,360 ng/mL (mean 461.7 ng/mL) and from 922 to 213,000 ng/mL (mean 23,375 ng/mL), respectively; PEth 18:1/18:1 and 16:0/18:1 values in DBS varied from 35.8 to 3,360 ng/mL (mean 457.6 ng/mL) and from 900 to 213,000 ng/mL (mean 23,470 ng/mL). The mean concentration ratio (blood/DBS) for PEth 18:1/18:1 and PEth 16:0/18:1 was 1.2 and 1.0, respectively. For both, PEth 18:1/18:1 and 16:0/18:1 the mean bias was −4.3 ng/mL with limits of agreement ranging from −30 to 21.5 ng/mL and from −1,270 to 1,461 ng/mL.
Conclusions. The Bland-Altman difference plots showed a single outlier for PEth 18:1/18:1, whereas all differences for PEth 16:0/18:1 between the assays fell within the limits of agreement. The determination of PEth species from DBS being comparable to that in whole blood may have utility in monitoring alcohol misuse.

O 123
Influence of alcohol on sex crimes against adolescents. Risk factors, perception of risk and use of forensic reports

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Introduction. Factors taking effect on sexual offence against adolescents with a special consideration to the influence were evaluated retrospectively. The risk factors included are puberty and group dynamics, neurobiological changes in adolescence, intellectual and social development and other developmental related risk factors. Special consideration concerned the perception of risk, acting variables on pressing charges against the perpetrator or keeping silence, as well as fictious accusations of rape, date rape drugs and their actual use and finally prospects of prevention.
Methods. The investigation incorporates a first explorative study of 48 cases by the Department of Sexual Offences of the State Office of Criminal Investigation Hamburg and interviews with first-aiders in police and non-govermental organisations. The age group of victims was 14–18 years, extended and added for 12–21 years of age.
Results. Results include a lack of date rape drugs like GHB or benzodiazepines. While often illustrated in the media, they are very rarely found in actual cases.
Conclusions. Alcohol consumption is dependent on scene and social surroundings. The initiative of consumption correlates with the site of the crime. Forced consumption by the offender corresponded with increased drunkenness of the victim and happened in places that promised control by the perpetrator, like his home or other closed places. Study limitations and implications of findings are discussed. Suggestions for further studies are given.

O 124
Assisted suicide with Fentanyl-transdermal patch

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The husband of a 46-year-old woman notified the emergency physician, that he found his wife dead at the bed in the early morning. She was suffering for years from breast cancer with a progressive metastasis, and he was nursing her at home. Within the post-mortal inspection a total of 34 transdermal patches were found on the wife's corpse, which contain Fentanyl in a concentration of 25–100 µg/h. All the patches were found in easily reachable body-regions by the deceased wife.
The forensic autopsy showed a status post right breast resection as well as metastasis in the axilla's soft tissues, lungs, epicardium and diaphragm. A toxicological analysis showed a Fentanyl-concentration of 87.8 ng/ml in serum. The cause of death was declared breathing paralysis by acute opioid-intoxication. By further interrogation the husband admitted that he had prepared several packages of collected transdermal-patches in the evening before. He also acknowledged that he found his wife with weak vital signs in the early morning hours and waited for her to die before notifying the emergency service. The case was processed by the district attorney under § 153 StGB.

Deutsche Vorträge der 90. Jahrestagung der Deutschen Gesellschaft für Rechtsmedizin

German Abstracts of the 90th Annual Conference of the German Society of Legal Medicine

OG 1
Autopsie – Virtopsie

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Einleitung. Die Autopsie hat sich als bestmögliches Verfahren erwiesen, um den Zustand eines Verstorbenen mit den körpereigenen Mitteln eines Untersuchers zu erfassen und bietet zudem die Grundlage für histologische, chemisch-toxikologische, mikrobiologische und molekulargenetische Zusatzuntersuchungen. Ein breites Spektrum von Informationen wird zu einem Befundbild integriert: Technik gemäß Leitlinien der Deutschen Gesellschaft für Rechtsmedizin. AWMF-Leitlinien-Register Nr. 054/001, Entwicklungsstufe 3. Die sich seit vielen Jahren entwickelnde Virtopsie ergänzt in hervorragender Weise mit Bildgebung dort, wo den Untersuchern physische und präparatorische Grenzen gesetzt sind. Der Arbeitskreis um Prof. Thali formuliert darüber hinaus auf http://www.virtopsy.com/index.php?option=com_content&view=article&id=1&Itemid=6 in den project ideas u. a. das erstrebte „replacing" der konventionellen Leichenöffnung, was wir im Kontext als Ersatz der sog. „body dissection" durch bildgebende bzw. minimalinvasive Verfahren verstehen.
Methoden. Die Möglichkeiten der physischen und virtuellen Befunderhebung werden für ausgewählte Organsysteme und ausgewählte Todesursachen gegenüber gestellt.
Ergebnisse. Die Ergebnisse der noch laufenden Untersuchungen werden/wurden nach Annahme des Vortrages auf der 90. Jahrestagung der Deutschen Gesellschaft für Rechtsmedizin präsentiert.
Schlussfolgerungen. Unser Beitrag zielt auf ein sinnvolles Miteinander und gegen die Ausschließlichkeit tradierter physischer bzw. virtueller Untersuchungstechniken.

OG 2
Rippenbrüche im postmortalen CT oder „Ich sehe was, was Du nicht siehst!"

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Einleitung. An immer mehr Instituten findet die Computertomographie (CT) Einsatz in der Skelettdiagnostik verstorbener Personen. Immer wieder fällt bei der Beurteilung der postmortalen CT-Datensätze eine Diskrepanz zwischen den Befunden der Obduktion und denen der CT-Untersuchung auf, wobei sich mehrheitlich im CT intakte knöcherne Strukturen autoptisch als frakturiert darstellen. Insbesondere bei Rippenbrüchen fielen diese Diskrepanzen häufig auf. Deshalb haben wir prospektiv untersucht, wie spezifisch und signifikant im postmortalen CT detektierte Rippenfrakturen letztlich wirklich sind.
Methoden. In 50 postmortalen Ganzkörper-Scans wurden die Rippenthoraces von jeweils einem in der postmortalen Bildgebung erfahrenen Facharzt für Rechtsmedizin sowie unabhängig davon von einem Facharzt für Radiologie beurteilt. Die entsprechenden Daten wurden ebenfalls in der Obduktion erhoben. Dabei wurde die Lokalisation der Frakturen mittels eines Schemas dokumentiert das sechs verschiedene anatomische Zuordnungen erlaubt. Sowohl die interobserver Variabilität wurde berechnet wie auch die Validität der forensischen Befundung und der klinisch radiologischen Befundung gegenüber den realen Autopsiebefunden wurde bestimmt.
Ergebnisse. Die Diskrepanzen konnten bestätigt werden. Letztlich zeigte sich, dass in der CT-Untersuchung Rippenbrüche dann nicht detektiert wurden, wenn keine Dislokation der Bruchenden vorlag. Auch fielen in modernen 3D-Rekonstruktionsprogrammen, wie in einzelnen Publikationen beschrieben, Software-induzierte sog. „Glättungsartefakte" auf, welche den Bruch zusätzlich verschleierten.
Schlussfolgerungen. Es werden die Resultate der autoptischen (makroskopisch) und bildgeberischen (CT-)Untersuchung und die statistischen Auswertungen präsentiert und unter Berücksichtigung der aktuellen Literatur wird der Stellenwert der Obduktion bezogen auf die neuen bildgeberischen Möglichkeiten diskutiert.

OG 3
Postmortale Ventilation bei penetrierenden Thoraxverletzungen

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Einleitung. Ungeachtet des Progresses in der postmortalen Bildgebung existieren nur wenige Studien über die Erscheinung der Lungen in der postmortalen Computertomographie (pmCT). Eine erste Studie über die postmortale Ventilation mittels eines Home-Care -Ventilators zeigte verheißungsvolle Ergebnisse. Bei penetrierenden Verletzungen des Thorax mit Ausbildung eines Pneumo- und/oder Hämatothorax ist die Beurteilung der postmortalen Lungen jedoch nur sehr eingeschränkt möglich. Ziel der Studie war die Etablierung einer Methode zur besseren Evaluierung der postmortalen Lunge bei gleichzeitigem Vorliegen eines Pneumo- und/oder Hämatothorax.
Methoden. In 5 Fällen mit penetrierendem Thoraxtrauma (1 Stichwunde, 4 Schussverletzungen davon 3 Schrotschüsse) wurden die Lungen intrakorporal über CPAP-Masken unter Verwendung eines Home-Care-Ventilators mit 0, 20 und 40 mbar ventiliert und gleichzeitig CT-Scans durchgeführt. Für die Evakuation des Pneumo- und/oder Hämatothorax wurden Thoraxdrainagen gelegt und mit einer Univac Absaugpumpe verbunden.
Ergebnisse. In 2 Fällen zeigte sich eine deutliche Reduktion des Pneumo-/Hämatothorax, wohingegen die Vakuumabsaugung in drei Fällen zu keiner Verringerung des Hämatothorax führte. Weiterhin fand sich in zwei Fällen eine Zunahme des Pneumothorax im Zuge der postmortalen Ventilation. Insgesamt führte die postmortale Ventilation zu einer (partiellen) Entfaltung kollabierter Lungenareale und somit zu einer besseren Beurteilbarkeit. Eine Dislokation der Schrotkügelchen als Folge der postmortalen Ventilation konnte nicht festgestellt werden.
Schlussfolgerungen. Obgleich der Effekt der postmortalen Ventilation von Fall zu Fall variierte, ist die Methode einfach anwendbar und eröffnet neue Möglichkeiten für eine verbesserte Beurteilung der Lungen nach penetrierendem Thoraxtrauma.

OG 4
Mit den Augen sehen, was vor den Augen lieget – zwei Beispiele beinahe unerkannter Tötungsdelikte

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Einleitung. Die Erkennung primär unerkannter Tötungsdelikte ist ein wichtiger Aspekt der rechtsmedizinischen Routine und ein bedeutendes Argument für eine möglichst hohe Obduktionsfrequenz.

Methoden. Wir stellen zwei Fälle vor, die erst im Rahmen der Obduktion als Tötungsdelikte erkannt wurden. Im ersten Fall wurde ein Mann mit einer ausgeprägten Schädelverletzung neben einer Bahnstrecke aufgefunden. Da von einem Suizid ausgegangen wurde, wurde der Verstorbene zunächst freigegeben. Aufgrund eines unklaren Spurenbildes erfolgte nach einem Tag die Hinzuziehung der Rechtsmedizin, die in der Folge durchgeführte Obduktion ergab als Todesursache einen Kopfschuss. Der Liebhaber der Ehefrau des Verstorbenen konnte als Täter überführt werden und wurde wegen Mordes zu einer lebenslangen Haftstrafe verurteilt.
Bei dem zweiten Fall handelte es sich um einen Alkoholiker, der tot in seinem Bett aufgefunden wurde. Aufgrund von Blutantragungen in der Wohnung wurde zunächst von einer gastrointestinalen Blutung ausgegangen. Da jedoch auch ein Brillenhämatom vorlag, wurde seitens der Rechtsmedizin eine Obduktion angeregt, die als Todesursache ein subdurales Hämatom ergab. Darüber hinaus fanden sich weitere Zeichen einer stumpfen Gewalteinwirkung, die – trotz zunächst gegenteiliger Auffassung der ermittelnden Polizeibeamten – nicht mit einem Sturzgeschehen in Einklang zu bringen waren. Wenig später konnte ein Bekannter des Geschädigten ermittelt werden, der einräumte, diesen im Streit getötet zu haben. Der Täter wurde wegen Totschlags verurteilt.
Schlussfolgerungen. Die Fallbeispiele heben die Bedeutung der gerichtlichen Obduktion als Mittel zur Aufklärung primär nicht erkannter Tötungsdelikte hervor.

OG 5
Fortgesetzte Kindeswohlgefährdung durch Fehlinterpretation einer kindlichen Verletzung

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Es wird ein Fallbericht eines misshandelten Kleinkindes vorgestellt, der aufzeigen soll, von welch großer Relevanz die rechtzeitige Diagnosestellung einer Kindesmisshandlung, insbesondere bei jungen Säuglingen, ist. Dies ermöglicht eine frühzeitige Einschätzung der Kindeswohlgefährdung und damit die Reduzierung des Risikos für zukünftige Misshandlungen. Ein 2-jähriges Mädchen wird, nach Angaben der Mutter nach einem Treppensturz mit sofortiger Bewusstlosigkeit, stationär aufgenommen. Es wird eine für ein Sturzgeschehen untypische Schädelfraktur mit Hirnblutungen diagnostiziert. Bereits im Alter von 3 Wochen erlitt der Säugling eine Oberarmfraktur, die, laut Mutter, durch einen Sturz des Säuglings verursacht worden sein soll. Die Verletzungsbefunde des Kindes, die rechtsmedizinische und kinderradiologische gutachterliche Einschätzung sowie die letztlich geständige Einlassung der Kindesmutter werden dargestellt.

OG 6
Injektionen von Fäkalien in die Blutbahn: ein extremer Fall von Münchhausen-by-proxy-Syndrom

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Einleitung. Das Münchhausen-by-proxy-Syndrom stellt eine subtile Form der Kindesmisshandlung dar, bei der Bezugspersonen Krankheiten oder Symptome bei Kindern erfinden oder herbeiführen, um eine Behandlung des Kindes und die damit verbundene Aufmerksamkeit zu erlangen. In den meisten Fällen handelt es sich bei den Bezugspersonen um die Mutter; insgesamt ist dieses Krankheitsbild mit geschätzten Zahlen zwischen 0,2–3 Fällen/100.000 Kinder eher selten.
Methoden. Im vorliegenden Fall wurde ein 1,5 Jahre alter Junge aufgrund einer schweren Gedeihstörung unklarer Genese zusammen mit seiner Mutter in einer Berliner Klinik aufgenommen. Eine Krankheitsursache konnte nicht festgestellt werden, der Junge nahm rasch wieder an Gewicht zu. In der Klinik kam es zu einer Rotavirusinfektion, so dass ein ZVK gelegt wurde. Kurze Zeit später traten erstmalig Fieberschübe auf, Blutkulturen zeigten eine Infektion mit *Streptococcus oralis* und *salivaris*. Trotz spezifischer Antibiose kam es im folgenden Monat wiederholt zu schweren Sepsisschüben mit permanenten Erregerwechseln, insgesamt handelte es sich durchweg um Bakterien und Pilze der menschlichen Darmflora. Auf der Intensivstation erholte sich der Junge mehrmals rasch, erkrankte auf der peripheren Station jedoch immer wieder erneut. Eine Ursache der Sepsisschübe wurde nicht festgestellt.
Ergebnisse. Beim Aufräumen im Krankenzimmer des Jungen wurde eine Spritze mit bräunlichem Inhalt gefunden. Mikrobiologische und molekularbiologische Untersuchungen ergaben, dass es sich um Fäkalien der Kindesmutter handelte.
Schlussfolgerungen. Im Gerichtsverfahren räumte die Mutter das dreimalige Injizieren ihrer Fäkalien in den ZVK des Kindes ein und wurde zu 4,5 Jahren Haft verurteilt. Ein psychiatrischer Gutachter bescheinigte ihr eine verminderte Schuldfähigkeit im Sinne von § 21 StGB durch eine schwere Persönlichkeitsstörung und ein Münchhausen-by-proxy-Syndrom. Der Junge entwickelte sich seit seiner Inobhutnahme altersgerecht.

OG 7
Ballistische Parameter und Traumapotenzial kartuschenbetriebener Bolzentreibgeräte

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Einleitung. Kartuschenbetriebene Bolzensetzgeräte sind seit Mitte des 20. Jahrhunderts in der Bauindustrie weit verbreitet. Sie dienen zum Eintreiben von Befestigungsmaterialien wie Gewindebolzen, Stiften oder Nägeln in feste Werkstoffe. In der medizinischen Literatur sind zahlreiche Berichte über Verletzungen und Todesfälle durch diese Schussapparate zu finden. Bauartbedingt werden Bolzentreibgeräte, bei denen ähnlich einer Schusswaffe die Energie der Treibladung vollständig und direkt auf den Bolzen übertragen wird, von Bolzenschubgeräten unterschieden, bei denen sich ein Kolben zwischen Kartusche und Bolzen befindet. Moderne Bolzensetzgeräte arbeiten ausschließlich nach dem Kolbenprinzip (Bolzenschubgeräte) und erreichen Mündungsgeschwindigkeiten unter 100 m/s. Die gewerbliche Verwendung von Bolzentreibgeräten ist nach den Unfallverhütungsvorschriften der Berufsgenossenschaften verboten. Nach §§ 7 und 8 BeschG sind sie jedoch nach wie vor zugelassen.
Methoden. Mündungsgeschwindigkeit und Mündungsenergie sind wesentliche Parameter zur Bewertung des Gefährdungspotenzials dieser Schussapparate. Aufgrund fehlender experimenteller Untersuchungen sind die entsprechenden Angaben in der medizinischen Literatur sehr unzuverlässig, ihre Bestimmung war Ziel dieser Arbeit. Untersucht wurden 3 Bolzentreibgeräte im Kaliber 6,3/16 (Record Piccolo S, Rapid Hammer R300, Titan Typ 1) sowie ein Bolzentreibgerät im Kaliber 9×17 (Ideal). Zur Überbrückung der Freischusssicherung erfolgte der Versuchsaufbau nach DIN 7260.
Ergebnisse. Die durchschnittliche Mündungsenergie der 9 mm Stahl- bzw. 6 mm Gewindebolzen lag zwischen 385 und 547 J bei einer durchschnittlichen Mündungsgeschwindigkeit von 400 bis 580 m/s. Die durchschnittliche Energiedichte der Projektile reichte von 9 bis 18 J/mm².
Schlussfolgerungen. Die ermittelten Mündungsgeschwindigkeiten und -energiewerte sind somit wesentlich höher als die bekannten Parameter der Bolzenschubwerkzeuge und durchaus mit dem weit verbreiteten Kaliber 9 mm Luger zu vergleichen.

OG 8
Ungewöhnlicher Fall einer Geschossfragmentation

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Am 10.04.2011 sei ein 23-jähriger Mann vor der Notaufnahme des Universitätsspitals Basel, in einem Rollstuhl sitzend, im hämorrhagischen Schock gefunden und sofort notoperiert worden. Es zeigten sich 2 dorsale Einschussdefekte sowie ein abdominaler Ausschussdefekt. Es konnte im Rahmen der Operation ein in zweigeteiltes Projektil gesichert werden. Ausgehend von einem Durchschuss sowie einem Steckschuss begann die Suche nach einem weiteren Projektil, in einem Fahrzeug, das inzwischen als möglicher Tatort in Betracht kam. Nach kriminaltechnischer Untersuchung konnte durch die Rekonstruktion eine Erklärung für das ungewöhnliche Verletzungsbild gefunden werden.

OG 9
Letale Kohlenmonoxidintoxikation durch Holzpellets?

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Einleitung. Holzpelletheizungen sind kostengünstig und klimaneutral. Im Zuge der aktuellen Klimapolitik in Kombination mit steigenden Öl und Gaspreisen erfreuen sich Holzpelletheizungen zunehmender Beliebtheit. Dass aus gelagerten Holzpellets CO entstehen kann, ist bekannt. Bereits 2009 warnte das toxikologische Zentrum Zürichs vor der Gefahr einer CO-Entstehung durch Holzpellets.
Fall. Eine 28 Jahre alt gewordene, im 4. Monat schwangere Frau war tot in einem luftdichten Holzpelletlagerraum unter einer Holzpellettransportmaschine eingeklemmt gefunden worden. Nach der Leichenschau standen primär die durch die Einklemmung entstandenen Verletzungen als todesursächlich im Vordergrund. Bei der rechtsmedizinischen Obduktion fielen hellrote Totenflecken und Fingernagelbetten auf. Die chemisch-toxikologische Untersuchung des Herzblutes ergab eine todesursächliche Carboxyhämoglobinkonzentration von ca. 75%. In Gewebeproben des ca. 13 Wochen alten Feten und der Plazenta ließ sich ebenfalls CO nachweisen.
Diskussion. Anhand dem untersuchten Fall wird diskutiert werden, ob das CO durch Autooxidation von Holzbestandteilen entstanden ist oder ein Zurückdrücken von Verbrennungsgasen aus dem Holzofen ursächlich für die letale CO-Intoxikation war.

OG 10
Bewertung von postmortalen Valproinsäureblutspiegeln – Quantitative Bestimmung von Valproinsäure bei Todesfällen

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Einleitung. Valproinsäure wird bereits seit über 40 Jahren im Rahmen der Therapie verschiedener Formen der Epilepsie eingesetzt. Weist ein Verstorbener in der Vorgeschichte ein Anfallsleiden auf, das therapeutisch mit Valproinsäure behandelt wurde und weist der Obduktionsbefund, z. B. durch die Feststellung eines Zungenbisses, auf das Vorliegen eines todeszeitnahen Krampfanfalles hin, stellt sich die Frage der Ursächlichkeit im Hinblick auf eine unzureichende arzneiliche Therapie. Konkreter Anlass für die Untersuchungen war der Todesfall eines stationären psychiatrischen Patienten bei dem ein Anfallsleiden vorlag, das mit Valproinsäure behandelt wurde. Es war daher notwendig eine quantitative chromatographische Bestimmung der Valproinsäure durchzuführen und dafür eine Methode zu erarbeiten.
Methoden. Da kein deuterierter interner Standard (ISTD) verfügbar ist wurden Gammahydroxybuttersäure (GHB), Methoxybenzoesäure und Cyclohexylcarbonsäure auf ihre Einsetzbarkeit als ISTD sowie verschiedene Extraktionsmethoden getestet. Ferner wurden Stabilitätsuntersuchungen bei Lagerung von Leichenblutproben bei −20°C, 4°C, 20°C über einen Zeitraum von einem Monat durchgeführt, um zu prüfen ob ein postmortal gemessener niedriger Wert von Valproinsäure ggf. durch Degradation erklärt werden kann.
Ergebnisse. Die Entwicklung einer Methode zum quantitativen Valproinsäurenachweis erwies sich als äußerst problematisch. Cyclohexylcarbonsäure als interner Standard erbrachte bei einer Fällung mit Acetonitril schließlich reproduzierbare Ergebnisse im Leichenblut. Die validierte Methode wird zusammen mit den Ergebnissen zur Stabilität vorgestellt.
Schlussfolgerungen. Ein postmortal erhobener quantitativer Befund in einer Leichenblutprobe stellt nicht nur an die Analytik sehr hohe Anforderungen. Die Miteinbeziehung der verschiedenen Faktoren, die das Ergebnis beeinflussen machen ggf. zusätzliche Untersuchungen z. B. zur Stabilität erforderlich, um ein aussagekräftiges und richtiges Interpretationsergebnis des Befundes zu erhalten

OG 11
Die Aussagekraft humanspezifischer Bluttests zur Einschätzung des postmortalen Intervalls bei Knochenfunden

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Einleitung. Vor dem Hintergrund vorliegender Studienergebnisse über die Verwendbarkeit des Luminoltests und humanspezifischer Bluttests bei der ersten Einschätzung der postmortalen Liegezeit knöcherner Überreste stellte sich die Frage nach der Anwendbarkeit für den Nachweis humaner Blutbestandteile noch sensibleren Testverfahren für die weiterführende Eingrenzung des PMI.
Methoden. In der Fortsetzung unserer Experiments wurden fünf humane Knochen mit bekanntem Postmortal-Intervall (PMI) aus fünf Liegezeitperioden im Erdlager (0,2 bis ca. 2000 Jahre) mit zwei etablierten Schnelltests zum Nachweis von Blutspuren (Hexagon-OBTI®-Test und RSID®-Bluttest) untersucht. Es erfolgten an den verblindeten Proben insgesamt 5 Versuchsreihen nach Packungsanleitung und unter Abwandlung der Standardprotokolle der Hersteller. Es sollte überprüft werden, ob mit vorgeschalteten Reaktionsschritten bzw. längerer Inkubationszeit, Hämoglobin bzw. seine Bestandteile aus dem Knochen gelöst und in Abhängigkeit des PMI positive Testergebnisse resultieren können.
Ergebnisse. Vier Versuchsreihen erbrachten für alle Proben ein negatives Ergebnis und eine Versuchsreihe für alle Proben ein gleichmäßiges schwach positives Resultat.
Schlussfolgerungen. Die Ergebnisse weisen darauf hin, dass diese Schnelltests, die auf dem Nachweis von Blut beruhen, zur Eingrenzung des postmortalen Intervalls von Knochenfunden trotz Abwandlung der Standardprotokolle nicht geeignet sind. Zu dem offenbar kritischen Problem des postmortalen Abbaus von Hämoglobin in Knochen sind weitere, grundlegende Experimente notwendig.

OG 12
Die Bestimmung des Skelettalters der Hand: ein Methodenvergleich

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Einleitung. Bis zum vollständigen Abschluss der Reifungsvorgänge mit etwa 18 Jahren kommt der Bestimmung des Skelettalters der Hand eine zentrale Bedeutung in der forensischen Altersschätzungspraxis zu. Für die Beurteilung von Handradiogrammen stehen dabei Atlasverfahren, Einzelknochenverfahren sowie planimetrische Verfahren zur Verfügung.
Methoden. Die verschiedenen methodischen Ansätze zur Bestimmung des Skelettalters der Hand wurden anhand einer Studienpopulation aus 48 männlichen und 44 weiblichen Probanden verglichen.
Ergebnisse. Die Ergebnisse des statistischen Vergleichs werden präsentiert.
Schlussfolgerungen. Es werden die sich aus der Untersuchung ergebenden Konsequenzen für die forensische Altersschätzungspraxis dargestellt.

OG 13
Studie zur sonographischen Beurteilung der Ossifikation der distalen Radiusepiphysenfuge

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Einleitung. Für die forensische Altersschätzung bei lebenden Personen ist die Beurteilung des Ossifikationsstadiums der Epiphysenfuge des distalen Radius von entscheidender Bedeutung. Aufgrund des Minimierungsgebotes im Strahlenschutz ist die Entwicklung nichtionisierender bildgebender Verfahren zur Untersuchung der Skelettreifung wünschenswert. Für die Praxis der forensischen Altersdiagnostik bei lebenden Personen liegt bezüglich der sonographischen Beurteilung der Ossifikation der distalen Radiusepiphysenfuge bisher lediglich eine Pilotstudie mit geringer Fallzahl vor.
Methoden. Prospektiv wurde der rechte distale Radius von 615 gesunden Personen zwischen 10 und 25 Jahren hinsichtlich der üblichen Ossifikationsstadien sonographisch mit einem 7,5 MHz-Linearschallkopf untersucht.
Ergebnisse. Die Autoren präsentieren die statistischen Maßzahlen.
Schlussfolgerungen. Die Anwendbarkeit der Ergebnisse für die Praxis der forensischen Altersdiagnostik wird erläutert.

OG 14
Prospektive CT-morphologische Bewertung der altersabhängigen Ossifikation der medialen Clavicula-Epiphysenfuge

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Einleitung. Entsprechend den aktualisierten Empfehlungen der Arbeitsgemeinschaft für Forensische Altersdiagnostik (AGFAD) ist die Bewertung der medialen Clavicula-Epiphysenfuge von entscheidender Bedeutung für die Altersschätzung von Jugendlichen im Strafverfahren, wenn deren Handskelett bereits vollständig entwickelt ist. Wir stellen hier die erste prospektive, CT-morphologische Untersuchung dieses Altersmerkmals vor.
Methoden. Von männlichen und weiblichen Personen zwischen 10 und 30 Jahren wurden nach der Obduktion Präparate entnommen, die das mediale Ende der rechten und linken Clavicula im anatomischen Zusammenhang mit dem Manubrium sterni enthielten. Diese wurden vakuumverschweißt und bei –20°C gelagert. Für die Untersuchung wurde ein 16-zeiliges Multidetektor-Computertomographie-System verwendet. Unter Anwendung der Stadien- und Unterstadieneinteilungen von Schmeling et al. (2004) sowie Kellinghaus et al. (2010) erfolgte anschließend die Bewertung axialer und koronarer Schnittebenen in 0,6 mm Schichtdicke.
Ergebnisse. Es werden die statistischen Maßzahlen präsentiert.
Schlussfolgerungen. Die Implikationen für die forensische Altersdiagnostik bei lebenden Patienten werden dargestellt.

OG 15
Etablierung einer Gewaltopferambulanz am Institut für Rechtsmedizin der Universität München

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Einleitung. Körperliche und sexuelle Gewalterfahrungen sind in den letzten Jahren immer mehr in den Blickpunkt öffentlichen Interesses getreten. Neben Maßnahmen zum Opferschutz ist die Dokumentation und Interpretation der verursachten Verletzungen entscheidend. Seit März 2010 besteht am Institut für Rechtsmedizin der Universität München das niederschwellige Angebot zur kostenlosen telefonischen und persönlichen Beratung, sowie zur körperlichen Untersuchung von Gewaltopfern und gerichtsverwertbaren Dokumentation der erhobenen Befunde.
Methoden. Zur Bekanntmachung des niederschwelligen Angebotes der Gewaltopferambulanz wurden insgesamt 5000 Briefsendungen bayernweit an niedergelassene und klinisch tätige Gynäkologen, Kinder- und Jugendmediziner sowie Allgemeinmediziner versandt. Eine zusätzliche Verbreitung des Angebotes und Vernetzung erfolgte u. a. im Rahmen von Fachtagungen, runden Tischen und Weiterbildungsveranstaltungen. Eine Untersuchung konnte jeweils nach vorheriger telefonischer Kontaktaufnahme erfolgen. Die Befunde wurden mittels standardisierter Untersuchungsbögen und fotografisch dokumentiert.
Ergebnisse. Innerhalb eines Jahres seit Eröffnung der Ambulanz stellten sich 30 Frauen und 2 Männer zur körperlichen Untersuchung und Beratung vor, wobei die Mehrzahl der Personen durch ihre behandelnden Hausärzte Kenntnis über die Ambulanz erhielten. In 19 Fällen erfolgte die Vorstellung vor dem Hintergrund körperlicher Gewalterfahrung (dabei 5-mal Gewalt gegen den Hals), in 11 Fällen nach sexuellen Übergriffen (davon in 2 Fällen bei Männern). Beide Misshandlungsformen fanden sich bei 2 Fällen. Des Weiteren wurden 35 Mädchen und 16 Jungen zur Abklärung bei Verdacht auf sexuellen und/oder körperlichen Missbrauch untersucht. In 32 Fällen bestand ein Verdacht auf sexuellen Missbrauch und in 11 Fällen auf körperliche Misshandlung. Fünf Kinder wurden bei Verdacht auf beide Gewaltformen untersucht. In 3 Fällen bestand kein konkreter Verdacht. Diese Kinder wurden im Rahmen von Untersuchungen bei Geschwisterkindern vorgestellt.
Schlussfolgerungen. Die gute Akzeptanz des niederschwelligen Angebotes der Gewaltopferambulanz am Institut für Rechtsmedizin der Universität München zeigt unter anderem, dass eine hohe Unsicherheit im Umgang mit Opfern körperlicher und sexueller Gewalterfahrung besteht. Dies betrifft insbesondere die gerichtsverwertbare Dokumentation von Befunden und Asservierung von Spuren. Gerade bei Kindeswohlgefährdung besteht seitens staatlicher Institutionen und Klinikärzten aber auch bei Sorgeberechtigten das Interesse den Verdacht zu klären. Zur Verbesserung der interdisziplinären Kooperation beim Umgang mit Erkennen von Gewalt an Kindern und Jugendlichen wurde im April 2011 offiziell die Kinderschutzambulanz am Institut für Rechtsmedizin München eröffnet. Sie wird vom Bayerischen Staatsministerium für Arbeit und Sozialordnung, Familie und Frauen als Modellprojekt für 3 Jahre unterstützt.

OG 16
Zum Phänomen der sog. Wohnungsleichen – eine Auswertung der Gießener Obduktionsfälle ab 2005

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Einleitung. Der Begriff „Wohnungsleiche" ist sowohl in rechtsmedizinischen Fachkreisen (tägliche Arbeit, Fachliteratur) als auch in der Öffentlichkeit (Presse, Romane) regelmäßig in Gebrauch. Die einzige Definition des Begriffs findet sich in „Basiswissen Rechtsmedizin" (Madea und Dettmeyer 2007). Die dort genannten 7 Kriterien dieser Definition sollten mit der vorliegenden Studie überprüft werden.
Methoden. Die Obduktionen der Jahre 2005 bis 2011 (bis Feb.) des Instituts für Rechtsmedizin der Justus-Liebig-Universität Gießen wurden retrospektiv auf die Kriterien der Definition überprüft. Als Einschlusskriterien galten eine Liegezeit von mindestens 24 Stunden und ein Auffindeort in einer privaten Wohnstätte (n=229).
Ergebnisse. Vier der sieben Kriterien („fortgeschrittene Leichenerscheinungen", „soziale Isolation", „oftmals unklare Todesursache", „Schwierigkeiten bei der Identifikation") waren verifizierbar. Ein Kriterium („häufig lange Liegezeit") zeigte keine Übereinstimmung und zwei Kriterien („Anlass der Auffindung", „häufig bestehender Alkoholismus") eine teilweise Übereinstimmung. Die Rate von Männern lag bei „Wohnungsleichen" höher (ca. 3:1) und das Sterbealter durchschnittlich bei 50,6 Jahren (Männer) bzw. 57,7 Jahren (Frauen).
Schlussfolgerungen. Bei den Punkten Grund der Auffindung und Alkoholismus sollte die Definition differenziert werden. Dass sich die häufig lange Liegezeit nicht bestätigte ist möglicherweise von den gewählten Einschlusskriterien abhängig.

OG 17
Ein besonderer Fall der Leichenzerstückelung – Fallpräsentation vor dem Hintergrund einer retrospektiven Auswertung des Sektionsgutes in Hamburg

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Einleitung. Bereits 1924 unterschied Sellers die religiöse von der gerichtlichen und der kriminellen (u. a. offensiv und defensiv) Leichenzerstückelung und definierte damit drei Gründe für ein derartiges Vorgehen. 1940 wurden durch Orsos die natürliche, zufällige, nichtkriminelle und kriminelle Leichenzerstückelung beschrieben. Püschel et al. (1987) differenzierten zwischen den Typen I–IV. Das Phänomen der Leichenzerstückelung gilt laut Literatur im forensischen Obduktionsgut als seltenes Ereignis mit Häufung in den städtischen Ballungsgebiete.
Methoden. Vorliegend werden die Leichenzerstückelungsfälle der letzten Jahrzehnte aus dem Sektionsgut in Hamburg entsprechend der gängigen Definitionen zusammenfassend präsentiert und ein aktueller Fall mit seinen Besonderheiten vorgestellt und diskutiert.
Ergebnisse. Die Auswertung zeigt, dass die einzelnen Fälle der Leichenzerstückelung sehr gut den gängigen Definitionen mit ihren entsprechenden Charakteristika zugeordnet werden können. Der präsentierte Einzelfall zeichnet sich jedoch durch eine besondere Form der Zerstückelung aus. Zudem waren ein Mann das Opfer und seine Ehefrau die Täterin.
Schlussfolgerungen. Die zusammenfassende retrospektive Falldarstellung bestätigt, dass es sich bei Fällen von Leichenzerstückelung um ein seltenes, aber stets wiederkehrendes Phänomen im rechtsmedizinischen Sektionsgut handelt. Es wird immer wieder Einzelfälle geben, deren Zuordnung zu einer dieser Definitionen aufgrund spezieller Besonderheiten erschwert ist. In diesen Fällen ist eine detaillierte Analyse für das Fallverständnis, insbesondere die Tätermotivation, unerlässlich.

OG 18
Sexualdelikte im Hamburger Stadtbereich – eine retrospektive Analyse

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Einleitung. Zu den regelmäßigen Dienstleistungen des Hamburger Institutes für Rechtsmedizin zählt die Untersuchung von Opfern sexueller Gewalt. Zu den Aufgaben des Rechtsmediziners gehören die Deskription, Dokumentation und Interpretation von Verletzungen ebenso wie die Sicherung biologischer Spuren. Inwiefern es sich tatsächlich um Opfer von Gewalt handelt oder ob eine Straftat vorgetäuscht wird, kann in aller Regel durch die Untersuchung allein nicht geklärt werden, sondern ergibt sich meist aus der Synopsis von polizeilichen Ermittlungen und rechtsmedizinischen Erkenntnissen. Nur selten – meist im Rahmen einer Gerichtsverhandlung – erfährt der Rechtsmediziner, ob die eigene Untersuchung zur Entlastung oder Überführung eines Tatverdächtigen beitragen konnte.
Methoden. Laut der polizeilichen Kriminalstatistik wurden in Hamburg in den Jahren 2008 und 2009 insgesamt 459 Fälle von „Vergewaltigung/besonders schwere sexuelle Nötigung" zur Anzeige gebracht, davon wurden 243 Frauen, mit einem Alter von über 14 Jahren, im Institut für Rechtsmedizin untersucht. Es erfolgte eine retrospektive Auswertung der von uns erstellten Gutachten sowie der Ermittlungsakten der Staatsanwaltschaft. Von besonderem Interesse waren, neben den demografischen Faktoren der Opfer und Täter, insbesondere die Ergebnisse und die Qualität der von uns angefertigten Asservate/Abstriche, die Gründe für die Einstellung von Verfahren, die Häufigkeit von Verurteilungen sowie die juristische Würdigung.
Ergebnisse. Die Auswertung bestätigte, dass viele der Verfahren wieder eingestellt und insgesamt wenige der mutmaßlichen Täter verurteilt werden konnten. Mit den angefertigten vaginalen Abstrichen gelang in einigen Fällen ein Nachweis von Sperma, selten reichte das Material jedoch für die Erstellung eines DNA-Profils des Täters.
Schlussfolgerungen. Die Gründe ein Sexualdelikt zur Anzeige zu bringen sind vielseitig. Immer wieder spielen beispielsweise psychiatrische Erkrankungen, Rache an dem (Ex-)Partner sowie die Verschleierung eines Seitensprungs eine Rolle. Die kritische Begutachtung ist bei Sexualdelikten daher von besonderer Bedeutung.

OG 19
Entwicklung einer Datenbank zur Archivierung und Bearbeitung forensischer Datensätze

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Einleitung. Mit voranschreitender Komplexität der Methoden und der Ergebnisse forensischer Routinearbeit wird die Analyse und Archivierung großer Datensätze immer umfangreicher. Besonders die Archivierung der gesammelten Daten in Papierform ist umständlich, kostenintensiv und erschwert eine spätere Auswertung dieser Daten unnötig. Dies und die Analyse der Ergebnisse kann in der heutigen Zeit durch die Nutzung von Software-Lösungen erheblich vereinfacht werden. Zudem können dadurch Übertragungs- und Ablesefehler verringert oder sogar gänzlich verhindert werden.
Methoden. Die hier vorgestellte ForensicDatabase© wurde in der Programmiersprache „objectpascal" mit der Software „Embarcadero RAD-Studio 2010" geschrieben und beinhaltet verschiedene Anwendungsmöglichkeiten.
Ergebnisse. Hierzu gehören eine Datenbank für forensische Datensätze inklusive Projekteinteilung, ein STR-Rechner zur Verarbeitung von Identitätsprofilen, darauf aufbauend ein Tool zum Profilabgleich sowie ein Extraktionstool für Daten aus dem ABI-Prism Genetic Analyzer 3130 (Applied Biosystems) mit der Software Genemapper v3.2. Die Fo-

rensicDatabase© bietet zusätzlich die Option der individuellen Anpassung an lokale Gegebenheiten, so dass beispielsweise der STR-Rechner mit eigenen Frequenzdaten versehen werden kann.
Schlussfolgerungen. Die von uns entwickelte Software soll vorgestellt werden, um einen Einblick in die Möglichkeiten der Automatisierung bestimmter Routineprozesse sowie aktuelle Ansätze zur Qualitätskontrolle aufzuzeigen.

OG 20
Post-mortem-CT (PMCT) nach Notfallversorgung von Gewaltopfern: Fragen aus radiologischer Sicht an behandelnde Ärzte

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Einleitung. Notfallversorgung von Gewaltopfern bedeutet eine Herausforderung für die beteiligten Ärzte, die Einführung von neuen Verfahren Chancen für den Patienten. Das ärztliche Handeln kann mit über Leben und Tod entscheiden. Die postmortale Rekonstruktion ärztlichen Handelns setzt eine ausreichende Informationslage voraus. Hier finden sich Grenzen, die an Hand von Beispielen beschrieben werden sollen.
Methoden. Beispiele aus dem eigenen Material (etwa 3000 PMCT) zeigen die die Problematik der Informationsbeschaffung und der Beurteilung von ärztlichen Maßnahmen nach Gewalteinwirkung und bei der Anwendung neuer Verfahren auf.
Ergebnisse. Beispiele für offene Fragen sind fehlplazierte und Verletzungen hervorrufende Beatmungstuben, perforierende Stents, rupturierende Dilatationsvorrichtungen sowie Luft/Gas im Gefäßsystem nach Wiederbelebung.
Schlussfolgerungen. Der beteiligte Arzt fürchtet einen Vorwurf; dies beeinflusst seine Auskunft. Während in der Klinik ein (inoffizieller) Austausch möglich ist, ist dieser ggf. beschränkt durch den Status des Rechtsmediziners. Erfahrungen in der Klinik führen zu Fragen, die in der Rechtsmedizin nur selten beantwortet werden. Postmortale Qualitätssicherung bietet die Gelegenheit zur ständigen Qualitätsverbesserung. Sie muss weiter konsequent ausgebaut werden, um dieses Potential nutzbar machen. Das PMCT führt in Einzelfällen zu Fragen, die von an einer Behandlung beteiligten Ärzten ggf. nur ungern beantwortet werden.

OG 21
Taschenmesser steckt in Brustbein: Wurf oder Stich?

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Einleitung. Ein Taschenmesser steckt 52 mm tief in einem Brustbein eines Mannes. Seine Lebenspartnerin gibt an, bei einem Streit aus Wut den nächstbesten Gegenstand vom Tisch gegriffen zu haben und diesen nach ihrem Partner geworfen zu haben. Dass dieser Gegenstand ein aufgeklapptes Taschenmesser gewesen sei, habe sie erst im Nachhinein realisiert. Die Staatsanwaltschaft zweifelte einen solchen Tatablauf an und kann sich eher einen vorsätzlichen Stich vorstellen anstelle eines Wurfes.
Methoden. Um die Sachlage zu klären, wurden Versuche an Modellen aus einer Knochensimulans, ballistischer Seife als Fett und Muskel Simulans und einer Hautsimulans durchgeführt. Dabei wurden die für ein Eindringen in die vorliegende Tiefe erforderliche Energie gemessen. Dazu wurde eine mit Gewichten beschwerte Klinge in einem Fallturm auf das Modell fallen gelassen. Des Weiteren wurde experimentell getestet, ob ein Steckwurf in ein entsprechendes Modell möglich ist. Das Modell wurde dazu senkrecht aufgestellt und mit verschiedenen Wurftechniken beworfen.
Ergebnisse. Für die benötigte Eindringtiefe wurde eine Energie zwischen 10 und 12,5 J gemessen. Bei den Wurfversuchen wurde festgestellt, dass es möglich ist ein Taschenmesser zum Stecken zu bringen. Die Wahrscheinlichkeit dafür liegt bei etwa 18%. Die benötigte Eindringtiefe kann jedoch nicht erreicht werden.
Schlussfolgerungen. Durch einen Wurf kann ein Taschenmesser nicht so tief wie es hier vorliegt zum Stecken gebracht werden. Aus einem vorangegangenen Versuch ist jedoch bekannt, dass durch einen von einer Frau durchgeführten Stich eine Energie von durchschnittlich 20 J aufgebracht werden kann. Folglich musste von ein Stich ausgegangen werden.

OG 22
Darum ist das Messer krumm

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Einleitung. Bei einem Streit kam es zu einer Stichverletzung mit einem Taschenmesser zwischen 10. und 11. Rippe, dabei wurden keine Knochen oder Organe beschädigt. Das Tatmesser war jedoch stark gekrümmt. Die Frage, die sich zu dieser Situation stellte war, ob es tatsächlich möglich ist ein Taschenmesser durch einen Stich zu verkrümmen ohne Knochenverletzungen zu verursachen.
Methoden. Auf der Suche nach einem möglichst ähnlichen Messer wurde festgestellt, dass es beträchtliche Unterschiede in den Klingenhärten gibt, was von großer Relevanz für die Biegung einer Klinge ist. Deshalb wurde darauf geachtet ein Vergleichsmesser zu finden das in Härte und Geometrie dem Tatmesser möglichst ähnlich ist. Als nächster Schritt wurde ein Modell hergestellt, welches aus einem in Plastilin eingebetteten Rundholz bestand. Die gefundenen ähnlichen Messer sowie auch ein Schweizertaschenmesser, dessen Klinge härter ist als die der anderen, wurden in das Plastilin nahe dem Holz gesteckt und dann gegen das Holz gedrückt, wobei sie aus dem Plastilin gezogen wurden.
Ergebnisse. Die qualitativ schlechten Messer konnten ohne Probleme um das Rundholz gebogen werden, wenn die Bewegung ruckartig durchgeführt wurde. Das Schweizertaschenmesser hingegen konnte auf diese Weise nicht gekrümmt werden.
Schlussfolgerungen. Folglich ist es möglich eine Klinge in einem Körper stark zu verbiegen ohne dass Knochen dabei verletzt werden, wenn diese genügend weich ist. Wohingegen die harte Klinge des Schweizertaschenmessers durch den Widerstand des Plastilins nicht gebogen werden konnte. Bei derartigen Versuchen mit Messern ist es also essentiell ein möglichst identisches Messer zu finden, wenn das Originalmesser nicht auffindbar ist, andernfalls können keine Aussagen getroffen werden.

OG 23
Rechtsmedizinische Untersuchungen nach Einsturz der Markthalle in Katowice

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Katastrophen sind Ereignisse, die mit verschiedenen Kataklysmen (Überschwemmung, Sturm, Trockenheit, Schneesturm, Brand) verbunden sein können und bei denen ein großer Sachschaden entsteht und viele Opfer zu beklagen sind. Eine effiziente Hilfe nach einer Katastrophe ist nur durch Koordination verschiedener Dienste gewährleistet, wobei der Anteil der medizinischen Hilfe auf ca. 20% der Gesamthilfe geschätzt wird. Der gerichtsmedizinische Dienst ist dabei ausgerichtet, seine Verpflichtungen am Ort des Geschehens oder im Sektionssaal zu erfüllen.

Die Autoren beschreiben die Grundsätze und den Verlauf der Untersuchungen der Folgen dieser Katastrophe, wobei insbesondere auf die Leichenidentifikation und Systematisierung der Verletzungen der Opfer eingegangen wird. Am 28.01.2006 kam es nach starkem Schneefall während einer Internationalen Taubenausstellung in der Markthalle von Katowice zum Einsturz des Dachs der Markthalle. Zu diesem Zeitpunkt befanden sich ca. 700 Personen in der Halle, von denen 65 verstarben und 170 verletzt wurden.
In 48 Fällen (43 Männer, 5 Frauen) wurden vom 29.01.–17.02.2006 im Institut für Gerichtsmedizin und Toxikologie in Katowice die Leichenbesichtigungen und die Obduktionen durchgeführt. Die übrigen Verstorbenen wurden außerhalb des Institutes seziert. In 27 Fällen wurde als Todesursache Ersticken diagnostiziert, 15 verstarben an einem Polytrauma mit Wirbelsäulenverletzungen (4 Fälle) sowie Frakturen (n=11) des Thorax, des Beckens, der Tibia, des Humerus, der Ulna, und in 6 Fällen kam es zu einer Aspiration von Blut und/oder Mageninhalt. Bei zahlreichen Verstorbenen wurden ausgeprägte Weichteilquetschungen festgestellt, die sich mit dem Unfallmechanismus in Einklang bringen ließen. Unter Einbeziehung von histopathologischen und toxikologischen Untersuchungen konnte in allen Fällen eine Todesursache diagnostiziert werden.
Für die Identifizierung der Leichen wurden auch hämogenetische Untersuchungen herangezogen. Bis zum 17.02.2006 konnten die gerichtsmedizinischen Untersuchungen insoweit abgeschlossen werden, dass alle Verstorbenen den Angehörigen übergeben werden konnten.

OG 24
Analyse des Einflusses bekannter Risikofaktoren für körperliche Misshandlung von Kindern auf die Intensität der Verletzungen

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Einleitung. In zahlreichen Studien konnte gezeigt werden, dass es bestimmte Risikofaktoren gibt, die eine Kindesmisshandlung begünstigen. Die Relevanz der Risikofaktoren für die Intensität der Verletzung wird dargestellt.
Methoden. Die Daten wurden mittels einer retrospektiven Analyse der Dokumentationsbögen des Institutes für Rechtsmedizin erstellt.
Ergebnisse. Die Ergebnisse lassen vermuten, dass die untersuchten Faktoren (jugendliches Alter der Mutter mit/ohne neuem Lebenspartner, Kind jünger als 1 Jahr, Familie bereits beim Jugendamt bekannt, mindestens 2 weitere Kinder unter 14 Jahre leben im selben Haushalt) vor allem in deren Kombination signifikanten Einfluss auf den Verletzungsschweregrad haben. Schwerwiegende Verletzungen wurden wie folgt definiert: Verletzungen in mindestens 3 Körperregionen, instrumentell verursachte Verletzungen, Knochenbrüche, Schädelhirntrauma/Schädeltrauma.
Schlussfolgerungen. Die Ergebnisse unterstützen die Annahme, dass die genauere Betrachtung der Risiken weiter gezielt vorangetrieben werden sollte, um Prävention gezielt zu verbessern.

Deutsche Vorträge der Deutsch-Japanischen Juristenvereinigung e.V.

German Abstracts of the German-Japanese Association of Jurists

OG 25
Paradigmenwechsel im japanischen Organtransplantationsgesetz und die verbleibenden Probleme

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Im Jahre 2009 hat das japanische Organtransplantationsgesetz eine wichtige Änderung erfahren. Der Gesetzgeber hat die Voraussetzungen für die postmortale Transplantation erheblich gelockert. Jetzt ist es möglich, Organe zu transplantieren, wenn der Verstorbene sich vorher nicht dagegen geäußert hat und die Hinterbliebenen in die Transplantation einwilligen. Vor dieser Änderung war die Organtransplantation nur unter sehr strengen Voraussetzungen möglich. Das Organtransplantationsgesetz von 1997 erlaubte die Transplantation nur, wenn der Organspender vorher schriftlich erklärt hatte, dass er die Prüfung des Gehirntodes akzeptieren und Organe spenden wolle. Und selbst dann konnten seine Angehörigen die Transplantation verweigern. Die schriftliche Willenserklärung war nur dann gültig, wenn der Organspender älter als 15 Jahre und nicht geisteskrank war. Warum war das alte Gesetz so streng? Was hat den Gesetzgeber zu der Gesetzesänderung angetrieben? Zuerst erkläre ich den Hintergrund des alten Gesetzes und den Wandel des Grundgedanken.
Das neue TPG wird u. a. nach dem Willen des Gesetzgebers, mittels teleologischer und systematischer Auslegung sowie rechtsvergleichend untersucht.
Das neue Gesetz hat die Möglichkeit der Organtransplantation erweitert. Während es von 1997 bis 2009 nur 81 Fälle der Transplantation gegeben hatte, sind nach dem Inkrafttreten des neuen Gesetzes schon 43 Fälle gezählt worden. Im Grunde wird die Entscheidung des Gesetzgebers befürwortet, allerdings bestehen noch weitere Probleme. Das neue Gesetz enthält eine Klausel, dass der Organspender schriftlich erklären kann, dass seine nahen Angehörigen bei der Organspende bevorrechtigt werden sollen. Aber diese Klausel ist auch aus den Indikationsgesichtspunkten nicht angemessen. Auch das technische Problem, wie man den Willen des Organspenders feststellen kann, ist noch nicht gelöst. Es gibt auch keine Regelung, wann die Organspende zwischen den Lebenden erlaubt ist. Unsere Aufgabe ist, solche Probleme aufzuzeigen und möglichst gerechte Lösungen zu finden.

OG 26
Ausgewählte aktuelle Aspekte zum deutschen Transplantationsgesetz (TPG)

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Der Nachweis des Todes bei der postmortalen Gewebespende erweist sich bei Anwendung der Vorgaben des TPG und der Richtlinien der Bundesärztekammer (BÄK) als unvollständig und praxisuntauglich. Es bestehen deutliche Unterschiede bezüglich der Todesfeststellung bei einer Organ- und Gewebeentnahme beim hirntoten Spender mit künstlicher Aufrechterhaltung der Atmung und des Kreislaufes auf der Intensivstation gegenüber der Gewebeentnahme bei einem Leichnam in einer rechtsmedizinischen Entnahmeeinrichtung. Diesen unterschiedlichen Anforderungen werden das TPG und die Richtlinien der BÄK teilweise nicht gerecht.

Anhand der einschlägigen Normen und eines Beispielfalles wird das Problem der Todesfeststellung und variabler Todeszeitpunkte verdeutlicht.
Zunächst werden die verschiedenen Todesbegriffe im TPG (Individualtod, Gesamthirntod, Irreversibler Herz-Kreislauf-Tod) und deren Nachweisverfahren erläutert. Anschließend wird dargestellt, warum das TPG bezüglich der Todesfeststellung vor einer rechtsmedizinischen Gewebeentnahme reformbedürftig ist. Gerade Kriterien zur Feststellung des Todes durch sichere äußere Zeichen des Todes fehlen im Gegensatz zu den Kriterien zur Feststellung des Gesamthirntodes. Anhand der Vorgaben des § 16 TPG wird erläutert, inwiefern solche Vorgaben erforderlich sind.
So werden ergänzende Neufassungen des § 1a TPG mit Legaldefinitionen sicherer innerer und äußerer Todeszeichen, sowie der §§ 3 und 5 TPG zur Todesfeststellung und zum Todesnachweis vorgeschlagen.

OG 27
Die Aufgaben der Rechtsmedizin in der Gewebemedizin am Beispiel Hamburg

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Die postmortale Gewebespende von Augenhornhäuten, Binde- und Stützgewebe, Haut und kardiovaskulären Geweben ist – im Gegensatz zur Organspende, die nur bei noch intakter Herz- Kreislauffunktion realisierbar ist – innerhalb eines definierten Zeitrahmens auch nach dem Erlöschen aller vitalen Funktionen möglich. Voraussetzungen sind eine entsprechende Willenserklärung des Patienten oder Zustimmung der Angehörigen im Sinne des Verstorbenen, die Prüfung möglicher medizinischer und sozialer Ausschlusskriterien, die Entnahme der Gewebe durch ein geschultes Team und die anschließende Weiterprozessierung in einer Gewebebank, die die gesetzlichen Auflagen erfüllt.
Trotz des erheblichen Mangels an Gewebetransplantaten in Deutschland gibt es kein nationales Gewebenetzwerk, das den Ablauf der o. g. Module für den Fall eines Spendewunsches umfassend, d. h. in Bezug auf alle Spendegewebe, sicherstellt. Der Bedarf wird stattdessen teilweise durch Importe auch aus außereuropäischen Ländern gedeckt, was angesichts der in Deutschland existierenden Spendeverfügungen nicht erforderlich wäre - allein: Es fehlen die Organisationsstrukturen. Im Institut für Rechtsmedizin in Hamburg erfolgt bei den jährlich ca. 4000 dorthin verbrachten Verstorbenen ein regelhaft implementierter Ablauf zur Prüfung des Letzten Willens im Rahmen der Angehörigenkontakte. Eine Gewebespende wird dann unter erheblichem Ressourceneinsatz im beschriebenen standardisierten, qualitätskontrollierten Ablauf durchgeführt. Die Historie, die aktuelle Organisation, die Ergebnisse und die noch anstehenden Herausforderungen unseres Gewebespendeprojektes in Hamburg werden auch vor dem Hintergrund berufspolitischer Aspekte für die Rechtsmedizin und in ihrem gesellschaftspolitischen Stellenwert dargestellt.
Unser Auftrag ist die Versorgung der Patienten mit den von ihnen zur Verbesserung ihrer Lebensqualität benötigten Gewebetransplantaten. „Von den Toten für die Lebenden."

OG 28
Die strafrechtliche Verantwortlichkeit des Arztes wegen eines Behandlungsfehlers nach japanischem Recht

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Die strafrechtliche Verantwortlichkeit des Arztes wegen eines Behandlungsfehlers ist heute in Japan eines der - nicht nur in der Rechtswissenschaft - umstrittensten Themen. In den letzten Jahren sind Stimmen - insbesondere von der Ärzteschaft - immer lauter geworden, die Ärzte generell von der fahrlässigen Strafbarkeit ausnehmen wollen. Diese an die Juristen gerichtete Kritik hat offenbar dazu geführt, dass heute der ärztliche Behandlungsfehler immer seltener zum Gegenstand der Strafverfolgung gemacht wird. Demgegenüber steht die Meinung u. a. von Strafrechtlern, dass die allgemeinen Strafrechtsgrundsätze hier gelten und die Ärzte auch für einen fahrlässig begangenen Behandlungsfehler haften müssen. Der Referent geht auf die Frage ein, ob die Sonderstellung der behandelnden Ärzte strafrechtsdogmatisch und auch rechtspolitisch gerechtfertigt ist. Eine genauso wichtige Problematik betrifft die prozessuale Seite der Strafverfolgung. Die Autoren, die sich gegen die Strafbarkeit der Ärzte aussprechen, wollen das Bedürfnis nach Aufklärung des Sachverhalts um der Prävention des künftigen Fehlers willen betonen: Nicht die Gerichte, sondern eine Sachverständigenkommission soll den Fall behandeln, den Sachverhalt der Wahrheit getreu aufklären und die dabei gewonnenen Erkenntnisse nicht zur Bestrafung des Arztes, sondern zur Vermeidung der Wiederholung gleicher oder ähnlicher Fälle nutzbar machen. In diesem Referat soll auch dieser Vorschlag auf seine rechtspolitische Richtigkeit hin überprüft werden.

OG 29
Ausgewählte Aspekte arztstrafrechtlicher Ermittlungsverfahren in der Bundesrepublik Deutschland

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Einleitung. Die Datenlage zu arztstrafrechtlichen Ermittlungsverfahren in Deutschland ist nicht nur hinsichtlich der Erfassung derartiger Verfahren sehr lückenhaft. Zum Ausgang der Verfahren gibt es nur sehr wenige Studien. Daher wurden retrospektiv die am Institut für Rechtsmedizin in Gießen bearbeiteten Fälle von Behandlungsfehlervorwürfen mit behauptetem letalem Ausgang erfasst, bei denen ein Verfahren gegen die behandelnden Ärzte eingeleitet worden war. Regelmäßig ging es vorrangig um die Prüfung des Straftatbestandes der fahrlässigen Tötung gemäß § 222 StGB.
Methoden. Herangezogen wurden insgesamt 176 Fälle der Jahre 1968 bis einschließlich 2007, von denen 109 Fälle auswertbar waren. Analysiert wurden der Anlass der Ermittlungen, die Art des vorgeworfenen Fehlers, die betroffene Einrichtung und die hauptsächlich betroffenen medizinischen Disziplinen. Weitere Punkte waren u. a. die Verfahrensdauer und die Ergebnisse der Kausalitätsbegutachtung.
Ergebnisse. Ein adäquater Umgang mit einem Behandlungsfehlervorwurf kann in einem Teil der Fälle dazu führen, dass auf eine Strafanzeige verzichtet wird. Bei unklaren Todesfällen sollte die Todesart als ungeklärt qualifiziert werden. Bei der Auswertung der Akten zeigten sich zudem Probleme sowohl bei der Auswahl geeigneter Gutachter, als auch bei der Qualität der Begutachtung.
Schlussfolgerungen. Soweit dann in einem erheblichen Teil der Fälle eine rechtsmedizinische Obduktion veranlasst wird, haben die Obduktionsbefunde sehr häufig eine exkulpierende Wirkung und das Verfahren kann unmittelbar eingestellt werden.

OG 30
Rechtsmedizinische Begutachtung iatrogener Todesfälle

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Einleitung. Bis vor wenigen Jahren war die Datenlage zu iatrogenen Todesfällen auf wenige Standardquellen beschränkt, welche oftmals aus der Rechtsmedizin stammten. Zunehmend entwickelt sich sowohl in der Ärzteschaft als auch in der Öffentlichkeit ein Bewusstsein für diese Problematik. Dies hatte und hat zur Folge, dass die wissenschaft-

liche Erfassung und Untersuchung solcher Todesfälle im größeren Rahmen, auch fächerübergreifend, erfolgt. Eine bundesweite Erfassung der in der Rechtsmedizin bearbeiteten Behandlungsfehlervorwürfe mit letalem Ausgang erfolgte für die Jahre 1990 bis 2000 für das Bundesministerium für Gesundheit und Soziales aus der Rechtsmedizin Bonn.

Methoden. Nunmehr wurden und werden diese Untersuchungen, auch unter Einbeziehung der ermittlungsbehördlichen Akten, für Norddeutschland weitergeführt. Einbezogen sind die Institute für Rechtsmedizin des Universitätsklinikums Schleswig-Holstein, der Universität Rostock und der Universität Greifswald.

Ergebnisse. Unabhängig vom Standort ist eine deutliche Zunahme der (behaupteten) iatrogenen Todesfälle im rechtsmedizinischen Obduktionsgut zu beobachten. Eine Zunahme der Verfahren wegen des Verdachts eines medizinischen Behandlungsfehlers, unabhängig vom möglichen tödlichen Ausgang, zeigt sich auch eindrucksvoll bei der Staatsanwaltschaft Lübeck. Während im Jahr 2000 nur 6 Verfahren im zuständigen Dezernat (Verfahren gegen Ärzte, Heilpraktiker und deren Hilfskräfte) anhängig waren, waren es im Jahr 2005 bereits 98 und 2010 342. Jedoch haben sich keine Hinweise auf eine Zunahme der tatsächlich bejahten Behandlungsfehler ergeben.

Schlussfolgerungen. Die Auswertung der Unterlagen erbrachte neben Daten zur Art und Anzahl der Vorwürfe und der betroffenen Fachdisziplinen unter anderem teilweise deutliche Differenzen in der Herangehensweise bei der Begutachtung. Während einige Rechtsmediziner auch unter Hinzuziehung eines Vertreters der jeweilig betroffenen Fachdisziplin die Frage eines Behandlungsfehlers bis zu einem Ergebnis bearbeiten, ist es teilweise üblich, solche Fragestellungen direkt an klinisch tätige Kollegen aus dem jeweiligen Fachgebiet zu verweisen.

Das Datenmaterial der Untersuchungen wird präsentiert.

OG 31
Rechtliche Aspekte der Kindesmisshandlung und des Kindesmissbrauchs in Japan

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In Japan kann die Justiz die Kindesmisshandlung (inklusive des Kindesmissbrauchs) auf verschiedene Weise behandeln. Eine strafrechtliche Verfolgung ist in vielen Fällen möglich und zivilrechtlich kann das Familiengericht den Eltern das gesamte elterliche Sorgerecht entziehen. Allerdings zögert man wegen der gravierenden familiären Folgen oft, zu diesen Mitteln zu greifen.

Eine wichtigere Rolle spielen demgegenüber das Kinderfürsorgegesetz von 1947 und die darauf begründeten Kinderberatungsstellen, in denen Sozialarbeiter beschäftigt sind. Wenn es um eine Kindesmisshandlung durch Eltern geht, beraten und leiten sie die Eltern an, um Wiederholungen zu verhindern. In dringenden Fällen hat die Kinderberatungsstelle die Befugnis, den Eltern das betroffene Kind vorübergehend zu entziehen. Dann entscheidet man darüber, ob eine Unterbringung in einer Erziehungsanstalt notwendig ist. Dafür soll grundsätzlich die Zustimmung der Eltern eingeholt werden. Wenn dies aber unmöglich ist, kann das Familiengericht eine Zustimmung erteilen. Besondere Schwierigkeiten existieren oft bei der Feststellung einer Misshandlung, die normalerweise hinter verschlossenen Türen begangen wird. Im Verdachtsfall ist das Personal der Kinderberatungsstelle zwar zum Betreten der Wohnung ermächtigt, aber dies durfte nicht zwangsweise durchgesetzt werden, sodass man die Effektivität anzweifelte.

Im Jahr 2000 wurde das Kindesmisshandlungsverhinderungsgesetz geschaffen, das neben der Normierung des Misshandlungsverbots die Voraussetzungen des behördlichen Einschreitens erweitert. Durch die Gesetzesnovellen von 2004 und 2007 wurden u. a. die Vorladung der Eltern sowie die Durchsuchung der Wohnung als Zwangsmittel eingeführt.

Im Beitrag werden u. a. die oben skizzierte Rechtslage und die Debatte über die geforderten weiteren Reformen vorgestellt.

OG 32
Interdisziplinärer Kinderschutz am Beispiel der medizinischen Kinderschutzambulanz des Klinikums der Goethe-Universität Frankfurt am Main

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Im Rahmen der voranschreitenden Professionalisierung der Kinderschutzmedizin wurde im November 2010 die interdisziplinäre Medizinische Kinderschutzambulanz des Klinikums der Goethe-Universität Frankfurt am Main im Zentrum für Kinder- und Jugendmedizin gegründet.

Ihre Hauptaufgabe stellt die Diagnostik und Behandlung von Kindern und Jugendlichen mit Verdacht auf Missbrauch, Misshandlung und Vernachlässigung dar. Sie ist Anlaufstelle und Ansprechpartner für die im Rhein-Main Gebiet sehr zahlreichen und aktiven Institutionen im Kinderschutz. Das sind vor allem Ärzte, Jugendamtsmitarbeiter, Bildungs- und Erziehungseinrichtungen, Justiz, Polizei, aber auch Betroffene, Kinder und Pflegeeltern.

Bereits initial gesicherte Kausalität stellt eher die Ausnahme dar, häufiger liegen initial Verdachtsfälle vor, bei denen die medizinische Diagnostik und Aufarbeitung die wesentliche Weichenstellung für das weitere Vorgehen darstellen. In enger Kooperation mit der Rechtsmedizin und weiteren beteiligten medizinischen Subspezialitäten, wie z. B. Gynäkologie, Radiologie/Neuroradiologie, Kinderchirurgie, Kinder- und Jugend-Psychologie/Psychiatrie usw., erfolgen medizinische Untersuchungen, bei denen am Ende eine interdizipliäre Fallbesprechung mit Beurteilung der Kausalität der vorliegenden Befunde („gesichert“, „Indiz/ien“, „starker Verdacht“, „ausgeschlossen“) steht. In einem abschließenden, zusammen mit den Mitarbeitern des zuständigen Jugendamtes, stattfindenden Helfergespräch erfolgt dann eine allgemeine Gefährdungseinschätzung für das Kind bzw. Jugendlichen sowie die Hilfeplanung.

Es besteht eine 24-Stunden-Erreichbarkeit entsprechend geschulter Ärzte. Kinder können ambulant oder stationär untersucht werden. Weitere Leistungen sind medizinische Beratungen und Schulungen ärztlicher Kolleginnen und Kollegen sowie die Beantwortung von Anfragen von Fachleuten aller Richtungen zu medizinischen Fragen oder Befunden bei Misshandlung oder Missbrauch. Die Abläufe sind weitestgehend standardisiert, insbesondere die interdisziplinäre Befunddokumentation, die interdisziplinären Fallbesprechungen sowie die Helfergespräche mit den am weiteren Wohlergehen des Kindes beteiligten Institutionen.

In den ersten 6 Monaten wurden insgesamt 75 Fälle bearbeitet, davon 35 stationär, 21 ambulant sowie 19 telefonisch konsiliarisch. Bei den 56 ambulant und stationär behandelten Fällen handelte es sich bei 38 um Kindesmisshandlung, bei 14 um sexuellen Missbrauch und bei 21 um Fälle von Vernachlässigung (inklusive Doppelnennungen).

Mittelfristiges Ziel ist es, über eine fachliche Vernetzung mit weiteren Kinderkliniken ein entsprechendes medizinisches Versorgungsnetz für Fälle von Misshandlung, Missbrauch und Vernachlässigung von Kindern über ganz Hessen zu spannen, die ihrerseits wieder zu wichtigen Bestandteilen der jeweiligen lokalen, am Kinderschutz beteiligten Netzwerke werden.

OG 33
Rechtliche Aspekte zur weiblichen Genitalverstümmelung anhand aktueller Gesetzesinitiativen

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Weltweit werden jährlich ca. 3 Mio. Mädchen und Frauen genitalverstümmelt. Schätzungen gehen davon aus, dass bis zu 6000 Mädchen in Deutschland von einer Genitalverstümmelung bedroht sind.
Normen für die rechtliche Bewertung der Genitalverstümmelung können aus dem Verwaltungsrecht (§ 60 AufenthG), dem Familienrecht (§§ 1666, 1666a BGB) und dem Strafrecht (§§ 223 ff., 228 StGB) entnommen werden. Eine spezielle gesetzliche Regelung, die sich konkret mit dieser Materie befasst, hat der deutsche Gesetzgeber bislang nicht erlassen. Derzeit gibt es jedoch unterschiedliche Gesetzesinitiativen, die Änderungen im Strafgesetzbuch vorsehen.
Auf Initiative der Länder Baden-Württemberg und Hessen (BR-Drs. 867/09) hat der Bundesrat einen Gesetzesentwurf zur Einfügung eines eigenständigen Straftatbestandes „Genitalverstümmelung" verabschiedet. Auch von Seiten der Fraktion Bündnis 90/Die Grünen (BT-Drs. 17/4759) wurde ein Gesetzesentwurf in den Bundestag eingebracht. Beide Entwürfe wurden vom Bundestag noch nicht beraten. (Stand April 2011)
Die beiden Gesetzesentwürfe werden einer rechtlichen Analyse unterzogen. Unterschiede ergeben sich u. a. hinsichtlich des gesetzlichen Standortes der einzufügenden Regelungen, der Mindeststrafandrohung und dem Umfang des Rechtsgüterschutzes. Ob sich der Deutsche Bundestag in dieser Legislaturperiode für den Erlass einer speziellen strafrechtlichen Regelung der Genitalverstümmelung entscheiden wird, ist noch nicht abzusehen.

OG 34
Rechtliche Aspekte beim Doping im Sport in Japan

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In den letzten Jahren hat sich Doping durch immer raffiniertere Methoden weltweit zu einem oft diskutierten Problem entwickelt. Auch in Japan werden ab und zu Dopingfälle bekannt. In letzter Zeit erregte ein Dopingskandal bei den Sumo-Ringern großes Aufsehen in der Öffentlichkeit. In Japan wird aber kaum über die strafrechtlichen Fragen des Dopings diskutiert. Doping schädigt zwar die Gesundheit des Betreffenden, mit Körperverletzung kann man ihm aber meist nicht beikommen, da zumeist ein rechtswirksames Einverständnis des Gedopten vorliegt. Viele neuere Dopingmethoden stellen auch keinen Verstoß gegen das japanische Betäubungsmittelgesetz dar. Denkbar wäre die Einführung einer neuen Strafvorschrift, die allerdings zurzeit kaum befürwortet wird. Rechtliche Probleme liegen in Japan vielmehr darin, wie die zivil-, arbeits- und disziplinarrechtlichen Konsequenzen bei den Gedopten aussehen sollen. Das und noch mehr sind Fragen, die in der Diskussion zu erörtern sind.

OG 35
Dopinganalytik-Chancen und Herausforderungen

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Vortragseinführung. Labordaten zu Dopinganalysen stellen einen wesentlichen Aspekt der Dopingbekämpfung dar. Kontinuierlich verbesserte Nachweisverfahren erlauben eine umfangreiche Untersuchung des vorliegenden Probenmaterials, wodurch verschiedene Formen der illegalen Leistungssteigerung aufgezeigt werden können. Anhand von Beispielen wird in diesem Vortrag die Rolle des Dopingkontroll-Labors und damit zusammenhängende besondere Herausforderungen dargestellt und die stetig wachsenden Möglichkeiten als auch Limitationen exemplarisch aufgezeigt. Diese betreffen zum einen Manipulationsversuche, zum anderen den Einsatz neuer, nicht zugelassener Wirkstoffe.

OG 36
Doping-Stigmata

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Eine Fragebogenerhebung in 11 Fitnessstudios und bei den HochschulsportFitnessteilnehmerInnen (n=484; 264 Männer, 220 Frauen) im Großraum Frankfurt im Jahre 2010 durch die Arbeitsgruppe des Vortragenden ergab die Einnahme von leistungssteigernden Medikamenten bei 12,9% der Männer und 3,6% der Frauen. Wurden nur die kommerziellen Sportstudios berücksichtigt (129 Männer, 57 Frauen), so stieg der Anteil auf 26% der Männer und 14% der Frauen (häufigste Substanzen: Testosteron, Stanozolol und andere Anabolika, STH, Stimulanzien etc.). Erschreckender Weise wurden die Dopingmittel in ca. 28% der Fälle sogar ärztlich verschrieben. Äußerlich sind die Anwender nicht selten durch sog. Doping-Stigmata erkennbar. Dieser von Lünsch (2001) erstmals geprägte Begriff kennzeichnete zunächst nur die Doping-Zeichen nach Einnahme von anabol-androgenen Steroiden: Hoden- und Penisatrophie, Quellmuskeln, Exophthalmus, Alopecia androgenetica, Steroid-Akne, Gynäkomastie, Cutis verticis gyrata, Striae distensae, Seborrhö und Einstichstellen. Bei Frauen können zusätzlich Mamma-Atrophie, Klitorisvergrößerung, Schildknorpel-Hypertrophie, Senkung der Stimmlage, Bartwuchs, Hirsutismus und maskulines Breitenwachstum auftreten. Vom Verfasser wurde der Begriff der Doping-Stigmata noch auf die äußerlich erkennbaren Doping-Zeichen unter der Einnahme von Wachstumshormon erweitert: Akromegalie, Supraorbitalwülste, Makroglossie, Prognathie, erweiterte Interdentalspalten, Hyperhidrosis, Cutis verticis gyrata, Seborrhö, Knöchelödeme, Haare von Drahtbürstenkonsistenz, eine rasche Muskelmassezunahme bei simultaner Fettanteilreduktion sowie eine sonographisch verifizierbare generelle Organmegalie.

Englische Poster des 8th International Symposium Advances in Legal Medicine (ISALM)

English Posters of the 8th International Symposium Advances in Legal Medicine (ISALM)

P 1
Direct PCR amplification of STR loci using samples remaining after identification of human hemoglobin

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Introduction. Human bloodstain is a commonly encountered evidence in criminal investigations. Preliminary and confirmatory assays are performed to ensure that a sample is in fact blood. If a stain is identified as blood, investigation is required to determine whether the blood is of human origin. Several commercial kits have been developed for detecting human blood. Although forensic DNA assay is sensitive, when the bloodstain is very small, the sample quantity may not be sufficient to support both human blood identification and DNA polymorphism assays.
Methods. In this study, we used two commercial human blood identification kits; OC-HEMOCATCH and Hexagon OBTI, to analyzed human blood, and attempted to use the samples remaining after human blood identification test to amplify STR by AmpFlSTR Identifier kit without DNA extraction. Human bloodstain samples collected over the past 1–25 years and bloodstains from nine animal species prepared on sterilized gauze were tested. For human bloodstains less than five years old, we cut off a 0.3 cm long of a piece yarn containing the human bloodstain and loaded it directly on the sample well, and then added the extraction buffer to the sample window. For human bloodstains over five years old, since they were too dry to be dissolved directly for reaction with antihuman hemoglobin antibody, we mixed the yarn with the buffer first for 5 to 10 minutes, and then loaded the mixture on the sample well.
Results. Specificity studies showed that the kits were specific for blood of higher primates including humans. Both of the test kits did not react with animal bloodstains except that of *Macaca fuscat*a. All fifteen STR loci as well as amelogenin were successfully amplified from the yarn remaining after the human blood identification test in all the samples tested.
Conclusions. This study indicates that STR amplification using samples remaining of human blood identification assay is available as a new method for individual identification of small quantity human bloodstain.

P 2
STR-typing from urine accompanying drug analysis: actual case reports

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Introduction. In most cases, the analysis of urine is performed as part of an investigation into whether a person has been abusing drugs or not. Occasionally, there is a question who actually produced the urine being used for analysis. This laboratory has previously examined DNA-typing from urine and urine stains, as well as a serial examination for amphetamine analysis plus DNA-typing from a sample of urine. In this report, we carried out DNA-typing of some urine samples in actual cases using these techniques.
Methods. Case 1: A male was arrested by the police and submitted a urine sample. Amphetamines were detected in his urine, but he claimed that it was not his sample. DNA-typing of the urine sample in storage confirmed that it was in fact his urine. Case 2: A female was arrested for drug abuse. The woman was carrying a small bottle containing liquid in her bag, which she claimed was her urine. Amphetamine analysis of the urine in the suspect's possession yielded negative results. STR-typing of the sample revealed that the urine was from another family member. The police made the suspect submit another urine test and amphetamines were detected this time.
Results. The two cases described in this report reveal the importance of carrying out personal identification of samples submitted for drug analysis.
Conclusions. STR-typing is especially useful because of its simplicity and robustness, even in urine.

P 3
Genetic analysis of the four rhabdomyolysis-associated genes in 18 forensic autopsy cases of methamphetamine abusers

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Introduction. Methamphetamine (MA) use sometimes causes rhabdomyolysis, which has been associated with mortality. We analyzed potential rhabdomyolysis-susceptibility genes from autopsy samples of 18 methamphetamine abusers.
Methods. We examined mutations in the *ryanodine receptor 1* (*RYR 1*), *carnitine palmitoyltransferase II* (*CPT II*), *very long-chain acyl-CoA dehydrogenase* (*VLCAD*), and *cytochrome P450* (*CYP) 2D6* genes. Different *RYR1* mutations that caused amino acid substitutions (^{612}Ala>Thr and ^{4295}Ala>Val) were identified in 2 cases. In the *CPT II* gene, there was a new mutation (^{545}Glu>Ala) in 1 case and there were mutations that did not change activity in 17 cases. In the *VLCAD* gene, there were mutations that did not change activity in 6 cases. In the *CYP2D6* gene, homozygosity for CYP2D6*10, which is associated with significantly reduced metabolic activity, was found in 3 cases, while 2 cases carried a different previously unreported missense mutation (^{344}Arg>Gln and ^{48}His>Tyr).
Results. *RYR1* mutations and the new *CPT II* mutation identified in this study were not observed in a control group. Eighteen cases that were genetically analyzed were also investigated immunohistochemically to diagnose the possibility of rhabdomyolysis. However, there were no significant mutations that reduced enzyme activity in the suspected cases of rhabdomyolysis.
Conclusions. These data suggested no obvious relationship between the genetic mutations observed in this study and rhabdomyolysis.

P 4
Y-chromosomal STR haplotype analysis in Lithuanian population

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Introduction. The research data presents comprehensive Y-chromosomal STR haplotype analysis in Lithuanian population in order to

evaluate Lithuanians Y chromosome variation, infer the genetic relation between Lithuanian and other European neighbouring populations and introduce population reference data for forensic purposes.
Methods. Data were collected from the peripheral blood samples of 194 unrelated males throughout various regions of Lithuania. The amplification of 17 Y-STRs was carried out in one multiplex PCR by the use of AmpFlSTR YfilerTM PCR Amplication Kit according to the supplier's protocol.
Results. The Y-chromosomal haplotype diversity in Lithuanian population rises as the number of analyzed Y-STRs is increased. All additional microsatellite loci are not hypervariable and only their whole makes large diversity of Y-STR haplotypes in Lithuanian males. Analysis of molecular variance revealed low but significant interpopulation differences except the pair of Lithuanian and Latvian populations. Phylogenetic analysis showed that clustered Lithuanians and Latvians have a closer phylogenetic relation to Russian and Estonian populations and are less genetically related to the other neighbouring populations of Belarus and Poland. Y-STRs alleles and haplotypes differentiate effectively inside and between closely related populations.
Conclusions. Comparison of the Y-STR haplotype data suggests an influence of gene flow carrying diverse sets of Y-STR alleles that correlates with the geography and history of the Lithuanian population. The Y-chromosomal haplotype data presented here were submitted to the 34th release of the Y-STR Haplotype Reference Database 3.0.

P 5
Genetic investigation of 17 Y-chromosomal STR loci in a population sample from Mecklenburg-Vorpommern

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Introduction. The specific characteristic of the Y chromosome is its inheritance from father to son while the majority of its DNA lacks the potential of recombination events. Therefore it is a powerful tool in forensic casework, paternity testing and for evolutionary studies. Though, a large set of population data needs to be ascertained to increase the power of discrimination for Y-chromosomal haplotypes. Population genetic investigations from inhabitants of Mecklenburg-Vorpommern have been characterized in a small resident sample, so far. The aims of this study were to evaluate particular regional variations of Y-chromosomal STR loci and increasing population data of the Y-Chromosome Haplotype Reference Database.
Methods. Y-chromosomal STR haplotypes were determined using the AmpF*l*STR® Y-filer™ PCR amplification kit (Applied Biosystems, Foster City, USA) including the loci DYS19, DYS385a/b, DYS389I/II, DYS390, DYS391, DYS392, DYS393, DYS437, DYS438, DYS439, DYS448, DYS456, DYS458, DYS635 and GATAH4 from 531 unrelated males resident in Mecklenburg-Vorpommern.
Results. A total of 531 haplotypes were found, and among these, 480 were unique, 21 where observed two times and three haplotypes were identified three times. Allele frequencies were estimated and the overall haplotype diversity was 0.9993. We report some non-standard characteristics, including the infrequent microvariant alleles 16.2, 17.2 and 19.2. In 257 father-son pairs, previously confirmed by autosomal STR analysis, 16 mutations were discovered, giving an average mutation rate of 3.6×10^{-3} per locus.
Conclusions. The present study describes a comprehensive contribution to expand the YHRD database, highlighted by prior European haplotypes, similar to results of other working groups obtained for Y-STRs. Furthermore, the historical Scandinavian influence on the population of Mecklenburg-Vorpommern becomes apparent. However, to increase the reliability and application of Y-STR analyses in forensic casework and paternity testing further investigations should be performed.

P 6
Analysis of single mitochondrial particles isolated from human lymphocytes

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Introduction. In forensic genetics mtDNA analysis is a powerful tool, when dealing with degraded DNA or low copy number (LCN) samples. The increasing sensitivity of analysis has made it possible to get sequence information from single cells and theoretically even from single mitochondria. The results must be regarded with attention, especially in the light of mitochondrial heteroplasmy (hp). If only a few molecules serve as template, stochastic events in early stages of PCR may lead to "false" pure sequences and hp might not be detected or misinterpreted. In order to assess reliability of mtDNA analysis, it is therefore interesting to systematically analyse the mtDNA composition of single mitochondria.
Methods. In this study we manually separated single human lymphocyte mitochondria using optical tweezers in combination with a 1µ-Ibidi-Slide and performed mtDNA sequencing using a nested PCR approach.
Results. Despite the small size of lymphocyte mitochondria that were only ~0.4 µm in diameter, we were able to successfully deposit them and to obtain mtDNA sequences. MtDNA analysis will be presented and discussed.
Conclusions. Optical tweezers in combination with a 1µ-Ibidi-Slide are a well suited method to separate and deposit single human mitochondria. Nevertheless, this method must be manually operated and is very time-consuming. Therefore, a systematic analysis of mitochondria using a sufficient sample size will be possible not until this technique has been automated.

P 7
Where do the Malagasy come from? – Evidence from a genetic point of view

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Introduction. The island of Madagascar in the Indian Ocean was probably the last great island landmass to be settled. The genetic origins of the Malagasy are still relatively poorly understood, since conflicting results pointing at African, Asian, Pacific and even European origin have been published. Since there are several genetic markers associated with the geographical origin the idea of this project was to apply these assays on a Malagasy population in an attempt to define a special Malagasy genotype.
Methods. Fifteen autosomal, eleven X- and eleven Y-chromosomal STRs as well as 16 autosomal SNPs have been analysed in 170 apparently unrelated people from Madagascar. In addition, Y-chromosomal SNP analysis and mtDNA sequencing have been done for haplogrouping.
Results. We will present a thorough summary of data from all genetic markers investigated and point out possible relations between the Malagasy and people from other population groups.

P 8
Analysis of transfer of epithelial cells by fingerprints

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Introduction. Dactyloscopy, the analysis of fingerprints, is one of the oldest crime scene investigations. Nevertheless, finger prints can bear more information than friction ridges of the hand. The process of touching not only leaves impression of the friction ridges, the fingerprints, also epithelial cells can be transferred. Such cells are important sources of DNA. The analysis of this DNA gives important information about the potential suspect und facilitates assignment to a person. Due to the small number of epithelial cells transferred by fingerprinting and the fact that these cells often do not contain a nucleus, analysis of DNA polymorphisms is not necessarily successful.
Methods. In order to investigate how many cells are transferred during fingerprinting we touched glass slides with the fingertip. The fingerprints were fixed and stained with eosin. We estimated cell number transferred by microscopic inspection. A consecutive DNA extraction from the slides and the quantification of human DNA reveals if enough material was transferred for STR analysis.
Results. We present the results from trials which include the investigation of the impact of pressure and the intensity of hand washing. We found differences in the amount of cells in dependence from pressure.
Conclusions. High variability between different volunteers anticipates a general conclusion for the transfer of cells during fingerprinting.

P 9
Simple method for identification of human DNA by real-time PCR of *FOXP2*

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Introduction. The forkhead box P2 (*FOXP2*) gene is specifically involved in speech and language development in humans and the sequence is well conserved among many vertebrate species but accumulates amino acid changes in the human lineage. In forensic field, we encounter the visible biological stains and sometimes need to identify the origin species. To discriminate between DNA of human and non-human vertebrate origins in forensic specimens, we designed real-time PCR genotyping method based on TaqMan probe assay.
Methods. The TaqMan probes and primers were desigened in exon 7 of *FOXP2*. Human or non-human specific probes were labelled with FAM or VIC, respectively. Real-time PCR was performed and products were detected using an Mx3000P. Specific PCR amplification was also comfirmed by electrophoresis. This study protocol was approved by the Ethical Committee of Kurume University.
Results. This system successfully distinguished human and most of non-human DNA tested (such as many mammalians, birds and frog). Although non-human signal was not detected form genome DNA of a mouse, a turtle, a lizard, and fishes, specific amplification on these species excluding fishes was detected by electrophoresis. In addition, we can roughly estimate the concentration of human DNA.
Conclusions. The present results suggested the *FOXP2* is one of useful identifiers of human DNA in forensic samples and this method is applicable to routine study prior to STR examinations in forensic fields.

P 10
Post-mortem mRNA extraction: a comparison of three commonly used methods

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Introduction. Preserving RNA quality during handling and extraction of samples is crucial to avoid further degradation. The aim of this study was to evaluate the quality and quantity of RNA extracted via three different extraction techniques.
Methods. RNA was extracted from six tissues (brain, cardiac muscle, skeletal muscle, liver, kidney, spleen) with three techniques: phenol/chloroform extraction (Ph/Chl), modified organic extraction: Trizol and bromochloropropane (Tri-BCP), and PeqLab's PeqGold kit. Extractions were performed in ten biological and two technical replicates. Yields were measured using Nanodrop-ND-1000 and RNA qualities were determined using Agilent's Bioanalyzer.
Results. RNA was obtained in suitable quantity with all three methods tested: Tri-BCP showed highest mean quantities in all tissues except liver, in which Ph/Chl yielded highest amounts of RNA. Tri-BCP was also found to preserve RNA best in cardiac and skeletal muscle while in brain and liver, PeqGold extracts showed the highest RIN numbers. Ph/Chl seems to be the least suitable method for brain tissue with extracts showing very low RIN numbers compared to the other two techniques. This finding might be explained by Tri-BCP and PeqGold being more suitable for tissue containing high amounts of fat.
Conclusions. Tri-BCP, followed by PeqGold, showed overall better performance compared to conventional phenol/chloroform extraction. The biggest difference in performance was found in brain tissue where RNA seems to degrade massively during the Ph/Chl process, but is reasonably well preserved by the other two methods. In conclusion, performance of extraction techniques is tissue dependent and thus, validation is needed.

P 11
Forensic imaging: 3D visualization of scattered particles contained in the skin by projecting their presence onto virtual body surfaces based on CT scans

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Introduction. Particles of materials such as glass, metal or rocks may become distributed across skin and superficial skin layers during blows, falls, explosions or other impacts of later interest to investigatory authorities. Particles may then show up in computed tomography (CT) scans if they are big and radio-opaque enough. Yet, documenting their distribution in a manner that is illustrative enough to aid further investigation constitutes an open problem.
Methods. CT data of deceased are obtained as part of our routine examination at our institute. CT data of survivors are acquired on hospital scanners as part of their diagnostic work up and later may be sent to us by investigative authorities to investigate claims. From CT data, skin surfaces are obtained as iso-surfaces. A number of tracing and distance calculations can be used to map volume data information to the surface vertices. Thus, colored 3D surfaces of the CT-derived skin can be used to show the distribution even of obscure information such as tiny particles. We applied visualization techniques implemented in IDL (ITTVIS, Boulder, CO, USA) to a number of clinical and post-mortem cases (1 instance of tiny rocks impaled into the skin, 1 instance of explosive device derived metal particles, 1 instance of glass fragments).
Results. Examining CT 2D slice images, particles that can be traced to possess a higher radiodensity than surrounding tissue will be able to undergo such visualization. Particles that for reasons of material com-

position or size relative to the CT scanner resolution are not captured can, obviously, not be visualized. On our poster presentation, we will present technical aspects of the visualization and discuss interpretation and problems. In the instance of the explosion case, reconstructive conclusions could be made as to location and count of blows that added to the investigation rather than merely supplementing it.

Conclusions. Distribution of scattered particles on or in skin is achieved by projecting CT volume data derived content onto a skin surface model drawn from the same data source. As an exploit of CT data, this type of visualization does not replace or compete with 3D surface scanning (which constitutes a totally different way of investigating body surfaces). In our view, visualization of such particle distribution can be a hard indication for acquiring a post-mortem CT scan as it adds to an autopsy what an autopsy can never document in the same way.

P 12
Experiences with the 3D photography in the daily forensic routine

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Introduction. Photographic documentation has become an integral part of forensic practice. In recent years, the three-dimensional photography has made great progress and is about to find its way into our daily lives. In particular, this technology allows a correct assignment of objects to image planes and allows a depth perception that two-dimensional photography lacks. Since three-dimensional cameras have become affordable and more user-friendly, we tested such a camera in a daily forensic routine.

Methods. Fujifilm provided us with a stereoscopic camera FinePix REAL 3D W1 and a digital 3D picture frame that we tested in the daily routine for two weeks. The camera has a resolution of 10 megapixels and an innovative Parallax Barrier Display which allows watching a 3D picture without special glasses.

Results. The camera was easy and straightforward to use. High-quality three-dimensional images could be immediately viewed on the display without special glasses. However, both macro mode and 3D portrait mode were lacking, and 3D paper prints are costly.

Conclusions. The "Finepix 3D W1" is a user-friendly and easily deployable 3D camera. Image planes were easily assignable on the photos. However, the practicability was limited as described above. To view the digital 3D images, the camera display or the specific viewer had to be used or the files had to be manually post-processed to anaglyphs. The 3D technology is currently making rapid progress so that it may enter our everyday (professional) life in the near future when 3D cameras will be perfected.

P 13
Injuries of motor vehicle occupants correlated with damages in cabin: the relevance of 3D surface scanning, MSCT and MRI for traffic accident reconstruction

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Introduction. Reconstructive questions in traffic accidents may be a big challenge to the investigators. From existing motor vehicle damages original speed and collision impact can be estimated by further physical calculations. In contrast to the exterior view and analysis damages in the cabin were not previously considered to the same degree. When needed three-dimensional surface scanning from involved vehicles (inside and outside) as well from victims can be performed.

Methods. With use of modern imaging techniques as radiology scanning (post-mortem multi-slice computed tomography, magnetic resonance imaging) for the analysis of internal findings and high resolution surface scanning for the analysis of external findings we detected the injuries in vehicle occupant fatalities. Data as metric plan of accident scene, condition of occupant protection and surface scanning were collected in collaboration with the specialized police.

Results. We present our first traffic accident documented and analyzed at Institute of Legal Medicine (IRM), Accident Service of City Police (UTD) and Forensic Science Institute (FOR) Zurich. Based on external data speed and collision impact could be estimated. Based on internal vehicle data and injuries of the vehicle occupant position and motion during impact could be reconstructed.

Conclusions. Surface scanning is in addition to radiology examinations a useful method for problems in traffic accidents regarding interaction between cabin elements and injured body regions. They help to answer complex questions as biomechanics, accident course and causality in fatalities of vehicle occupants. Not least these methods will add to improve automobile safety by preventive accident research.

P 14
Usage of anti-PSA gold-nanoparticle conjugates for detection of semen in sexual assaults

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Introduction. PSA (Prostate-specific antigen) is a 34 kD glycoprotein produced by certain cells in the prostate gland. This protein is mainly present in semen and plays an important role in fertility. Presence or absence of PSA has been used as a forensic marker for determining the presence of azoospermic semen in some sexual assault cases. Accurate detection of semen plays a key role in solving the sexual assault problems.

Methods. In our study, we have used the optical properties of gold nanoparticles (GNPs) and its conjugation with anti-PSA antibody to bind specifically with the PSA which is present in the semen.

Results. First, we analyzed the optical properties of the GNPs which were synthesized in our laboratory, its different sizes and the respective red-shift due to aggregation. Second, conjugation of the anti-PSA antibodies with GNPs and removal of unconjugated GNPs or anti-PSA antibodies were the main criteria. The final step was to check the binding and aggregation of GNP- anti-PSA antibody with abundant PSA present in semen and the red-shift phenomena as the result of aggregation, which was measured by UV-Vis spectophotometry. TEM images also showed the aggregation of GNPs.

Conclusions. With this achievement we are hopeful to design a kit to confirm the presence of PSA in forensic samples which are collected at sexual assault scene which is of a great importance.

P 15
Forensic study of new storage method of corpses

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Introduction. In order to preserve the corpse for a few days or a few weeks, cryopreservation using refrigerators or dry ice, and embalming are commonly used in the world. Recently a new method using ozone gas and microwave (Brand name: MC-06) is being developed in Japan. The corpse treated by this process can be preserved at room temperature for about a week without cold treatment or embalmment. Using

animals, we studied the forensic effects after MC-06 processing based on microscopic findings and toxicological data.
Methods. Animals, rabbits and pigs, were euthanized using an anesthetic, and divided into a group treated with MC-06 and a group without MC-06 (control). The animals were kept at room temperature and observed over time. Autopsy was performed, and organs, blood, urine samples were collected. Findings of pathological examination and toxicological tests were compared.
Results. The detailed data of this study will be presented in this congress.
Conclusions. The advantages of this method are that special skills such as embalming and equipment such as refrigerator are not required. MC-06 will be useful in large-scale disasters involving many corpses. The disadvantages are that electricity is used and the time required is approximately 1 hour/human body. If this method causes no or less impact on forensic examinations, it will become a very easy and useful technique.

P 16
Optical stress analysis in shaken baby syndrome physical brain model by using high-speed polarized camera

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Introduction. Shaken baby syndrome (SBS) is one type of child abuse caused by shaking infant violently, but the mechanism of intracranial injury has not been clearly understood. By using high-speed polarized camera we carried out an optical stress analysis and observed the stress distribution in the gelatin brain model.
Methods. We modified Holbourn's (1943, 1945) sagittal slice gelatin brain model and added the lateral ventricle. The experimental device consisted of a rotation table, white light source, polarizer, the model and high-speed polarized camera. The model was oscillated rotationally along the sagittal direction with 60 degrees of central angle and 2–3 cycles/sec of shaking frequency. Color image change for major polarization axis direction indicating qualitative stress generations was examined.
Results. The average peak values of linear acceleration, angular velocity and angular acceleration were 0.87 G, 5.05 rad/s and 289 rad/s^2, respectively. In color image sequence, color change was clearly observed near by brain surface of frontoparietal region at several milliseconds before full flexion. The stress change in frontoparietal region may be an explanation of subdural hemorrhage due to rapture of bridging vein in the SBS. This region is the common site of a gliding contusion. Krave et al. (2011) said that flexion caused more extensive diffuse brain injury than extension. Our result is in good agreement with their report.
Conclusions. We think that our model is very useful to understand the mechanism of intracranial damages in the SBS such as subdural hemorrhage or a brain injury.

P 17
Application of the biological clock-based method for estimating the time of death to forensic practices

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Introduction. Recently, we reported a biological clock-based method for estimating the time of death. In this report, we applied the method to autopsy cases to evaluate its applicability to forensic practices.
Methods. Total RNA was extracted from autopsy tissue samples and reverse-transcribed into cDNA. Thereafter, generated cDNA was subjected to real-time PCR analysis of *Bmal1* and *Rev-Erb α* (*Rev*). The time of death in each was estimated by mean value of Rev/Bmal1 ratios of the kidney, liver and heart. The applicability of our method to forensic practice was evaluated in comparison with conventional methods for estimating the time of death.
Results. Our method was applied to a case of double suicide of son (50 years old) and his mother (77 years old) with dementia. Their causes of death were traumatic shock. When the deceased were recovered (18:00/7/July), rectal temperature of the son and that of his mother were 29.5 °C and 28 °C, respectively. Based on the rectal temperature, it was estimated that their post-mortem interval was about 14 hours, and the mother died 1–2 hours prior to the son. At autopsy (13:30/8/July), tissue samples were collected and subjected to analysis of clock gene expression. Consistent with the estimation by conventional method, Rev/Bmal1 ratios of the son and his mother were 79.0 and 34.3, respectively, indicating that the son and mother died around 2:00 and 0:00, respectively.
Conclusions. Estimating the time of death based on biological clock would be applicable to forensic practice.

P 18
Why QR code? – Technology, chances, aims

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QR Code („Quick Response") is a worldwide standard 2D code, which is easy to create and quick to read by almost every smartphone and tablet PC. The availability of posters and presentations is limited by time and place of the conference and while authors have their work in a digital form, they often lack the option to publish it online.
In preparation for the 8th International Symposium Advances in Legal Medicine (ISALM) we were looking for a future technology which is free of charge, easy to use and able to speed up the transfer of information. Today QR Codes can be found in newspaper and poster advertisements, on business cards, on buildings and others in order to transport data to mobile devices.
QR Code as a global 2D code standard with multiple options of usage during an expert conference has the potential to increase information transfer in total and in tempo. Apart from that it may also be of interest for forensic scientists, because tattooed QR Codes may hide important information as names or nicknames etc.
In presentations, on business cards and posters information such as hyperlinks or contact details can be shown as QR Codes. Those are easily to create on any computer with internet access free of charge. Smartphones and tablet PCs decode them with a QR Code-Reader-App. Uploaded pictures taken by digital cameras can be decoded online. To attach the hyperlink to a poster or presentation as a QR Code ensures fast and easy access to it.

P 19
Investigations about the application of Polyvinyl alcohol for the recovery of biological stains from skin

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Introduction. When conducting an investigation at the scene of crime this includes securing stains from the body of the victim or committer. These stains can consist of fibres, hairs and/or other biological materials like epithelial cells. Normally latent stains, e.g. epithelial cells or body fluids are collected by swabs from skin surface. Due to a non-sticky material swabs may not be the best choice for securing DNA material. Collection by adhesive tapes is an alternative; however it can not be assured that all material is saved, because wrinkles are omitted

especially in case of rigor mortis. Polyvinyl alcohol is a water-soluble, non-toxic synthetic polymer which has good film forming and adhesive properties. Up to now, polyvinyl alcohol is used in crime scene investigation solely for the protection of gunshot residues.
Methods. To investigate the ability of polyvinyl alcohol for covering biological stains from skin surface we produced artificial stains on skin surface of the hands of living volunteers. These stains were covered with polyvinyl alcohol several times and allowed to dry. The polymer film was removed and biological material was secured from the film either by swabbing or washing. After conventional DNA extraction human DNA was quantified. We determined DNA profiles by STR analysis.
Results. Here we discuss the performance of polyvinyl alcohol for the covering of DNA material from skin.
Conclusions. The method for recovery of biological material from skin has to be adapted to the case specific circumstances.

P 20
Post-mortem LDH enzyme activity in human tendon in relation to time after death

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Introduction. Assessing the time of death is a crucial problem in legal medicine. Despite numerous approaches by using biochemical techniques there is still a lack of reliable and validated methods, especially in the middle and late post-mortem interval.
Methods. In the present study the activity of lactate dehydrogenase (LDH) has been assayed in human patellar- and Achilles tendon. This enzyme is ubiquitous in human cells making its liberation a valuable indicator for cell lysis. In previous studies, a correlation between cell lysis and the time after death was shown using the human Dura mater. Tendons from 25 corpses with time after death from 33 to 173.5 hours were analyzed. LDH activity was quantitatively determined using a colorimetric assay (Cytotoxity detection Kit®). In a first measurement spontaneously liberated LDH in PBS-buffer was assayed, indicating the amount of lysed cells. In the following measurements LDH was quantified after artificial cell lysis using TritionX-100, a non-ionic detergent. Using these two data, relative cell lysis after death was evaluated.
Results. In contrast to the previous study on the Dura mater no significant correlation between cell lysis and LDH liberation in human tendon and time after death could be demonstrated. **Conclusions.** Quantifying LDH liberation in human tendon seems not to be applicable for estimating time after death.

P 21
LDH release from human Dura mater in relation to the environmental temperature

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Introduction. The determination of time since death is an essential parameter in legal medicine. No reliable methods exist for the middle and late post-mortem interval, particularly when the influence of temperature is considered. In a previous study on the post-mortem LDH-enzyme activity in human Dura mater a statistically significant inverse correlation between remaining vital cells estimated by LDH liberation before and after cell lysis with TritonX-100, a non ionic detergent, and the post-mortem interval was shown. LDH (lactate dehydrogenase) is an enzyme, which is present in almost every cell in the human body.
Methods. The Dura mater was selected because it represents a bradytrophic tissue, which may be less affected by environmental factors (e. g. temperature) over a long post-mortem interval. In the present study the LDH release from the Dura mater incubated for two hours in PBS buffer at three temperatures (2, 15, 26.5°C) was determined using a colorimetric assay (Cytotoxity Detection kit®).
Results. No significant correlation between the autolysis of Dura mater cells resulting in the release of LDH and temperature could be demonstrated.
Conclusions. There seems to be no influence of temperature in LDH release in human Dura mater.

P 22
Up-to-date methods of research in forensic medicine

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Introduction. We recommend to use laser polarimetry and mass-spectrometry in modern forensic medical science and practice in order to diagnose injuries of human tissues. The object of research is studying of modern methods investigation in forensic medicine.
Methods. Laser polarimetry is topical for the sake of resolving the problems of detecting areas of acute myocardial ischemia. In order to perform a quantitative analysis of biological objects; a method of non-standard laser mass-spectrometry is suggested.
Results. A possibility of a future use of laser polarimetry in practice is demonstrated by the results of our studies; the diagnostic criteria of the areas of acute ischemia on laser polarization images of the myocardial tissue have been detected, a higher efficiency of this particular technique has been corroborated as compared with the traditional methods. When resolving many problems of a forensic-medical examination, the leading role is played by the osseous tissue as a material evidence which preserves for a prolonged period of time a number of identification signs, traces of traumatic damage, the consequences of actions of diverse factors of the outdoor environment, deliberate elimination of the traces of crime often lead to a situation when the bones of a human skeleton or their separate fragments remain the only source of information and the object of forensic-medical investigation.
Conclusions. The modern methods are used by us successfully in our forensic medicine practice.

P 23
A novel method using microwave digestion and vacuum filtration followed by automated SEM for diatom detection in the diagnosis of drowning

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Introduction. The detection of diatoms has been proposed to be useful in the diagnosis of drowning. We have developed a novel method using microwave digestion and vacuum filtration followed by automated scanning electron microscopy (SEM) for detection of diatoms in water and organs.
Methods. In order to evaluate the usefulness of the method for the diagnosis of drowning, diatom tests with the method were carried out on drowned rabbits (12 cases) and non-drowned rabbits submerged after death(10 cases), as well as six human drowning cases. Samples including lung, liver, kidney, bone marrow and water were treated by microwave digestion with concentrated nitric acid and hydrogen peroxide; the fluid obtained was vacuum-filtrated, and its sediment on the microporous nylon membrane was dried, coated, and photographed under the scanning electron microscope with automated scanning mode; quantitative and qualitative analysis of the diatoms in the samples were accomplished based on the images taken.

Results. Diatoms were detected in all water samples and the organs of the drowning victims. While diatom test was proved to be negative for the non-drowned rabbits submerged after death.
Conclusions. The developed method is rapid, sensitive, labor-saving, and accurate for qualitative and quantitative diatom analysis, thus is of prominent application value in the diagnosis of drowning.

P 24
Systematic approach to liver gas volume and distribution in post-mortem CT by computer aided density analysis

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Introduction. It has been shown that CT is superior to conventional autopsy in detecting gas. Attempts have been made to describe the distribution of gases in different organs, as well as to describe the origin of the found gas. It has also been noted that the knowledge of post-mortem changes, especially the formation of gas, is essential for forensic interpretation of post-mortem CT. Furthermore it is evident, that the measurement of gas volumes is of diagnostic value e.g. in iatrogenic gas embolism, diving accidents. Therefore a more systematic measurement of gas volume and distribution seems reasonable.
Methods. We performed a manual liver segmentation of our CT data sets, using the open source tool ITK-Snap from Insight (http://www.itksnap.org). The CT data has a slice thickness of ca. 3 mm, thus, we needed to segment about 100 slices manually by drawing a contour into each slice around the liver outline. Afterwards we investigated the grey value distribution of the HU values limited to the segmented liver tissue. We calculated the histogram and the cumulative grey-value distribution and compared such histograms by a χ^2 distance. Distributions were evaluated for a range between –1000 HU and 200 HU, where gas can be expected. Further, we computed the inflection point of the cumulative distribution and track its location over different time points/scans.
Results. As could be expected only the livers from recently deceased persons without any trauma showed a "normal" histogram, e.g. an almost normal distribution around 50–60 HU, covering an density from approximately –20 to 120 HU. They also showed a cumulative grey distribution beginning at app –20 to app. 120 HU. This is in accordance with other authors findings in living persons. In slightly putrefied livers with visible gas accumulation the histograms were asymmetric due to the density of the gas and the partial volume effect on the borders of gas and liquids respectively tissue. A slight skewness to the left could be observed. By histogram subtraction a theoretical gas volume could be measured. Nevertheless this is not possible in organs that already contain gas. By logarithmic analysis of the cumulative distribution it is possible to identify an infliction point that may indicate a possible threshold level for determining the gas content of an solid organ. The gas distribution in trauma vs. putrefied cases shows a different infliction point.
Conclusions. The observed differences may be due to effects on the level of the partial volume effect, as traumatic gas is more confined to bigger vessels as gas due to putrefication may be distributed in smaller bubbles and thus vessels. Without knowledge about the gas distributional effects errors in CT reading may result. In later stages intraparenchymal gas could be expected to explain some of the phenomena. An interdisciplinary approach is needed for the analysis of CT data, including forensic medicine, radiology and informatics. A larger collective of cases has to be analyzed to reach significant conclusions. The method is applicable to measure gas in solid organs and has to be analyzed for further potential applications in pmCT.

P 25
Post-mortem neuro-MRI

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Introduction. CT (computed tomography) imaging was able to augment forensic autopsy increasingly during the past decade as a cross-sectional method. Nevertheless, newer techniques such as post-mortem MRI (magnetic resonance imaging) are rarely investigated. The purpose of this study was to understand the typical features of tissue and vascular changes of the brain on post-mortem MRI.
Methods. Imaging was performed on a 3 and 1.5 Tesla MR scanner (both Siemens, Erlangen, Germany) on 10 consecutive bodies. All underwent subsequent autopsy and additional CT (6-slice, Siemens, Erlangen, Germany). Utile sequences such as T1, T2, SWI, PD, isotropic 3D-sequences, CISS, Inversion Recovery and diffusion were studied in order to establish typical post-mortem patterns on post-mortem MRI of the brain.
Results. Image quality of utile MR sequences is strongly core temperature dependent and typical patterns in post-mortem MR can be established. The lack of ante mortem circulation leads to typical changes on SWI sequences. Basal ganglia, cortical and parenchymal signal intensity changes on T1, T2 and PD compared to ante mortem brain MR imaging. Isotropic sequences are useful for anatomical morphology and image reconstruction.
Conclusions. Post-mortem MRI shows typical patterns compared to ante mortem neurological MRI. Nevertheless, these patterns need to be established and understood. Not all standard ante mortem sequences are utile on post-mortem MRI and the examiner needs to know which sequences are beneficiary for diagnosis in order to add information to classical autopsy.

P 26
Characteristics of gunshot wounds to the head on post-mortem computed tomography – a review

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Introduction. Regarding the forensic investigation of cases of gunshot victims, some of the most important issues are the recovery of metal parts (projectiles and/or fragments of it), the differentiation of the entrance from the exit wound, and the determination of the firing distance (e.g. depiction of contact gunshots).
Methods. All post-mortem computed tomography images of cases with fatal gunshot injuries to the head, are being reviewed and the special characteristics of the projectile-induced injuries are shown and discussed.
Results. Post-mortem computed tomography allows for the identification and visualization of the entrance and exit wound characteristics, the presence of projectiles and/or fragments of it, and the presence of gunshot residues in cases of contact gunshots. Additionally, in many cases, the projectile trajectory through the brain can be visualized.
Conclusions. Computed Tomography is a very helpful tool for the investigation of cases of fatal gunshot injuries, as it can provide significant information regarding important forensic questions.

P 27
Accreditation process forensic center of Montenegro to the mentorship of the European Union (IPA 2009 projects and EMFA-2)

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Introduction. The Forensic Centre of Montenegro is the only institution in Montenegro that deals with matters of forensic expertise, testing and research. In the modern facility of 3500 m2, in conditions that meet modern European standards, forensic experts work in the field, chemistry, biology (DNA), examination of manuscripts, documents and information technologies; dactyloscopy, tools mark, ballistics, determine the causes of fires and explosions, digital audio processing video and photo technology, coordination, and crime scene investigation. In accordance with the recommendations of the European Union and document 2009/905/JAI of 30. Nov 2009, the Forensic Centre of Montenegro in 2010 started work on the accreditation by the European quality standard ISO/IEC 17025.
Methods. The Forensic Centre of Montenegro is accredited according to the European standard ISO/IEC 17025, under the mentorship of the Forensic Institute of the German police in Wiesbaden as part of an IPA Twinning Project MN09/IB/JH/01 2009-Strengthening the capacity of Police Directorate Montenegro approved by the European Union. This project involves the following activities: document management, scope accreditation requirements and controlled protocols of footprints in the Forensic Center. However, the validation method in the Forensic Center is included in the project EMFA-2 (European Mentorship for forensic accreditation), taking place in the organization ENFSI a (European Network of forensic science institutions), under the auspices of the European Union (Monopoly Programme). As a mentor Forensic Laboratory Center of Montenegro in the project EMFA-2 was measured by the Forensic Institute in Tallinn (Estonia) which is accredited according to ISO/IEC 17025.
Results. As a result of mentoring projects by these institutions of the European Union, it is generally intended that by 2013, the Forensic Center of Montenegro will be accredited according to ISO/IEC 17025 as follows: all the documentation and management procedures of quality management. In addition to general instruments, is planned and method validation or accreditation of biological-DNA laboratory, laboratory for chemical analysis of drugs, laboratories for chemical traces causing ridges and laboratory tests for GSR.
Conclusions. The accreditation of a forensic institutionis a *conditio sine qua non* for the verification and recognition of its results. This is especially so in interstate forensic collections (for example DNA, fingerprints, etc.), where non validation methods were non compatibility and therefore useless for the exchange and operational use. Presentation methods of accreditation of the Forensic Center of Montenegro, is one good example where the European Union through projects using certified institutions as mentors, assessors and auditors in the field of accreditation.

P 28
Autopsy standards after organ donation for transplantation

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Introduction. Organ shortage for transplantation determined extension of the donors' pool by including marginal cases as well. The donor must be free of infectious disease and malignancy but sometimes only autopsy reveals occult diseases that might be harmful for the recipient.
Methods. We reviewed the medical literature looking for pathology transmitted through transplantation in correlation with findings at donor's autopsy. We selected case reports, incidence analyses, brief reports, cohort studies using as inclusion criteria content of donor-derived malignant or infectious disease in transplanted organ recipients and we performed statistical meta-analysis.
Results. An autopsy of the donor was performed in only 63% of the cases, in the other situations the donor origin was proved by genetic studies or by gender-specificity (e.g. ovarian cancer metastasis in male recipient). The risk of transmitting cancer to a recipient is as low as 0.2%. Localization most frequently involved in undetected malignant tumor is genital (prostate and ovary), while melanoma in donor is considered as an excessive risk for recipients.
Conclusions. Autopsy should be performed in all cases as a completion of the donor selection process. We support a close cooperation between forensic and clinical pathologists when making macroscopic and microscopic examinations. As a quality management procedure we recommend specific techniques and sampling for histopathologic investigations focusing on genital and skin examination.
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P 29
The quality management of forensic medical activity in Komi Republic of Russian Federation

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Introduction. The quality management of medicolegal work is one of the most important problems for the State Medicolegal Institute.
Methods. The system includes 3 stages of the control:
1. Stage – chiefs of departments inspect the medico-legal documents which were made per month.
2. Stage – the deputy chiefs of the Institute collect the results of checking and write the reviews. In the review the lacks of methods and errors are specified. The review is represented on a methodical council.
3. Stage – the methodical council monthly considers the presented reviews and makes the decisions. The coefficient of quality by following criteria was accounted: under the presented reviews, data on quantity of repeated researches, by quantity of remarks from the deputy chief, coefficient of productivity, an indicator of terms of the document, an indicator of defects.

Results. As a result the quality coefficient is applied to updating of the expert's salary. From the moment of introduction of the given system in 2007 it is possible to note the positive dynamics in experts work. The average level of the quality coefficient has been: 93,6 in 2007; 94,6 in 2008; 96,2 in 2009; 96,6 in 2010.
Conclusions. The monitoring system of quality management allows to estimate the experts' work and to prove the administrative decisions.

P 30
Unexpected sudden death due to intravascular large B-cell lymphoma thrombosis in mesenteric vessels: an autopsy case

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Introduction. Intravascular large B-cell lymphoma (IVLBCL) is a rare type of extranodal large B-cell lymphoma characterized by the selective growth of lymphoma cells within the lumina of vessels, particu-

larly capillaries. The present case was a sudden death of a 41-year-old man presenting with a 6-month history of progressive nervous syndromes in the bilateral lower extremities and saddle areas. Cranial magnetic resonance imaging (MRI) showed abnormal signals in the thoracic cord. The patient was preliminary diagnosed as inflammatory demyelinating polyneuropathy (IDP) and transferred to a top-class hospital because of the worsening of his illness. Three days later, the patient began to develop painful distension in the abdomen, deep coma and death.
Methods. As there were doubts about the diagnosis and treatment, a legal-medical autopsy was performed.
Results. The autopsy revealed 220 cm of hemorrhagic and necrotic small intestine caused by thrombus obstructions in the superior mesenteric vessels and in one branch of the superior mesenteric artery, which were histologically diagnosed as IVLBCL thrombosis. Tumor cells are also observed in multiple organs, as well as in the spinal cord, which may contribute to the paralysis of the intestine vessels and the previous nervous symptoms. Thus, the cause of death was identified as severe hemorrhagic infarct in the small intestine caused by IVLBCL thrombosis.
Conclusions. These results suggest that, when in the advanced stage, IVLBCL cells may aggregate into thrombus in medium intestine vessels and even lead to sudden death via severe hemorrhagic infarct. In autopsy cases suspected as acute abdomen, careful examination of the intestine vessels should be highly recommended.

P 31
The case of Ono hospital – the turning point of the medical system in Japan

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Introduction. I describe the case of a doctor who was arrested and its impact on the Japanese society. An obstetrician who caused the death of a patient during a C- section was arrested on suspicion of professional negligence in February 2006. So far, in Japan when doctors are arrested, their reputation are stained as if they were criminals by the mass media even before legal conclusions. However, the context of how the media dealt with the "Ono hospital case" was different.
Methods. By examining newspapers and electronic media, I analyzed the relationship between the "Ono hospital case" and the political agenda about "a shortage of doctors" and tried to find the reason why the media changed the context concerning this doctor's case.
Results. The media focused on the special situation, when the obstetrician was alone in the hospital and there was a serious shortage of obstetricians in all of Fukushima Prefecture rather than the concerns about what a doctor's negligence is. One of the reasons is that Fukushima's public medical school and the Japan Society of Obstetrics and Gynecology definitely criticized the police for the arrest. This was the most that doctors ever expressed their anger in Japan. The other reason is more serious, when the medical school organized obstetricians throughout Fukushima and so the obstetrics medical system collapsed in some hospitals where single obstetricians moved to other hospitals. Moreover, this phenomenon spread in other areas throughout Japan like Hokkaido and Nara. Consequently, it seems that the arrest of the doctor brought about a collapse of the obstetrics medical system in Japan. The media linked this case to another case where a pregnant woman was transferred from the hospital to a higher level one but died, since many hospitals would not accept her in Nara in August 2006.
Conclusions. After this, the obstetrician was found not guilty in August 2008. The political agenda about "a shortage of doctors" was set. The Japanese government changed the policy of this issue, since it has insisted that the number of doctors is sufficient and has tried to reduce it.

P 32
A trial of thymic volume evaluation by computed tomography

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Introduction. Preventing child maltreatment death or damage is urgent and important task for forensic scientists. It is well known that thymic involution and decrease of thymus weight occur as a result of exposure to long-term stress in children. Recently, diagnostic imaging has been commonly employed in legal medicine. This study aims at evaluating thymus volume calculated from computed tomography images to demonstrate child maltreatment.
Methods. Thymus volume and weight were compared for 27 cases (0–6 years old) examined in Department of Forensic Medicine, Center for Diagnostic, University Medical Center Hamburg-Eppendorf for two years since 2008. Thymus volume was calculated from computed tomography images by using OsiriX Imaging software run on Macintosh personal computer.
Results. A statistically significant correlation was observed between thymus weight and volume ($r=0.95$, $p<0.001$). A case showing loss of thymus weight and volume remains to be resolved.
Conclusions. Thymic involution could be successfully evaluated on computed tomography images. The most useful feature of computed tomography scan is to be able to demonstrate thymic involution non-invasively in a surviving victim. Computed tomography images will provide crucial evidence in a case where a surviving victim has a chance to be medically examined.

P 33
Fatal left ventricular and coronary air embolism during implantation of a Watchman Device

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Introduction. We report about a case of fatal left ventricular and coronary air embolism after interventional closure of the left atrial appendage with a so called Watchman Device with accidental air inflow during this minimal invasive vascular surgical intervention.
Methods. Autopsy and post-mortem CT-scan were performed to ensure the cause of death.
Results. The Watchman Device is a quite new method (first mentioned 2005) avoiding clot embolization in cases of atrial fibrillation to minimize the risk of stroke or transitory ischemic attacks. Conservative therapy with oral anticoagulation (e.g. Falithrom) is considered to cause bleeding complications, so we can suppose an increase of interventional therapy with the risk of blood vessel injuries or air embolism.
Conclusions. Left air embolism is difficult to verify with common morphological (like Richter-technique) and radiological methods. Hence post-mortem CT-scan seems to be necessary for validation of cause of death in such cases. We want to introduce this new interventional method and resume diagnostic opportunities.

P 34
Professional liability in orthopaedics and traumatology

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Introduction. In Italy, over the last decade, lawsuits against medical doctors have dramatically increased. Recent studies indicate that surgical specialists, such as orthopedists and traumatologists, are the most sued. This results in a substantial impairment of health services.
Methods. In this study we evaluate the 2005–2009 verdicts of the Civil Court of Rome concerning medical professional liability cases related to the area of Orthopedics and Traumatology. The documentation, provided by the Observatory on Medical Liability (O.R.Me), were analyzed in collaboration with Society of Orthopedics and Traumatology (S.I.O.T.). We considered several parameters: number of legal actions and surgeries (trauma and orthopedics), worker categories and surgical procedures most associated with cases of medical malpractice, informed consent and the economic compensation for therapeutic and diagnostic errors.
Results. Over 160 complaints filed against specialists in orthopedics and traumatology 66% were accepted. Among them, 60% were elective orthopedic surgeries and 40% trauma surgeries: surgical équipe was sued in 21 judgments and in 70% of cases condemned. In particular, spine surgery is the most susceptible to claims (13%), followed by hip arthroplasty (10%) and foot surgery (8%), moreover a defect in informed consent was reported in 6.2% of cases. Importantly, in addition to procedure expenses, 8,568,781.40 euros were spent on patient compensations.
Conclusions. Monitoring is a critical tool to highlight potential system failures. Thus, the extension of our analysis to the whole national scenario, developing a comprehensive database, will first improve our ability in the identification of system pitfalls, and, more importantly, will let us develop effective strategies for prevention.

P 35
A new trial for estimating medical malpractice in Japan

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Introduction. It is very conflicting to estimate medical malpractice. In Japan, usually judicial autopsy in medical malpractice related death cases is performed. Recently, a doctor was arrested by police after accusation of malpractice in delivery following a judicial autopsy. After this case, Japanese medical circles protected this arrest, and they installed a new examination system instead of judicial autopsy.
Conclusions. In this new autopsy system, when a patient died after medical treatment, the doctor can call the chief of the new organization, then the autopsy is performed by three doctors (pathologist, forensic pathologist and expert clinician.) After the diagnosis of cause of death, an assessment conference consisting of clinical doctors, lawyers of hospital and patient will be held several times, and they decide whether the therapy was performed according to the rules of the medical treatment or not. Then, this decision is reported to the hospital and family. After that, they discuss civil solutions or bring the case to court. This new system is held at each prefecture unit, and now 8 prefectures join including Tokyo, Osaka etc. Moreover, nurse coordinators attend this system. They attend the autopsy and coordinate the hospital and family. Now, we have about 140 cases.

P 36
A case of insulin-related suicide of a non-diabetic

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Introduction. Case: A 29-year-old, height 178 cm, weight 65.6 kg, non-diabetic male with depressive illness and attempting suicide with insulin was found dead in his bed with empty vials of insulin beside his body. We could found several needle punctures over the right antecubital fossa and left forearm. The cohabitant is his father who has insulin dependent diabetic mellitus, and the vials were administrated to his father.
Methods. Autopsy finding: there was no significant finding apart from the post-mortem changes corresponding to the time of death and no evidence of infliction of violence. Several subcutaneous hemorrhages were noted over the puncture sites of both forearms.
Results. Biochemistry study: the insulin level in serum revealed 3860 μU/ml and the post-mortem blood sugar showed 97 mg/dl. The concentration of C-peptide was 0.4 ng/ml in the blood.
Conclusions. The remarkable change of the serum insulin level was noted. The low C-peptide level and the high insulin level suggested an exogenous source of insulin. Although the blood sugar was 97 mg/dl, it usually remarkably elevated after death. Therefore, we concluded that his cause of death was probably due to hypoglycemia induced by hyperinsulinemia. Fatal self-injection insulin overdose in non-diabetic individuals is less common. To our knowledge, this might be the first case report of insulin overdose of a non-diabetic in Japan.

P 37
Addressing malpractice in Romania

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Introduction. The purpose of the paper is to inform about the laws which govern malpractice cases in Romania.
Methods. Identifying how to address malpractice in Romania
Results. The Physicians' Code of Deontology (2005) which contains the deontological norms and the general ethical principles, describes a responsibility of the Romanian College of Physicians. The medical deontological norms are not compulsory in court. They may be accepted or rejected by the judges on an individual case basis. Breaking of the code involves the breaking of laws, then the judicial branch will be directly involved. Regarding the differences between the ethical responsibility and the legal responsibility, the court may order a medico-legal report.
The medical responsibilities and the physician-patient relationship have evolved towards a contractual relationship in which the patient chooses his physician and the contract may incriminate the medical activity if the result is not the one expected by the patient, if the physician's nonintervention diminishes the medical condition of the patient or if actions not undertaken could include risks useful for the patient. The conflicts between physician and patient are resolved by insurance agencies, independent of the judicial decision or by mediation.
Conclusions. When the suspicion of malpractice arises, the medico-legal report is the tool used for establishing the responsibility of the physician or other medical staff, assessing the damage (physical, psychological, aesthetic), identifying the claimed action or inaction of the medical staff and establishing the causal link between them.

P 38
The medico-legal view on malpractice in Moscow region of Russia

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Introduction. The investigation was conducted to prove the criteria of forensic medical estimation of malpractice.
Methods. 70 cases of a forensic medical study on civil cases of malpractice have been investigated.
Results. The following rate of judicial claims mainly took place: the stomatologists – 30,5%, the obstetrics-gynecologists – 13%, the surgeons – 9,3%, the traumatologists-orthopedists – 7,1%, the plastic surgeons – 1%, the neonatologists – 0,2%. The common defects of medical aid have been revealed: the wrong diagnostics of the disease which have entailed inadequate treatment and development of complication; an erroneous choice of way of medical intervention which has caused the development of complications, lengthening of treatment terms and physical inability. Observance of medical aid standards in all cases has not been noted. Defects of the medical documentation have been revealed in 95% of the cases. Data of objective research, treatment plans have not been stated. The wrong choice of strategy of treatment was observed in 38%. Diagnostic errors have been revealed in 49%. The lack of required consultations of the adjacent specialists has been found in 13% of the cases.
Conclusions. The obtained data allow to differentiate the sources of malpractice occurrence.

P 39
Life-threatening postpartal haemorrhage after rupture of the vagina, uterine cervix, caesarean section and hysterectomy

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The authors discuss 10 cases – seven after vaginal and cervical rupture, 2 after Caesarean section and 1 after hysterectomy. Six of the patients had died – 5 after a rupture of the vagina and cervix and one after Caesarean section.
The lethal outcome was avoidable in all cases, because it was a result of untimely operation or not performed necessary interventions at all hysterectomy, e.g. ligation of the hypogastric arteries, as well as of faulty surgical performance. Basic principles of surgical behavior in such cases are postulated

P 40
Multisector quality assurance in relation to decubitus ulcers

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Introduction. In the care sector the occurrence of decubitus ulcers is seen as an indicator of quality. A study published in 1999 by the Institute of Forensic Medicine in Hamburg attracted much attention. Since then the *Hamburgische Pflegegesellschaft* (Hamburg care association; member establishments include both residential and day care providers) has made available to its members an external quality assurance procedure aiming to reduce the occurrence of decubitus ulcers to a minimum of unavoidable cases. In the period up to 2005 a benchmarking procedure was used in about one third of Hamburg's care establishments. This led to marked reductions in the prevalence and incidence of decubitus ulcers. A further study by the Hamburg Institute of Forensic Medicine (2008) led to additional development of quality assurance activities. Its aim was to extend these activities throughout all areas of care provision.
Methods. Care establishments participate in the present quality assurance project on a voluntary basis. Each establishment uses a computer based tool to record the data of all care recipients with stage III or IV decubitus ulcers. Every change of status is recorded. Decubitus ulcers whose status does not improve are treated separately in a single case analysis (the establishment completes a semi-standardised questionnaire). The single case analyses are evaluated by a specialist working group consisting of care staff, researchers studying care and doctors. Particularly unusual cases are evaluated by an advisory committee. The decubitus ulcers recorded are compared with data collected in routine from the Institute of Forensic Medicine. An initial data comparison with Hamburg's hospitals is planned for summer 2011.
Results. Altogether Hamburg has about 500 establishments providing day and residential care. Currently over 120 of these establishments, caring for about 9600 people, are involved in this project. Since November 2010, 27 single case analyses have been carried out. The specialist working group judged the vast majority of these to be understandable and appropriately treated. An additional analysis was carried out in a smaller number of cases. Few cases were advised by members of the specialist working group. An initial draft of an evaluation matrix reveals connections between the quality of recording and the frequency of additional analyses.
Conclusions. The theoretical and practical knowledge of the nursing staff in relation to decubitus ulcers is at a safe level for the participating establishments. In relation to individual cases, however, it must be noted that patient compliance is essential for successful treatment. We expect that the planned comparison of data with the EQS hospitals will reveal interfacing problems. It is already apparent that difficulties exist in relation to the handover of care (diagnoses, procedures, treatments) on transfer of patients between care providers.

P 41
Latrogenic death due to medical malpractice, a review of cases investigated at the Department of Forensic Medicine, Vienna

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Introduction. Medical malpractice is a global problem which can have considerable financial and legal consequences for the community and personal consequences for those involved. Austria is deficient in providing statistical and epidemiological data concerning medical malpractice cases.
Patients and Methods. Data from 7211 autopsy cases from the Department of Forensic Medicine in Vienna covering the period from 1990 to 2000 were analyzed. Fifty-five autopsy reports that were filed as suspected medical malpractice were recorded and analyzed.
Results. 30 cases were classified as surgical incidents, 19 cases were classified as negligence, and 6 cases were classified as medication incidents. Out of a total of 40 cases from available court files, 36 cases were dropped, there were 2 acquittals and merely 2 convictions.
Conclusion. The number of medical malpractice practices leading to iatrogenic deaths in Austria seems to be very low in comparison to other countries. The possibility that many cases go unnoticed needs to be taken into consideration, and future change concerning the autopsy system is necessary.

P 42

Differences between mechanical asphyxia and acute cardiac death as demonstrated by molecular pathology of the lung

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Introduction. Pathology of the lung is important for discriminating mechanical asphyxia or drowning from acute cardiac death; however, these fatalities often present similar morphological findings. A previous study using molecular biology suggested early inflammatory responses in the lung to be characteristic to drowning. In the present molecular pathology methods were applied to the lung to differentiate cause of death.
Methods. Autopsy cases of mechanical asphyxia (n=24), including neck compression (hanging, n=9; ligature and manual strangulation, n=9) and others (smothering, n=3, choking, n=3), drowning (n=18), and acute cardiac death (ACD, n=15) were examined (total n=57; within 48 h post-mortem; survival time, <0.5 h). TaqMan real-time RT-PCR was employed to quantify mRNA expressions of aquaporin-1, 5 (AQP-1, 5), matrix metalloproteinase-2, 9 (MMP-2, 9), claudin-5 and intercellular adhesion molecule-1 (ICAM-1).
Results. mRNA expressions showed similar levels in drowning and ACD. In cases of mechanical asphyxia, the AQP-5 mRNA level was higher in neck compression (hanging and strangulation) than other types of asphyxia and ACD, while expressions of other markers were similar. Smothering/choking showed a tendency toward a lower expression of AQP-5 mRNA, compared to that for drowning and ACD.
Conclusions. The present study suggests a partial difference in pulmonary damage between asphyxia due to neck compression, smothering/choking and ACD with regard to alveolar endothelial damage; however, drowning and ACD showed similar findings. Pulmonary pathophysiology is different between mechanical asphyxia and drowning as well as among the types of asphyxia.

P 43

Molecular pathology of the lung in fatalities due to thermal and toxicological insults in forensic autopsy

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Introduction. Pathology of the lung is important in determining the cause of death, but morphological findings are often insufficient for interpretation of the functional changes. The present study investigates the molecular pathology of the lung in death due to thermal and toxicological insults without fatal injury with regard to functional changes involved in pulmonary alveolar damage.
Methods. Forensic autopsy cases of fire fatality (n=24), hyperthermia (heat stroke, n=7), hypothermia (cold exposure, n=12), and intoxication (n=15), as well as acute cardiac death (n=15) and pneumonia (n=15) for comparison, were examined (total n=88; within 48 h post-mortem; survival time, <268 h). TaqMan real-time RT-PCR was employed to quantify mRNA expressions of aquaporin-1, 5 (AQP-1, 5), matrix metalloproteinase-2, 9 (MMP-2, 9), claudin-5 and intercellular adhesion molecule-1 (ICAM-1).
Results. Each mRNA level showed a large case-to-case variation in individual groups; however, some characteristic findings were detected as follows. All markers except for AQP-5 mRNA were higher in fatal hyperthermia, but were mostly lower in fire fatality. Hypothermia showed an elevated MMP-9 mRNA level, while pneumonia cases had a higher MMP-2 mRNA level with a relatively high ICAM-1 mRNA level. Intoxication and acute cardiac death did not present characteristic findings; all markers showed intermediate levels.
Conclusions. The present study suggests that hyperthermia (heat stroke) causes substantial damage to alveolar microvascular endothelia, extracellular matrix (ECM) and endothelia; however, such findings were not detected in fire fatality, possibly due to suppressed cellular responses. Hypothermia appeared to be accompanied by damage to interstitial matrix.

P 44

Evaluation of human brain damage in "functional death" by quantification of basic fibroblast growth factor (bFGF), glial fibrillary acidic protein (GFAP), S100β and single-stranded DNA (ssDNA) immunoreactivities

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Introduction. "Functional deaths" involving environmental hazards or intoxication might be present with poor or nonspecific morphological pathologies, which are insufficient to establish the diagnosis in forensic practice. The aim of the present study was to investigate the diagnostic efficacy of immunohistochemical markers in the brain in such cases.
Methods. Immunohistochemical positivities of basic fibroblast growth factor (bFGF), glial fibrillary acidic protein (GFAP), S100β and single-stranded DNA (ssDNA) in the brain (n=60), and S100β concentration in cerebrospinal fluid (CSF, n=38) were examined in autopsy cases.
Results. Hyperthermia showed higher glial bFGF immunopositivity in the cerebral cortex, lower glial GFAP and S100β immunopositivities in the white matter, and higher neuronal ssDNA immunopositivity in the cerebral cortex and hippocampus, whereas hypothermia cases had a higher glial bFGF immunopositivity in the cerebral cortex and white matter without significant changes in other markers, involving a lower CSF S100β concentration. Chemical poisoning produced lower glial bFGF and GFAP immunopositivities in the cerebral cortex and white matter, lower glial S100β immunopositivity at each site of the brain with higher CSF S100β concentration, and higher neuronal ssDNA immunopositivity in the cortex and hippocampus. Drug intoxication cases had higher glial bFGF and GFAP immunopositivities but a lower glial S100β in the cerebral cortex and white matter, and higher neuronal ssDNA immunopositivity in the cortex and hippocampus.
Conclusions. These markers may be useful for evaluating brain damage and responses in "functional death".

P 45

Molecular pathology of pulmonary surfactants and cytokines in the lung with special regard to fatal intoxication, hypothermia and hyperthermia

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Introduction. Molecular biology methods were applied to study pulmonary surfactants and cytokines in routine forensic casework with particular regard to fatal intoxication, hypothermia (cold exposure)

and hyperthermia (heat stroke), in which specific pathological findings are often poor.
Methods. Medicolegal autopsy cases of intoxication (n=11), hypothermia (n=11) and hyperthermia (n=6), as well as acute deaths due to mechanical asphyxiation (n=18) and ischemic heart disease (n=9) for controls, were reviewed (total n=55; within 48 h post-mortem; survival time, <24 h). TaqMan real-time RT-PCR was employed to quantify mRNA expressions of pulmonary surfactant-associated proteins A and D (SP-A and -D), tumor necrosis factor (TNF)-alpha, interleukin (IL)-1beta and IL-10 in routine bilateral upper lung lobe specimens. Immunohistochemical distributions in the lung were also examined.
Results. SP-A1 and -D mRNA levels were higher for hypothermia and hyperthermia than for other groups; however, SP-A2 mRNA was higher for hypothermia than for hyperthermia and other groups. TNF-alpha and IL-1beta mRNA levels were lower for hyperthermia than for other groups, including hypothermia. IL-10 mRNA showed a tendency toward an increase in intoxication, hypothermia and hyperthermia compared to controls. Immunohistochemistry detected no significant difference, except that SP-A showed combined alveolar injury and respiratory distress patterns in intoxication and hyperthermia as well as asphyxiation and ischemic heart disease.
Conclusions. The present study suggested milder pulmonary distress in fatal hypothermia, and characteristic pulmonary injury due to hyperthermia, involving partial suppression of SP-A and isolated activation of IL-10 among inflammatory mediators.

P 46
Different death processes of fire fatality as demonstrated by molecular pathology of pulmonary surfactants and cytokines with special regard to contribution of burns and carbon monoxide intoxication

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Introduction. Multiple lethal factors contribute to death in a fire, involving flames and smoke containing toxic gases. The present study applied molecular biology of pulmonary surfactants and cytokines in routine forensic casework to investigate the death process of fire fatality with particular regard to the contribution of burns and carbon monoxide (CO) intoxication.
Methods. Medicolegal autopsy cases of fire fatality (n=18) with higher (>60%) and lower (<60%) blood carboxyhemoglobin (COHb) saturation (n=8 and n=10, respectively), as well as injury (n=23), and acute deaths due to mechanical asphyxiation (n=10) and ischemic heart disease (n=9) for controls, were reviewed (total n=68; within 48 h post-mortem; survival time, <24 h). TaqMan real-time RT-PCR was employed to quantify mRNA expressions of pulmonary surfactant-associated proteins A and D (SP-A and -D), tumor necrosis factor (TNF)-α, interleukin (IL)-1β and IL-10 in routine bilateral upper lung lobe specimens. Immunohistochemical distributions in the lung were also examined.
Results. SP-A1 and -A2 mRNA levels were similar in all groups, showing a tendency toward a higher expression in injury cases. Fire fatality with a lower COHb level showed no characteristic findings also for SP-D, TNF-α, IL-1β and IL-10; however, these markers were lower in higher COHb cases than in lower COHb cases and control groups. Immunohistochemistry detected no significant difference, showing SP-A patterns of alveolar injury and respiratory distress in all groups.
Conclusions. The present study suggested milder pulmonary alveolar injury in fire fatality due to CO intoxication.

P 47
Child abuse induces changes in the hypothalamic pituitary adrenal (HPA) axis

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Introduction. The abuse and neglect of children is a social problem in advanced nations.
Methods. We examined changes in the hypothalamic-pituitary-adrenal (HPA) axis in a mouse restraint stress model of psychological abuse and in autopsy cases to determine a possible indicator for the diagnosis of child abuse.
Results. In the animal experiments, serum levels of ACTH and glucocorticoids (corticosterone, cortisol) and adrenal weights showed a significant increase from 1 day to 3 weeks stress, whereas adrenal cholesterol content decreased. Gene expression of molecules involved in the cholesterol supply to adrenal glands (AGs), including scavenger receptor class B type I (SR-BI), HMGCoA reductase and hormone-sensitive lipase (HSL), was increased over the same period. After 4 weeks stress, these changes, except for the upregulation of HSL, returned to control levels. We also examined AGs obtained from autopsy cases (12 child abuse; 12 control). Similar to the results of the animal experiments, the children abused for longer periods than 2 months showed a significant increase in adrenal weights compared with control cases. Moreover, the abused children showed a significant decrease in adrenal cholesterol content and an increase in SR-BI immunoreactivity in AGs compared with controls. In contrast, children abused for several weeks to 2 months did not show these changes.
Conclusions. The results indicate that children abused for relatively short periods show adrenal hypertrophy due to the overproduction of glucocorticoids, and suggest that the analysis of HPA axis may be useful for the diagnosis of child abuse and determining its duration.

P 48
Skin aquaporin-3 gene expression can differentiate antemortem and post-mortem skin burns

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Introduction. In order to diagnose death due to burns, evidence that the body was exposed to heat while alive is essential. The expression of both aquaporin-1 (AQP1) and aquaporin-3 (AQP3) was examined in the skin of an experimental burn model and autopsy cases to determine a vital sign of burns.
Methods. Mice were classified into four groups (n=4 for each group): control, antemortem burn (sacrificed at 5 minutes after burned), post-mortem burn (burned at 1 hour after sacrifice), and antemortem mechanical wounds.
Results. Although there was no significant difference in AQP1 gene expression between the four groups, the gene expression of AQP3 in antemortem burned skin was significantly increased compared with that of the other three groups. However, immunohistochemical analyses revealed that there was no obvious difference in the expressions of either AQP1 or AQP3 in the skin among the four groups. Furthermore, we examined the gene expression of AQP1 and AQP3 in the human skin obtained from autopsy cases (8 antemortem burns, 2 post-mortem burns, 4 mechanical wounds, and 4 controls). Consistent with the

animal experiments, the gene expression of AQP3, but not AQP1 in the skin of the antemortem burn was significantly increased compared with that of other cases, although immunohistochemical analyses revealed no obvious difference.
Conclusions. AQP3 gene expression has been reported to be increased by dehydration to maintain skin water homeostasis. These results indicate that an increase of AQP3 gene expression in the skin may be useful to differentiate ante- and post-mortem burns.

P 49
Immunohistochemical detection of uPA, tPA and PAI-1 in a stasis-induced deep vein thrombosis model and its application to thrombus age determination

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Introduction. Deep vein thrombosis (DVT) is one of the major causes in pulmonary thromboembolism (PTE) from both clinical and forensic aspects. When forensic pathologists encounter cases of DVT-related PTE, they are always required to estimate how old the venous thrombi are.
Methods. We immunohistochemically examined the expression of urokinase-type plasminogen activator (uPA), tissue-type plasminogen activator (tPA) and plasminogen-activator inhibitor type-1 (PAI-1) using venous thrombi developed by ligation of the inferior vena cava (IVC) in mice. The patency rates of thrombosed IVC blood flow was measured by the laser tissue blood flow meter.
Results. Immunohistochemically, uPA- and tPA-positive cells could not be detected until 3 days after IVC ligation and thereafter gradually increased after 7 days. The number of PAI-1-positive cells was significantly higher than that of uPA- and tPA-positive cells after 7 days. Until 7 days, uPA/PAI-1 ratio and tPA/PAI-1 ratio was less than 0.15 and 0.2, respectively. After 10 days, uPA/PAI-1 and tPA/PAI-1 ratio was greater than 0.15 and 0.2, respectively. These observations implied that an uPA/PAI-1 ratio and tPA/PAI-1 ratio, markedly exceeding 0.3, strongly indicating a thrombus age of 14 days and more. On the other hand, the thrombosed IVC blood flow was recovered according to the time after IVC-ligation.
Conclusions. The present study provided evidence that immunohistochemical detection of intrathrombotic uPA, tPA and PAI-1 would be applicable for thrombus age estimation.

P 50
Quantitative analysis of GFAP- and S100 protein-immunopositive astrocytes to investigate the severity of traumatic brain injury

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Introduction. Astrocytes are the most numerous cell types in the central nervous system (CNS), impairment of these astrocyte functions can critically influence neuronal survival and CNS functions. Recent studies have suggested that the loss of astrocytes occurs prior to the development of reactive gliosis. Combining hypoxia with acidosis could accelerate astrocyte death to occur in just a few hours. Loss of astrocytes after traumatic brain injury may be due to disruption of extracellular microenvironment, which may be accompanied by brain edema. The present study quantitatively analyzed astrocytes that showed GFAP- and S100-immunopositivity in the cerebral white matter and hippocampal CA4 region at the sites distant from primary injury with regard to survival time, complications, and the immediate cause of death of brain injury cases, in order to investigate posttraumatic CNS dysfunction so as to elucidate the cause and process of deaths due to brain injury.
Methods. Autopsy cases of brain injury (n=121) were classified as follows: acute death (ABI, survival time <3 h, n=27); subacute death (SBI, survival time, 6 h–3 days; n=42), including cases with/without secondary brainstem lesions (BSL+/BSL–, midbrain hemorrhages and/or hemorrhagic uncal herniation: n=26/16) and cases with/without complications (n=4/38); and delayed deaths (DBI, survival time >3 days, n=52) with/without brainstem lesions (n=35/17), and with/without complications (DBI-C+/DBI-C–, n=30/22). Delayed death cases with complications were subdivided into those in which the immediate cause of death had been determined as cerebral dysfunction (DBI-C±CD, cases with non-fatal complications, n=22) with/without brainstem lesions (n=17/5) and those that had been determined to be caused by fatal complications (DBI-C±FC, n=8) without secondary brainstem lesions. Delayed death cases without complications comprised those with/without brainstem lesions (n=18/4).
Results. The numbers of astrocytes that demonstrated GFAP- and S100-immunopositivity in the cerebral white matter and hippocampal CA4 region were significantly lower for subacute death and delayed death without complications ($p<0.05$–0.001). Delayed death with fatal complications showed a significant increase in the number of S100-immunopositive astrocytes ($p<0.05$). Among delayed death cases, the numbers of astrocytes that showed GFAP- and S100-immunopositivity were higher in the cases with fatal complications than in those without complications and with non-fatal complications, although the latter cases showed large variations in the numbers of these astrocytes.
Conclusions. These findings suggest that critical brain injury causes acute death without evident astrocyte pathology and that subacute death is associated with progressive brain damage accompanied by an astrocyte loss throughout the whole brain. In delayed death cases, the numbers of GFAP and S100-immunopositive astrocytes might be closely related to the severity of posttraumatic brain injury. GFAP and S100-immunopositivity might be useful for elucidating the cause and process of deaths due to brain injury.

P 51
An autopsy case report of acute human poisoning with diethylene glycol

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Introduction. Diethylene glycol (DEG) is a poisonous organic compound widely used in chemical industry. In the present case, 18 patients in a hospital for infectious diseases were found developing acute and severe renal failure synptoms of oliguria and anuria simultaneously without fever or shock. Soon the cause was discovered as poisoning of DEG in the parenteral solution of Amillarisin A, which had been prescribed for all these 18 patients a week before. Despite hemodialysis and symptomatic treatments, they began to develop metabolic acidosis, anuria, renal failure, asterixis, aphasia, respiratory failure, coma and death progressively within weeks to months.
Methods. In order to ascertain the cause of death and determine the poisonous substance, a medical-legal autopsy was performed in a 33-year-old male victim.
Results. Histopathological examination showed extensive and severe necrosis of the renal cells, which had caused occlusions of the kidney tubules, whereas most of the tubular basement membranes were still intact. Severe necrosis was also found in the liver with portal cirrhosis and in the central nervous system. Liquid chromatography and mass spectrum (LC/MS) analysis of the heart-blood revealed a slight residue of DEG.
Conclusions. These results suggest that necrosis, release of renal cells and occlusions of kidney tubules are distinctive pathological features of DEG poisoning, and that LC/MS analysis of the blood may play a key role in the determination of DEG even after a 1-month history of hemodialysis.

P 52
Serum tryptase levels of acute cardiovascular death in forensic autopsy cases

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Introduction. Tryptase, a neutral protease, is the major protein component of mast-cell secretory granules. Because negligible amounts of this enzyme are present in basophiles, an elevated serum tryptase level is considered to be a central feature of anaphylaxis. In addition, because this enzyme has a longer serum half-life than other chemical mediators like histamine, the measurement of serum tryptase level is reported to be useful for post-mortem as well as antemortem diagnosis of anaphylaxis. In some cases of acute cardiovascular death, high levels of serum tryptase levels were observed. In the present study, the serum tryptase levels of acute cardiovascular were measured and compared with other death causes in order to evaluate its diagnostic value in the acute cardiovascular and anaphylactic deaths.
Methods. In the present study, we measured the serum tryptase levels in 13 acute cardiac deaths (with/without acute coronary syndromes, n=7/6), 6 acute deaths due to dissecting aneurysm and 21 controls cases (including anaphylaxis shock, n=8; systemic infection, n=7; methamphetamine poisoning, n=5) by Uni-CAP TRYPTASE Fluoroenzyme immunoassay system.
Results. The serum tryptase levels markedly increased in anaphylactic shock (35.9±9.6 ng/ml, $p<0.001$), was mildly elevated in acute cardiac death, 13.5±1.9 ng/ml, and in dissecting aneurysma, 18.7±2.1 ng/ml). In acute cardiac death, cases with acute coronary syndromes showed significantly higher levels of serum tryptase than those without coronary syndromes ($p<0.05$).
Conclusions. The results revealed that the serum tryptase levels increased not only in anaphylaxis, but also in some cardiovascular diseases (acute cardiac death with acute coronary syndromes and dissecting aneurysma). High serum tryptase levels of acute cardiovascular death probably originate from the formation of thrombi, indicating normal fluctuation in the inflammatory diseases. While elevated levels of tryptase are noticed in autopsy cases, it should be paid attention to the differential diagnosis between anaphylactic and acute cardiovascular deaths.

P 53
Post-mortem degradation influences the measurement of blood c-reactive protein levels

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Introduction. Post-mortem biochemical analysis is performed to evaluate the agonal status of patients. C-reactive protein (CRP) is an acute inflammatory marker widely used in clinical practice. However, post-mortem stability of CRP is controversial.
Methods. Peripheral blood was collected during medico-legal autopsies. Blood CRP levels were quantified by the latex agglutination immunoassay. Degraded (oligomeric) and non-degraded (pentameric) CRP were separated by native polyacrylamide gel electrophoresis followed by western blotting, and their levels were quantified by densitometric method. Commercially available recombinant human CRP served as non-degraded CRP control.
Results. The results of electrophoresis and western blotting showed that in some cases, the cadaveric CRPs were degraded. The band density of non-degraded pentameric CRPs, not the sum of non-degraded and degraded CRPs, correlated well with the blood CRP level.
Conclusions. Cadaveric CRP may be degraded and thus blood CRP levels at post-mortem examination may not be stable. Measurement of CRP levels using latex agglutination immunoassay only reflects residual non-degraded CRP and thus CRP levels may be underestimated at post-mortem examination. During post-mortem examination, the diagnosis of inflammation should be made on the basis of not only blood CRP levels but also on the basis of macro- and micro-pathological findings.

P 54
Headspace solid-phase microextraction – gas chromatography – mass spectrometry for the quantitative determination of the characteristic flavourings menthone, isomenthone, neomenthol and menthol in serum samples with and without enzymatic cleavage to validate post-offence alcohol drinking claims

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Introduction. To evaluate menthone, isomenthone, neomenthol and menthol as characteristic markers for the consumption of certain alcoholic beverages particularly peppermint liqueurs.
Methods. A rapid HS-SPME-GC-MS method has been developed for the determination of menthone, isomenthone, neomenthol and menthol in serum samples with and without enzymatic cleavage. *In vivo* experiments were conducted with volunteers, which consumed peppermint liqueur under controlled conditions. At defined intervals, blood samples were taken from the subjects and concentration/time profiles in serum were determined for these analytes. Blood samples were also taken from 100 drivers claiming to have consumed peppermint liqueur.
Results. HS-SPME-GC-MS enables the detection of menthone, isomenthone, neomenthol and menthol with a LOQ lower than 10 ng/ml in serum samples. Our findings confirm that neomenthol and menthol undergoes a rapid phase II metabolism as it occurs almost completely conjugated as neomenthol glucuronide and menthol glucuronide in serum. Menthone and isomenthone were not conjugated. The *in vivo* experiments showed a rapid resorption leading to a peak maximum of neomenthol and menthol glucuronide concentrations directly after drinking. Menthone and isomenthone were rapidly metabolised and found in much lower concentrations and over a shorter time span than the other analytes. In blood samples taken from 100 drivers, in 35 cases neomenthol, in 59 cases menthol and in 8 cases menthone and isomenthone were detected.
Conclusions. These test results confirm that the analysis of beverage-specific volatile compounds such as menthone, isomenthone, neomenthol and menthol can be useful in forensic toxicology for the verification of post-offence alcohol consumption claims.

P 55
Immunohistochemical study of kidney in multiple injury forensic autopsy cases

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Introduction. To obtain useful information the severity of trauma, the main wound organ or site and the pathological condition after the wound of receiving in the multiple injury cases, we examined the kidney immunohistochemically with some markers for damaged organs.
Methods. Sixty-three multiple injury cases within 48 hours of the post-mortem duration were examined. They included assault, fall from high place, traffic accident, and sharp instrumental injury cases. Im-

munohistochemically, the kidney was stained against to Hb, Mb, SOD, 8-hydroxy-2'-deoxyguanosine (8-OHdG), 150kD oxygen regulated protein (ORP-150), pulmonary surfactant A (SP-A), and liver-type fatty acid binding protein (L-FABP), respectively.
Results. Hb and Mb were observed in the case with the severe trauma, such as the fall from the high place. The 8-OHdG and ORP-150 might be reflected by antemortem circulatory failure. SP-A was positive in the case of the lung injury. SP-A might not be relation to circulatory failure because of no corresponding to the ORP150 manifestation. For the moiety of the example of LFABP positive, ORP150 was also positive. LFABP might appear due to nephrotic circulatory failure. Moreover, it was considered that LFABP appeared due to the peroxidative damage due to skeletal muscle injury.
Conclusions. Immunohistochemical observation of the kidney might be useful and surmisable to the level of the lesion, the damaged organ, and pathological condition after injury.

P 56
Faster gas chromatography-mass spectrometry analysis using tandem columns

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Introduction. In post-mortem examinations of decedents, the analysis of drugs from autopsy specimens reveals useful information about antemortem health conditions. An effective and fast system to obtain detailed drug information should be available. Thus, we have attempted to shorten GC-MS measurement time by using two short columns linearly connected (tandem columns).
Methods. Samples from the deceased were prepared with acetonitrile, and the basic and acidic compounds were individually extracted. The extracts were examined by GC-MS. GC-MS conditions: Apparatus: Shimadzu QP-2010Plus. Tandem columns: 0.5 mm-BPX5, 1.2 m×0.25 mm i.d., for the pre-column and 0.25 mm-BP5, 4 m×0.15 mm i.d., for the separation-column (SGE). Temperature program of GC oven: initially 110°C for 0.25 min, to 340°C at a rate of 60°C/min. Carrier gas (He): 206 cm/s. Injection mode: splitless (high pressure injection). Ionization mode: electron ionization (positive). Scanning range (interval): 40 to 470 amu (0.06 s).
Results. Under this condition, cresol, valproic acid, amphetamine, nicotinamide, lidocaine, carbamazepine, quetiapine, 7-aminoflunitrazepam, etc., were detected in a time range from 0.35–4 min. A coated pre-column was used to increase sample capacity, shorter columns were utilized to perform under relatively low pressure, and high pressure injection and a FocusLiner™ (SGE) were employed to focus the peaks.
Conclusions. This proposed method was useful in shortening the analyzing time without sacrificing peak shape.

P 57
Two autopsy cases doubted the injection of a large amount of the insulin

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Introduction. Not only a suicidal case but also a homicide is included in the insulin large-scale injection, and needs attention for that diagnosis. We report two forensic autopsy cases of the diabetes type 2 with an insulin therapy, who doubted the injection of a large amount of the insulin.
Methods. Case 1: A man in fifties was subcutaneously injected 600 units of insulin by his wife during his sleeping. Twelve hours later, he was carried to the hospital, but died. Autopsy findings: 174.5 cm height and 76.5 kg weight. The subcutaneous injection scars were recognized in the abdomen, the several shallow incised wound were in the lower limb. Examination findings: Insulin 0.99 μIU/ml, C-peptide 0.45 ng/ml in the plasma and zolpidem 0.7 μg/ml in the whole blood.
Case 2: A man in sixties was found to die at home. The subcutaneously injection of more than 50 units of insulin was suspected. Autopsy findings: 165.5 cm height and 50.0 kg weight. The several shallow puncture wounds and incised wounds were in the neck and the lower limb. The anterior descending branch of the left coronary artery was stenosis. Examination findings: Insulin 3.47 μIU/ml and C-peptide 0.14 ng/ ml in the plasma.
Results. In case 1, insulin was significant high level in the serum collected in a hospital, so he was considered the injection of a large amount of the insulin. However, high level of insulin couldn't be detected from the samples collected in both autopsies.
Conclusions. It is difficult to conclude whether a large amount of insulin present in a fatality is the result of a suicide or a homicide. Therefore, special attention is required to ensure the correct mode of death in these types of cases.

P 58
Expression of four marker genes in human post-mortem brain tissue after traumatic brain injury

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Introduction. Traumatic brain injury (TBI) induces changes in the expression of many different genes involved in neurotoxic processes leading to cell loss and functional deficits. Apart from destructive processes, also neuroprotective events take place, i.e. DNA-repair and regeneration. These processes occur in a time-dependent manner.
Methods. Human post-mortem brain tissue was collected from patients with severe brain injuries. Samples were taken from the injured as well as from the contralateral brain site. As control samples brain from patients without any injury of the skull was collected. The time-dependent expression changes of four genes, namely GFAP, TrkB, Caspase-3 and S100B, were determined by quantitative real time PCR. As an additional indicator of sample-quality the pH of all brain samples was measured.
Results. The expression of the four target genes was normalized to the expression of the three housekeeping genes HMBS, SDHA and GAPDH. We found changes in expression in dependence on the survival times. The pH of traumatically injured tissue showed no significant difference compared to the pH of the contralateral site. Compared to normal controls the pH of the injured site was slightly lower, but showed a high range of variation.
Conclusions. Quantification of the changes in expression profiles may help to understand the complex regulation on the cellular and molecular level after TBI. Measurement of pH serves as a useful procedure in assessing the quality of the brain tissue used for mRNA-quantification.

P 59
Tendencies of cannabis consumption in Lithuania within 1992–2010

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Introduction. The increasing consumption of cannabis is likely to be influenced by its increasing supply in the illicit market and low street price.
Methods. In 1992–2010 the Toxicology laboratory analysed 25,764 living persons' biological samples. THC COOH and THC were detected in urine and blood by GC/MS (SIM) method.

Results. In 1992–2001 cannabinoids were detected in 63 cases (1,1%) of the total 8203 living persons' biological samples. In 2002–2006 – in 597 biological mediums (9%) of 8894 living persons' biological samples – by 9 times more than in 1992–2001. In 2007–2010 of the total 8667 living persons' biological samples cannabinoids were detected in biological fluids of 1463 persons (17,9%): 236 cases in 2007 (16,3%), 273 cases in 2008 (18,6%), 467 cases in 2009 (24,4%), 487 cases in 2010 (23%). Distribution of the total samples analysed in the laboratory in 2007–2010 by gender proved that the majority of abusers were male – 96,2%, while female – 3,8%. Cannabis is most popular among 15–29 year-old people (80,7%); however, in the 30–39 year-old group it is 15,6%.
Conclusions. In conclusion, the data of biological samples analysis on cannabis consumption have revealed increasing tendencies of cannabis consumption in Lithuania.

P 60
A case of fatal gasoline poisoning in a tanker

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Introduction. Gasoline is a familiar chemical as a fuel. Although the dangers of explosion associated with this substance are well known, inhalation toxicity is less familiar. We encountered a case of fatal gasoline poisoning due to a leak in a tanker carrying gasoline.
Methods. Case: The accident occurred in a small tanker loaded with gasoline in late August. The captain found a leak of gasoline from the gasoline transport pipe, the gasoline was spread all over the floor of the bottom of the pump room which had a layered structure. About 20 min later, the engineer entered and found the captain unconscious in the depths of that room. The captain was extricated in a state of cardiopulmonary arrest from the room after 3.5 h and immediately transported to a hospital, but was not able to be resuscitated.
Results. Organs and tissues were analyzed by head space using gas chromatography/mass spectrometry in combination with solid-phase microextraction. Toluene concentrations were determined as an indicator of gasoline toxicity. Constituents of gasoline were found in all autopsy materials. Toluene concentrations in the brain, blood and urine were 27.4, 7.50 and 0.037 μg/g, respectively. The cause of death was confirmed as gasoline poisoning.
Conclusions. Toluene concentrations were not considered to have reached a lethal dose, but because gasoline is a mixture of many hydrocarbons with various levels of toxicity, the gasoline levels were fatal. This accident was caused by ignorance among workers regarding gasoline toxicity. Instructions regarding gasoline toxicity are needed for workers involved in its transport.

P 61
Data on drug overdose poisoning fatalities in lithuania (15-year study in klaipeda county)

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Introduction. The research data present trends of drug-related overdose mortality, based on the data of forensic medicine autopsies in 1993–2007 in Lithuania (Klaipeda County).
Methods. Research material is the data on the deceased due to narcotic drugs and psychotropic substances intoxication in 1993–2007, selected out of archival copies of forensic medicine examinations. The data was collected according to the questionnaire of the primary data on drug abusers' age, gender, territory of living, and drugs found during the toxicological analyses.
Results. The drug-related overdose mortality, based on the data of the forensic medicine autopsies varied from 0.5 cases per 100 thousand of population in 1993 to 3.1 cases in 2007 per 100 thousand of population on average. In the biological samples of the deceased the following substances were detected most often: 64.9% of opiates, 46.8% of benzodiazepines and 13.0% of psycho stimulators. The combined poisoning cases made 66.2%, most often with the combinations of opiates-benzodiazepines which made 18.2%. The average age of deceased due to drug intoxication was 30.46 years.
Conclusions. The drug-related overdose mortality totaled 1.46 cases per 100 thousand of population on average. A statistically significant tendency of the increase of this rate has not been determined. The majority of overdose-related deaths was associated with the substances of the opiates and benzodiazepines groups. Neither increase nor decrease tendency has been observed when analyzing the dynamics of the average age of deceased due to intoxication drug users. Psychoactive substances overdose fatalities' distribution by gender and age reveals that the majority of them – 77,3% included 27–30 year-old male.

P 62
Amphetamine in wine gums and cannabis in chewing gum?

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Introduction. Subjects of police checks get repeatedly tested positive on cannabis and amphetamine (Drugwipe +5) in their salivary juice, even though they satisfactorily show they did not consume any. What affected the test? Repeated tests after 20 min always proofed negative. It turned out that a certain kind of chewing gum was consumed when tests went positive for cannabis. Regarding the amphetamine saliva sample, it was found that a certain brand of wine gum was consumed shortly before the tests.
Methods. Target of our study is to carry out further tests with the chewing gum and wine gum. After consumption saliva samples were tested at different time intervals with the Drugwipe 5+ and enzyme assays.
Results. Earliest analyses did show indeed faint signs of positive tests for cannabis and amphetamine for a small group of test subjects, while using the Drugwipe 5+. The enzyme assays however did not show any sign of positive testing at any time.
Conclusions. What mechanisms prompted the positive test results? Can assertions be made as to when tests will go negative again, thus publish references for police officers in order to avoid false positive test results?

P 63
Study regarding drugs in blood with ELISA and chemiluminiscence versus ELISA with spectrophotometric detection

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Introduction. Preliminary screening for drugs is usually done on urine samples and, if not available, as in some forensic cases, on blood samples. In this paper we present two immunotechniques which may be used for drug screening on blood: ELISA with chemiluminiscence (Biochip Array Technology-BAT) and ELISA with spectrophotometric detection(ELISA SD). BAT is based on the principles of competitive ELISA and chemiluminiscent reactions, with CCD digital camera detection system. ELISA SD is also a competitive enzyme immunoassay with spectrophotometric detection at 450 nm on microtitre strips.
Methods. Fifty samples of post-mortem blood were tested for opiates, cannabinoids, benzoylecgonine, barbiturates and benzodiazepine. For BAT we used DOA I WB SQ kits, Evidence Investigator, (RANDOX)

and for ELISA SD Cozart Forensic kits, SIRIO S plate reader, (SEAC). The preliminary analytical test results were confirmed on GC-MS (opiates, cannabinoids, benzoylecgonine) and HPLC (barbiturates, benzodiazepine).

Results. Our results showed that BAT produced fewer false positive results compared with ELISA SD. Also has a more specificity for benzodiazepine by performing simultaneous two different assays based on oxazepam and lorazepam. The measure for chemiluminiscence must be done in exactly 2 minutes (±10 seconds), compare with ELISA SD (15 minutes) which is based on a more stable reaction. Drugs detected in blood by both methods are compared.

Conclusions. Both immunotechniques showed comparable results which allow preliminary screening important in legal medicine. BAT allows simultaneous detection of multiple analytes from a single blood sample, which means less time consuming and a smaller quantity of sample needed.

P 64
Victims of lethal hypothermia have decreased thrombomodulin levels inendothelial cells and urine

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Introduction. Thrombomodulin (TM) is a transmembrane protein expressed in endothelial cells. It is also secreted as smaller soluble particles (sTM) into plasma and urine. The plasma concentration of sTM has been shown to increase in induced hypothermia during cardiopulmonary bypass. It is also well known that hypothermia disrupts blood coagulation. The objective of the present study was to assess whether TM's expression on cell level and the consequential secretion to urine differ between victims of accidental hypothermia, cardiovascular disease (CVD) deaths and other causes.

Methods. Immunohistochemistry was used to measure the amount of TM protein expressed in cardiac muscle samples. TM concentrations in urine were quantitated with enzyme-linked immunosorbent assay (ELISA). Differences were determined with statistical analyses.

Results. The endothelium of both intramyocardial capillaries and larger vessels with a visible lumen had significantly lower protein levels in hypothermia than in CVD and non-CVD deaths. Median TM concentrations in urine were also lower in hypothermia deaths, and the range was remarkably smaller in them compared with other causes of death.

Conclusions. Hypothermia seems to induce TM secretion to blood observed here by the decreased levels of cellular protein in the endothelium of intramyocardial blood vessels. Furthermore, our results indicate that the concomitant decrease in TM secretion to urine seems to take place in hypothermia deaths. These events probably enable maximal amounts of soluble TM to participate in the altered regulation of blood coagulation in hypothermia.

P 65
Investigation on the use of piperazine-type designer drugs among visitors of a rave music event

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Introduction. The quantity of ecstasy tablets containing piperazine-type designer drugs, such as mCPP or BZP, that have been seized in Germany over recent years has increased considerably. Piperazines should produce mainly entactogenic effects similar to MDMA. It is a well-known fact that the prevalence for ecstasy use among rave attendees is rather high and, consequently, piperazines may occur in blood samples of these persons.

Methods. Blood samples from the years 2007 to 2010 of visitors of a popular annual rave event were tested for piperazines. The volunteers were attendees who left the festival site by car and were stopped in police traffic controls because of suspicion of driving under influence of drugs. For each year a randomly selected sample of 50 blood samples were analyzed for piperazines using a validated GC/MS method. Additionally, the samples were analyzed for amphetamines, cannabinoids, cocaine and opiates.

Results. BZP could not be detected in any case. mCPP was present in a total of eight samples in concentrations ranging from 5 to 450 ng/mL. Extrapolated to the whole study population, 2% of the tested subjects in 2007 had consumed mCPP. In 2008 and 2009 the proportion was 6% each and 2% in 2010. Recently, BZP could be detected in a fatal psychostimulant intoxication, besides TFMPP, amphetamine and 4-methylamphetamine.

Conclusions. Despite the presumed high prevalence of ecstasy use among rave attendees, the proportion of piperazine-positive cases was surprisingly small. The percentage was between 2 and 6% for mCPP, whereas BZP was not detected at all.

P 66
Alcohol consumption habits among adolescents

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Introduction. According to mass media the alcohol consumption including binge drinking habits among adolescents has been increasing since the last decade. This assumption was evaluated by two studies.

Methods. Alcohol concentrations in blood and urine of adolescents <18 years undergoing hospital care because of alcohol intoxication were analyzed over a period of 11 years. Furthermore, adolescents in bars were asked to fill in questionnaires concerning their alcohol consumption habits, and their breath alcohol concentration was tested.

Results. Since 2002 the number of alcohol intoxicated youths requiring hospital care has increased rapidly. Most patients are aged between 14 and 17 years, two thirds are boys. The median alcohol concentration in blood was 0,9 g/l (0,1–2,67g/l), in urine 1,05 g/l (0,1–5,2 g/l), and slightly higher among boys. The 66 correctly filled questionnaires indicate that adolescents are aware of the risks of alcohol consumption. The first alcoholic drink is consumed below the age of 12. Social drinking is common, although it is claimed that friends don't push others. No differences due to social background were found. Interestingly, most know about legal limitations but think they are useless because of missing controls. The most common beverages are beer and wine. The commonly blamed alcopops are consumed by half of the girls. The mean breath alcohol concentration was overall 0,14 mg/l.

Conclusions. (Risky) alcohol consumption among adolescents <18 years is increasing, although adolescents claim to drink responsibly. Legal restrictions are well known, but have been useless so far. The most important risk factor seems to be drinking habits within society.

P 67
Lack of PPARα exacerbates lipopolysaccharide-induced liver toxicity through STAT1 inflammatory signaling and increased oxidative/nitrosative stress

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Introduction. Peroxisome proliferator-activated receptor-α (PPARα) has been implicated in a potent anti-inflammatory activity. However, no information is available on whether PPARα can affect signal transducers and activator of transcription proteins (STATs) in acute liver damage. Thus, this study was aimed to investigate the in vivo role of PPARα in elevating STATs as well as oxidative/nitrosative stress in a model of lipopolysaccharide (LPS)-induced acute hepatic inflammatory injury.
Methods. Using age-matched Ppara-null and wild-type (WT) mice, we performed intraperitoneal injection with LPS and an equivalent volume of saline, respectively. Then, we assessed serum alanine transferase (ALT), cytokine levels, and activities of anti-oxidant enzymes and mitochondrial complexes as well as immunoblot analyses.
Results. We demonstrate that the deletion of PPARα aggravates LPS-mediated liver injury through activating STAT1 and NF-κB-p65 accompanied by increased levels of pro-inflammatory cytokines. Furthermore, the activities of key anti-oxidant enzymes and mitochondrial complexes were significantly decreased while lipid peroxidation and protein nitration were elevated in LPS-exposed Ppara-null mice compared to WT.
Conclusions. These results indicate that PPARα is important in preventing LPS-induced acute liver damage by regulating STAT1 inflammatory signaling pathways and oxidative/nitrosative stress.

P 68
Analysis of the intramyocardial JAK-STAT signaling pathway dynamics in mice administered alcohol

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Introduction. Alcohol and its metabolites produce various symptoms, and sometimes lead to sudden death, but the mechanisms are still unknown. Nowadays, there has been increasing interest in the role of cytokine-mediated signaling pathways in the mechanism of onset of cardiomegaly and cardiomyocyte death. Especially, the JAK-STAT signaling pathway (JSSP) plays a key role not only in cardiomyocytes but also in various other cells, and has been shown to be involved in the onset of cardiac failure. In this study, we investigated changes in the expression dynamics of the genes in the JSSP in mice following alcohol administration.
Methods. Mice were administrated either 7% (3.5 g/kg body weight) ethanol, or saline as control, once daily or over 4 weeks. Hearts were extracted either 30 min or 24 h after the final administration. The expression of the 88 genes in the JSSP was determined using real-time PCR, and the expression dynamics were analyzed.
Results. Cluster analysis with the expression dynamics of the 88 genes involved in the JSSP for the eight groups (alcohol/control, single/4-week, and 30-min/24-h groups) showed that the expression dynamics of the alcohol/4-week/24-h group were positioned far from those of the other groups. Additionally, long-term intake of large amounts of alcohol resulted in changes in the expression of genes concerning the JSSP, but the acute effects of alcohol might buffer these changes.
Conclusions. We determined the relationship between the JSSP and the effects of alcohol and/or its metabolites on cardiac muscle.

P 69
Homicide by organophosphate and carbamate compounds in Sri Lanka – case reports

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Introduction. Organophosphates and carbamates are widely used as insecticides in Sri Lanka. They both inhibit acetylcholinesterase resulting in acute toxicity. They have been frequently used for homicidal purposes due to their easy access. Two such cases will be discussed in this paper.
Methods. Case I: An unmarried 19-year-old mother delivered a baby and he was fed with mother's milk via a naso-gastric tube. On the second day while feeding the baby, the nurse noticed an offensive smell in the cup which was used to collect milk. They suspected a foul play and stomach contents were aspirated. Case II: A 10-year-old girl died after consuming chocolate and an expired soft drink given by her father. The investigators suspected that the death was due to the consumption of the expired drink. The qualitative analysis of organophosphates and carbamates was carried out by TLC and GC-MS, while quantitative analysis was done by validated methods using HPLC with photodiode array detector and GC with NPD detector.
Results. Case I: Toxicological analysis revealed the presence of an organophosphorus compound-phenthoate in the suspected milk and aspirated stomach contents in concentrations 4.5 mg/l and 0.7 mg/l respectively. It was later found that the mother poisoned her baby. Case II: A carbamate compound carbofuran was detected in the suspected drink and stomach contents of the child in concentrations 3.8 mg/ml and 0.3 mg/g respectively and in the vomit revealing the truth.
Conclusions. The strict rules and regulations should be implemented to limit the access of pesticide into unwanted hands.

P 70
An autopsy case of p-methoxyethylamphetamine poisoning

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Introduction. Para-methoxyethylamphetamine (PMEA) is an amphetamine-like designer drug, details of its property are unknown. We report a case of 27-year-old male died after trying out several drugs including PMEA to sell them. He was found unwell with vomiting by his friend after he had ingested 20 ml of the designer drug solution. Since he was showing seizures, he was taken to the hospital where he was pronounced dead. He was in the state of hyperthermia of 41 degrees. The autopsy revealed cyanosis, petechiae of the conjunctivae, edema of the lungs and congestion/petechiae of multiple organs. There were also old bruises and abrasions on his extremities.
Methods. Gas chromatography-mass spectrometry was performed on extracts of blood and urine samples to detect PMEA. The quantitative analysis and estimation of toxicity was also conducted. Determination of the LD50 of PMEA was performed in mice. Doses of 5-300 mg/kg of PMEA were injected interperitoneally.
Results. Toxicological analysis revealed 12.2 μg/mL of PMEA in the blood and 96.2 μg/mL in the urine. Its metabolites, p-hydroxyethylamphetamine, p-methoxyamphetamine and p-hydroxyamphetamine

were detected in both samples. The LD_{50} values determined in mice was as high as 60.1 mg/kg compared to that of methamphetamine(70 mg/kg).
Conclusions. Since the LD_{50} of PMEA was comparable to that of methamphetamine, the blood concentration in the present case could be interpreted as lethal level. From these findings, the cause of death was due to PMEA poisoning.

P 71
The time-course expression of FMO3 mRNA and protein in mouse liver after single and repeated methamphetamine administration

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Introduction. Methamphetamine (MA) is a commonly drug of abuse in Japan. Although there exist numerous reports that MA is metabolized in the central and peripheral nerve system, few studies examine MA metabolism in other organs. In this study, we focused on the mRNA and protein of Flavin Mono Oxygenase 3 (FMO_3), which metabolizes MA in liver.
Methods. mRNA and protein were extracted from the liver of mice which had been administrated with MA (10 mg/kg), and normal saline as control after single and once daily for 1–4 weeks. All mice were sacrificed at 60 minute after the final injection. The expression level of FMO_3 mRNA and protein was measured, respectively.
Results. There was no significant change of FMO_3 protein after single and 1 week administration, but the level gradually decreased from 2–4 weeks. Surprisingly, not in accordance with the protein expression, the level of FMO_3 mRNA gradually increased from 2–4 weeks. Thus, there was a discrepancy between mRNA and protein expression after chronic MA administration.
Conclusions. We assume that the decrease of the FMO_3 protein might be due to metabolized MA only. We suppose that, although the level of the protein actually decreased, the increase of mRNA could supply the FMO_3 protein to compensate the insufficiency.

P 72
The expression of c-Myc and Bcl2l1 in withdrawal after repeated alcohol administration in mouse forebrain

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Introduction. Many alcohol abusers show various symptoms associated with the dysfunction of the frontal lobe, especially, when they withdraw from alcohol. We suspect that alcohol might affect gene expression in the cortex. As the JAK-STAT signaling pathway (JSSP) modulates signal transduction and transcription, we hypothesized that the expression of JSSP genes might change in frontal lobe in intoxication and withdrawal from alcohol after repeated alcohol administration. Thus, we investigated the expression of JSSP genes in the brain.
Methods. Mice were treated with 3.5 g/kg ethanol (Alc), and saline as standard, once daily for 4 weeks. The brain was dissected at 30 minutes (intoxication model: IM) or 24 hours (withdrawal model: WM) after the final injection. Total RNA was extracted from the forebrain and reverse-transcribed to cDNA for semi-arrays of JSSP.
Results. The expression of c-Myc and Bcl2l1 increased significantly in only Alc-WM, but not in Alc-IM.
Conclusions. Expression of some gense must be induced in Alc-WM. Nakahara et al. reported that the expression of c-Myc and Bcl2 that resembled Bcl2l1 increased after chronic alcohol exposure in rat muscle, which is similar to our findings. They described that both gene expression represented a pre-apoptotic effect, or even a nonspecific cellular stress response. We agree with their prediction. In addition, since the concentration of alcohol decreased in WM than in IM, we assume that both genes might be induced only after alcohol was almost metabolized.

P 73
Fas, caspase 3 and caspase 8 expressed after single and chronic chlorpromazine administration on mouse skeletal muscle

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Introduction. Chlorpromazine (CPZ) is widely used as an anti-psychotic drug. CPZ may lead to neuroleptic malignant syndrome (NMS) as side effect. NMS includes symptoms of muscle weakness, rigidity and rhabdomyolysis leading to death. As most studies about NMS aimed at brain, there are few studies on skeletal muscle where the disturbance occurred at NMS. The CPZ administration causes low levels of tumor necrosis factor (TNF) in serum. TNF affects the expression of many cytokines and their receptors. The aim of this study was to investigate the mRNA expression of the cytokines, their receptor and the mediators affected by the cytokine signaling pathways in mouse muscle after CPZ treatment.
Methods. Mice were administrated once daily with 7.5 mg/kg CPZ or saline as control at 1 day and 4 weeks. RNA was extracted from left iliopsoas muscle and applied to the semi-array analysis concerning cytokines and their receptors. In addition, we checked the expression of caspase 3 and 8, which were activated by the increased gene in the semi-array analysis.
Results. The array analysis showed that Fas was expressed after one day. Caspase 3 and 8, which are the proteases of the apoptotic pathway, significantly increased at the same time. However, the expression level of the genes decreased after 4 weeks.
Conclusions. The single CPZ administration must induce apoptosis, as Fas was a strong inducer of apoptosis at one day. However, the expression level of the genes decreased after 4 weeks. We assume that chronic treatment might prevent apoptosis in muscle. Thus, the effect of CPZ on the muscle might differ according to the duration of treatment.

P 74
A case report on death by bromadiolone poisoning

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Introduction. A male suspect, 30, bought a bottle of red raticaide (then validated as the bromadiolone) at large. After drinking bromadiolone, there were no obvious toxic symptom. At night the suspect broke into a store and attempted to steal another pesticide, but he was caught by the proprietor and sent to the police where he was imprisoned. On the third day after drinking bromadiolone, the police released him back. But he developed haematuria and was immediately sent to hospital. On the third day of hospitalization (the sixth day after drinking the pesticide), the suspect died due to extensive bleeding.
Methods. Legal medicine findings: Livor mortis were light and subcutaneous hemorrhage were found in many parts of the body, lungs were bulging and congested, 120 ml guts liquid in the stomach, surrounding soft tissue of posterior peritoneum was bleeding from the iliac artery as well as the right pelvis and kidney. Blood was seen in the urinary bladder. Histology examination: diffuse bleeding in the alveolar space and kidney calices; small focal hemorrhage in the brain. Toxicological examination: bromadiolone was detected in both blood and liver. Blood contains 0.20 mg/L bromadiolone, and liver 0.80 mg/kg bromadiolone.

Results. Bromadiolone belongs to the coumarine rodenticide and its mechanism of causing death is impairment of blood clotting and destruction of the blood capillary. Death is caused due to bleeding. Before death, the clinical laboratory shows that prothrombin time and activated partial thromboplastin time are prolonged, diffuse bleeding and focal hemorrhage of brain, nephrorrhagia and gastrorrhagia occurs. All these changes are concordant with the toxicological effect of bromadiolone poisoning, and are also consistent with the pathology changes caused by bromadiolone poisoning.
Conclusions. Bromadiolone poisoning causes diffuse bleeding in many organs which is leading to death of acute respiratory and circulatory failure.

P 75
The study about the expression of ubiquitin(Ub) and ubiquitin-activating enzyme(UbE1) in human epileptic temporal cortex originating from post traumatic epilepsy

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Introduction. Epilepsy is a chronic brain disease, whose character is the short disorder of central nervous system caused by neuron paradoxical discharge. PTE is a common and serious sequela after head injury. Until now literature defines posttraumatic epilepsy epileptic paroxysm after head injury. The incidence rate of PTE is high and there is no treatment available. It is of clinical significance to explore traumatic epilepsy pathogenesis and study the pathological changes for seeking a more effective treatment and prevention. The Ubiquitin system is an important way for regulating the protein level and function, it also plays a important role in cell cycle adjustment, signal transduction and cell's stress responding.
Methods. 15 specimen from human epileptic temporal cortex originating from PTE were collected as well as 15 specimen from non-PTE as the control groups. The expression of mRNA and protein of Ub and UbE1 was detected by RT-PCR and Western Blot electrophoresis. Statistical analysis was employed for comparing the data between three groups.
Results. The expression of mRNA and protein of Ub and UbE1 in the PTE group were higher than that in the non-PTE group($p<0.05$). The expression of mRNA and protein of Ub and of UbE1 in the non-PTE group was higher than that in the contol group ($p<0.05$).
Conclusions. The experiments confirmed that UPS is upregulated in epilepsy, especially in post traumatic epilepsy. The activation of UPS may be one of the main mechanisms of neuron's pathology change in post-traumatic epilepsy.

P 76
The study on the relationship between post traumatic epilepsy the apoptosis genes of bcl-2 and caspase-10

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Introduction. Post traumatic epilepsy (PTE), which is a serious complication following the brain injury. The Bcl-2 gene race and the caspase gene race are apoptosis genes which have been discovered recently. They regulate apoptosis in different cell cycles. Many animal experiments and clinical research confirmed that apoptosis takes place and apoptosis gene express, especially Bcl-2 gene and caspase-10 genes. Whether these genes also express in traumatic epilepsy, and to what extent they express, there is not known. In this study, we compare the expression of bcl-2 and caspase-10 with RT-PCR, immunohistochemistry and western blot among each group and discusses its forensic medical and the clinical significance
Methods. Cortex samples were divided into 3 groups: post-traumatic epilepsy group (15 samples originating from post-traumatic epilepsy); non-traumatic epilepsy group (15 samples originating from non-traumatic epilepsy), and non-epilepsy group (15 samples originating from corpse which die of hemorrhagic shock). All cortex samples were examined fo morphological changes with hematoxylin and eosin stain(HE). The expression of bcl-2 and caspase-10 on mRNA with RT-PCR among each group was investigated as well as protein expression of bcl-2 and caspase-10 with Immunohistochemistry and Immunofluorescence. The expression of bcl-2 and caspase-10'protein was also tested by western blot.
Results. The expression of caspase-10 gene and protein are higher in the PTE group than in the non-PTE group and in the traffic accident death group, the difference has statistical significance ($p<0.05$); the expression of the caspase-10 gene and protein are also higher in the non-post traumatic epilepsy group than in the accident death group ($p<0.05$). Compared with the PTE and the traffic accident group, the expression of bcl-2 protein are higher in the non-PTE group ($p<0.05$).
Conclusions. The results of HE show that there are obvious morphological changes in the PTE group,and the apoptosis changes in the PTE group are more obviously than the non-PTE group. There is a difference between the PTE and the non-PTE group regarding the bcl-2 and caspase-10's expression. The expression of bcl-2 on in the non-PTE group is obviously higher than in the PTE group ($p<0.059$). The expression of caspase-10 on in the PTE group are obviously higher than the non-PTE group ($p<0.05$). The difference among these gene expressions is valuable for PTE's identification. This research provides the scientific basis for traumatic epilepsy pathogenesis and clinical care.

P 77
1,5-anhydroglucitol and methylglyoxal – new post-mortem marker for glucose metabolism disorders?

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Introduction. Post-mortem diagnosis of diabetes and a diabetic coma can be difficult because of the unreliability of certain biochemical parameters. 1,5-Anhydroglucitol (1,5-AG) competes with glucose for reabsorption in the kidneys, Methylglyoxal (MG) is mainly derived from intermediates of glycolysis. Therefore, diabetics show significantly different plasma concentrations of 1,5-AG (lower) and MG (higher). Our objective was to develop LC-MS/MS methods for the determination of both parameters in serum and blood and to see if an ante-mortem hyperglycemia can be proved by the analytes.
Methods. For 1,5-AG serum was protein precipitated before the isocratic separation over a NH_2-endcapped column. Sample preparation for MG demands liberation of MG from its high plasma protein bond and a derivatization step (24 h, 4°C with 2,3-diaminonaphthalen) due its high reactivity before separation over a C18 column. Mass spectrometric detection was made in MRM mode with APCI in negative mode for 1,5-AG and ESI in positive mode for MG. The assays were validated according to GTFCh guidelines. Serum of diabetics from a diabetic clinic and non-diabetics was used to assess data about reference concentrations in human serum.
Results. Validation of the assays showed linearity and good precision data (<15%). Reference concentrations of hypo-/normo- and hyperglyc-

emic patients in relation to other parameters of the glucose metabolism are discussed.
Conclusions. In post-mortem assays an antemortem unknown diabetes could be detected by 1,5-AG or MG concentrations, thresholds are discussed. Concentrations could not distinguish reliably between deaths due to diabetic coma and other causes of death in diabetics.

P 78
C-kit positive cardiac telocytes

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Introduction. Telocytes are a subpopulation of interstitial Cajal-like cells characterized by the presence of long moniliform processes called telopodes. Even if the gold standard for their identification is electron microscopy, immunohistochemistry is also extremely useful, most telocytes being c-kit positive.
Methods. Heart samples were obtained from 13 cases where the cause of death was non-cardiac and were immunolabeled with CD117/c-kit. Electron microscopy was used as confirmation.
Results. C-kit immunopositive ICLC's were identified with both subepicardial and intramyocardial localizations, with different morphological characteristics. Electron microscopy positively identified the c-kit immunopositive cells as telocytes.
Conclusions. There are two different ICLC c-kit positive subpopulations within the heart, which are indicating interstitial cardiac system similar to the one described in the gut.

P 79
Neurofilament positive endothelial cells

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Introduction. De novo genesis of blood vessels is made throughout three main methods – angiogenesis, vasculogenesis, and arteriogenesis. The vascular and neural networks are developing synergistically during embryogenesis by angiogenesis. At the extremity of these developing networks were identified a special type of endothelial cells (tip cells), characterized by long filopodia, which were found to be involved in the leading and guiding endothelial sprouts.
Methods. Sinoatrial node and right atrial wall were obtained from fourteen diabetic hearts and six nondiabetic controls and were immunostained with neurofilament antibodies.
Results. Microvasculogenesis with NF immunopositive cells was extremely intense in the diabetic heart and extremely rare in non-diabetic hearts. NF staining was found mostly in the apical area of endothelial cells where we found emerging filopodes.
Conclusions. Neoangiogenesis is highly increased in diabetic compared to non-diabetic NSA. NF staining was mostly found in the apex of tip cells which could suggest a neural control of adult neoangiogenesis.

P 80
Particularities of the etiology of sepsis in legal medical practice

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Introduction. Sepsis in legal medicine is mostly found in traumatic deaths with long hospitalization or in medical malpractice cases. In clinical practice until recently Gram positive sepsis was more frequent than Gram negative; however in the last few years Gram negative became prevalent. The purpose of this presentation is to compare the etiology of sepsis in clinical environment with the one found in legal medicine practice.
Methods. Sepsis cases with a known cause were collected over a three-year period (79 cases); the results obtained were compared to those from the literature as found in clinical environment.
Results. In legal medical practice the prevalence of Gram negative and plurimicrobial sepsis is more frequent than that in clinical sepsis. The sources of error must be carefully taken into consideration when analyzing post-mortem sepsis

P 81
Conceptual models in sudden cardiac death lethal arrhythmias

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Introduction. Animal models are more frequently used. Our approach was necroptic using human material.
Methods. Sudden cardiac death cases were investigated for defining the cause of death (forensic autopsies). We completed gross pathology and performed an immunhistochemical study on several cases of sudden cardiac death in order to underline a predictive role of several cellular factors, which might be involved. Myocyte morphology was examined for structural and ultrastructural modifications.
Results. Desmine and myiogenine showed the highest sensibility for detecingt hypoxia and ischemia in myocytes and peri-lesional areas more than Myo-D1. We looked for ultrastructure changes in fibrillation vs. asystolia.
Conclusions. Structural and structural changes may be used to define a phenotypical pattern in lethal arrhythmias prone to sudden cardiac death. Finally this allows more specific clinical evaluation of risks for patients with known heart diseases, to reduce the lethal risk and to enhance prevention.

P 82
Asphyxiation due to helium and argon – Toxicological findings in two suicides

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Introduction. Numerous death cases due to suffocation in a toxic or oxygen deficient gas atmosphere have been described in the literature, but unfortunately especially cases involving inert gases like helium are often presented without detailed toxicological findings. We report about our observations on two suicides, one by helium and the other one by argon inhalation.
Methods. During autopsy gas samples from the lungs were collected directly into headspace vials by a procedure ensuring minimal loss and dilution. Analyses were performed by headspace gas chromatography/mass spectrometry (HS-GC/MS) in which the usual carrier gas helium was replaced by nitrogen.

Results. Positive results were obtained in the argon case, but in the case involving helium we saw results similar to environmental air.
Conclusions. Use of HS-GC/MS enables in principle to detect inert gases like argon or helium. However, a number of factors may later influence the results as e.g. a longer period of time between death and sampling or pre-analytical artefacts during sampling of such highly volatile substances.

P 83
Ethyl glucuronide concentrations in pulverized and cut hair samples

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Introduction. The determination of ethyl glucuronide (EtG) in hair is a powerful tool to prove alcohol abstinence or to distinguish between social and heavy drinkers. Sample preparation, especially cutting the hair with scissors, is a very time-consuming process. Grinding the hair samples with a mill would save an enormous amount of time. However, studies have shown that analyzing pulverized hair samples have a negative influence on analytical measurements. A comparative analysis of hair samples tested positive for EtG should show if grinding hair with scissors or with a mill leads to convergent results.
Methods. 40 positively tested hair samples have been included in this study. After washing the hair samples, one half was cut with scissors and the other half was pulverized. The following extraction procedure was identical. EtG concentrations were determined with LC-MS/MS.
Results. Concentrations between 11 and 140 pg/mg (mean: 43 pg/mg, median: 29 pg/mg) were determined in hair samples cut with scissors. In pulverized hair samples EtG concentrations between 13 and 175 pg/mg (mean: 59 pg/mg, median: 45 pg/mg) were measured.
Conclusions. In pulverized hair samples the determined EtG concentrations differ from the concentrations measured in cut hair samples by 5–177% (mean: 47 pg/mg, median: 38 pg/mg). Significant increased EtG concentrations indicate a better extraction yield as a result of the more homogenous and finely ground hair matrix. Higher background noise or a larger number of matrix caused signals have not been observed. It becomes obvious that determined EtG concentration varied significantly depending on how the hair matrix is cut.

P 84
Determination of cocaine and cocaine metabolites in single hairs by the MALDI LTQ Orbitrap XL instrument – preliminary results

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Introduction. Matrix-assisted laser desporption/ionization (MALDI) mass spectrometry imaging (MSI) as a complementary technique could be very helpful for drug detection in such complex biomatrices like hair samples under forensic or clinical purposes.
Methods. In a preliminary test 4 single hairs were analyzed for the presence of cocaine by use of the MALDI LTQ Orbitrap XL instrument. Hair strains were fixed on a sample plate and an **α-cyano-4-h**ydroxycinnamic acid (CHCA) matrix was manually spotted onto the hair strains. Fourier transform mass spectrometric full scans were obtained moving from the hair root region towards the hair tip.
Results. In hair 1 cocaine (exact mass 304.15433) was identified mostly from the root of the hair and then towards the hair tip. This was confirmed by analysis of hair number 2. Drug concentrations determined by conventional LC-MS/MS approach were as follows: cocaine 3.33 ng/mg, benzoylecgonine 0.70 ng/mg. Using this technique we got time-related information concerning the behavioural pattern of the consumer with high resolution. Cocaine was not administered during the whole period of time but there were two particular periods where cocaine was used, one of them 3 months prior to sampling and the other one 6,5 to 9 months before. In addition to cocaine we were able to detect cocaine metabolites for plausibility control (benzoylecgonine/norcocaine and cocaethylene). In two hairs of the same subject which were analyzed under the same conditions we obtained negative results.
Conclusions. These preliminary results confirm the applicability of MALDI-MSI for the determination of drugs in hair samples. The high chronological resolution allows enhanced interpretation concerning the periods of drug administration. However, the results with 2 negative hairs have also demonstrated that hair analysis of single hairs can lead to misinterpretation. Different growth rates have to be considered, the phenomenon of different stages (anagen, catagen, telogen). The results obtained from a quick-and-dirty experiment can be seen as the tip of the iceberg.

P 85
Epidemiologic study of carbon monoxide poisoning related death referred to Khouzestan Legal Medicine Organization 2007–2009

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Introduction. Carbon monxoide is known as the silent killer. Death due to carbon monoxide (CO) poisoning is one of the common causes of death in forensic investigation. Information on poisoning deaths based on forensic investigation in Khouzestan province of Iran, are not available; so, this investigation was done.
Methods. This retrospective study based on autopsies samples sent to the laboratory of toxicology of Khuzestan legal medical organization during period 2008 to 2009. Cases were analyzed according to the following criteria: age, region gender, presence or not of autopsy report and post-mortem blood carbon monoxide determination.
Results. The hematological investigation indicated that 35 (59.32%) deaths were not from carbon monoxide intoxication. The information obtained from 59 deceased showed that 40 (67.79%) was men and 19 (32.21%) women, average age in investigated cases was 30.06 (SEM; ±2.02) ranging from 3 days to 80 years. The highest rate was seen in young workers (18–70 yr.). 26 (44.06%) of people were poisoned at home, most of them were in the bath or the bedroom, 2 (3.38%) on a ship, 6 (10.17%) in a car and 6 (10.7%) at their work place. There were 2 (3.38%) cases of homicide by burning, 1 (1.69%) car accident, 1 (1.66%) electric shock, 1 (1.66%) explosion and 4 (55%) by fire. 4 (6.779%) of the bodies were related to the people whom were killed at first and then was burned.
Conclusions. Epidemiological profile data from medicolegal investigation of poisoning deaths is very useful not only for forensic examiners but also for the development of preventive programs in developing countries.

P 86
Crystal nephropathy – a sign in ethylene glycol poisoning

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Introduction. We studied the particular morphological and toxicological aspects in ethylene glycol poisoning.

Methods. Between 2006 and 2010 of 177 cases of poisoning 19 were lethal due to ethylene glycol poisoning.
Results. Although rarely met, ethylene glycol poisoning may be accidental because of the sweet taste. The study group consisted of 2 women and 17 men with an average age of 34,6 years. 16 deaths were quick without time for treatment, 3 persons were hospitalized, received dialysis, but later died. In all cases, the investigation concluded that poisoning was accidental. Macroscopical modifications were mostly unspecific, but 10 cases revealed important modifications of the renal parenchyma with crystal nephropathy (calcium oxalate crystals), 8 cases revealed noncardiogenic pulmonary oedema and myocarditis with cardiovascular collaps in 3 cases. The toxicological examination indicated different levels of ethylene glycol and was performed by gas chromathography.
Conclusions. In establishing the cause of death due to poisoning by ethylene glycol a complete evaluation of the case is necessary starting with the scene where the body was found because of containers which could be found. In the cases of prolonged survival, the observation of calcium oxalate crystals allows an indirect determination of the cause of death.

P 87
Honour killing – a comparison of two case reports

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Introduction. An honor killing (also called a customary killing) is the murder of a female family or clan member by one or more fellow family members, where the murderers and potentially the wider community believe the victim to have brought dishonor upon the family, clan, or community. This perceived dishonor is normally the result of (a) utilizing dress codes unacceptable to the family (b) wanting out of an arranged marriage or choosing to marry by own choice, (c) engaging in certain sexual acts or (d) engaging in relations with the same sex. These killings result from the perception that defense of honor justifies killing a person whose behavior dishonors their clan or family. Honor killings have been reported from antiquity from all over the world, however the recent past has shown an alarming and disturbing resurgence of this inhuman deed.
Methods. This paper presents two cases related to honour killing: the first a dual homicide of two lovers who were killed in the name of preserving family honor and hanged after death together by the entire village; the second in which a foster father killed his adopted teenage daughter after he found out that she was having an affair with a classmate.
Results. The pattern of injuries in both cases and crime scenes are compared and discussed in detail.
Conclusions. A comprehensive in depth study of factors, social and ethnic must be looked into to arrive at a proper understanding of this horrendous crime. Only then, some solution can be envisaged to combat and eradicate honor killing.

P 88
Morphological variations of the internal jugular venous valve

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Introduction. The internal jugular vein is a popular route for central venous catheter placement and are also important venous vessels for returning blood from the brain. The internal jugular vein valves are the only venous valves between the heart and the brain and incompetence may result in retrograde cerebral venous flow during coughing and other precipitating activities. We investigated 60 cadavers from legal autopsies to observe the morphological variations of the internal jugular venous valve. The position of the internal jugular venous valve in situ varied among the subjects, ranging from being directly posterior to the clavicle to a position 3 cm further inferior and 2.5 cm further superior. Valves were present bilaterally in 58 (96.7%) subjects and unilaterally in 2 (3.3%) subjects. Bicuspid valves were present in 72.0% of the valves we examined. As the internal jugular vein is increasingly used for vascular access, knowledge about and evaluation of these valves may be useful in clinical practice to avoid damage during percutaneous procedures.
Methods. Autopsy data of 60 individuals were collected from 35 males and 25 females ranging in age from 17 to 85 years and with a mean age of 59.5 years. The subjects involved in the study had been otherwise healthy and none had had a history of cerebrovascular disorders, pulmonary disease, right-sided heart failure, neurological diseases, or notable trauma to the cervical and supraclavicular region. The ethics committee of the university approved the study, but waived the need for consent from the patients' next of kin because the autopsy was ordered by law.
Results. A total of 118 valves were examined which were bilaterally present in 58 (96.7%) subjects. Of the female subjects, 2 (3.3%) had unilateral valves. The position of valves was noted relative to the clavicle and 63 (53.4%) valves were directly posterior to the clavicle. In 32 subjects the right and left valves were positioned at the same level, in 18 subjects the right valve was more superior than the left and in 10 subjects the right valve was more inferior than the left. Of the valves 31 (26.3%) were unicuspid (13 valves on the left side and 18 valves on the right side), 2 (1.7%) were tricuspid and the remaining 85 (72.0%) valves were bicuspid.
Conclusions. As the internal jugular vein is increasingly used for vascular access, knowledge about and evaluation of these valves may be useful in clinical practice to avoid damage during percutaneous procedures.

P 89
Assessment of abdominal fat mass measurements using CT as a risk factor for cardiovascular lesions in autopsy materials – a preliminary study

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Introduction. The concept of metabolic syndrome has become common in health care; however, there have been poor data for assessment with regard to cardiovascular pathology at autopsy and sudden cardiac death. The present pilot study statistically analyzed serial routine forensic autopsy cases of adults.
Methods. Autopsy data (n=63: 46 males and 17 females; age >20 years, within 3 days post-mortem), including pathology, biochemistry and CT, were examined with regard to cardiovascular lesions and fatal cardiac accidents.
Results. CT measurements of abdominal subcutaneous and visceral fat masses (S- and V-FM) correlated to the body mass index (BMI); however, subjects with a high BMI of >25 had a larger subcutaneous fat mass of >100 cm^2. CT S- and V-FM measurements highly correlated to the thickness of abdominal subcutaneous and mesenteric/renal fat tissues as measured at autopsy, respectively, but were independent of epicardial fat deposits. However, significant correlations were detected between CT V-FM measurement and atherosclerotic cardiovascular lesions involving the left anterior and right coronary arteries, and thoracic aorta, and also between CT S-FM measurements and atherosclerosis of the left anterior coronary artery. There was no significant correlation between post-mortem CT S-/V-FM measurements and serum cholesterol or hemoglobin A1c levels.

Conclusions. The present study suggests that both subcutaneous and abdominal visceral fat deposits are risk factors of cardiovascular lesions; however, fatal cardiac accidents were independent of these findings, suggesting a larger contribution of the other factors to an unexpected fatal cardiac attack.

P 90
Post-mortem urinary catecholamine levels with regard to the cause of death

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Introduction. Previous studies suggested serum catecholamines to be useful for investigating stress responses in the death process. The present study analyzed post-mortem urinary adrenaline (Ad), noradrenaline (Nad) and dopamine (DA) with regard to the cause of death in routine medicolegal casework.
Methods. Serial forensic autopsy cases (n=86: 70 males and 16 females; survival time <0.5–150 h; median 1 h; within 10 days post-mortem, median, 27 h) at our institute were examined, including blunt injury (n=21: head injury, n=5; non-head injury, n=16), sharp instrument injury (n=2), mechanical asphyxiation (n=11), intoxication (n=13: methamphetamine, n=6; sedative-hypnotic drugs, n=7), drowning (n=4), fire fatality (n=10), hypothermia (cold exposure, n=4), hyperthermia (heat stroke, n=9), and natural death (n=12).
Results. Each catecholamine level in urine was independent of the age or gender of the subjects, post-mortem interval or survival time. Urinary Ad and Nad levels partly remained within clinical serum reference ranges; however, a higher level of Ad was detected in blunt head injury and hypothermia cases, and these cases as well as drowning, methamphetamine abuse and fire fatality had a higher Nad level. Urinary DA was markedly higher than the clinical serum reference range, and the above-mentioned groups and hyperthermia showed a higher level. Each level was lower in asphyxiation cases.
Conclusions. The profile of urinary catecholamines was quite different from that of serum levels, involving a predominant increase of DA followed by Nad in head injury, drowning, methamphetamine abuse and fire fatality, and the elevation of each level in hypothermia.

P 91
Azan-Mallory staining might be useful for detection of myocardiac damage due to hypothermia

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Introduction. Observational and experimental works induced hypothermic death have provided that there are some diagnostic pathological changes including necrosis of pancreatic cells with leukocytes infiltration, vacuolization of hepatocytes, adrenal and renal cells, and fatty changes of cardiac myocytes, hepatocytes and renal tubular cells. The densely gathering of cardiac myocytes induced hypothermic death was also described.
Methods. The four parts of cardiac tissues were obtained at autopsy and were fixed with formalin and embedded in paraffin. The tissue sections were stained with Azan-Mallory method.
Results. The orange colored cardiac myocytes were clearly detected around the contraction band necrotic area with Azan-Mallory stain in the heart muscles obtained from 22 individuals who died due to hypothermia or immersion hypothermic death, although the weak and scatterable orange colored cardiac myocytes were also observed from individuals due to cardiac infarction or CO intoxication. Although at present the detail mechanism and cause of the color change is unknown, it might relate the decreasing of oxygen releasing from hemoglobin and/or cardiac fibrillation due to hypothermia.
Conclusions. Azan-Mallory staining might be useful for detection of myocardiac damage due to hypothermia.

P 92
Analysis of post-mortem tissue water contents with regard to the cause of death

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Introduction. Tissue water contents of human viscera are relatively stable, but fatal traumas and diseases may cause substantial alterations, especially in the lung and brain. In the present study tissue water contents with regard to the cause of death were performed to elucidate the pathophysiology of systemic water dynamics in routine casework.
Methods. Serial autopsy cases (n=148: 103 males and 45 females; 18–100 years of age; survival time, <6 h; within 2 days post-mortem) were examined. Water contents of tissue specimens taken at autopsy were measured using an HB 43, Halogen (Mettler Toledo).
Results. Ranges (mean) of water contents were: upper/lower lobe of lung, 58.7–87.9 (80.4)%/73.4–89.2 (80.5)%; spleen, 60.8–81.4 (77.4)%; kidney, 67.3–85.4 (80.2)%; brain, 59.8–89.5 (79.7)%. There was no significant tendency toward a post-mortem or survival period-dependent change, gender-related difference, or age dependency. Heart blood water contents (right, 70.7–89.7%; left, 66.2–88.3%) showed a high negative correlation with hematocrit. Water contents of all viscera other than the brain showed a slight negative correlation to left heart blood hematocrit. Lung water contents were higher for drowning than for other groups. Brain water contents were higher for hyperthermia, and largely varied by case for injury, asphyxiation, intoxication and acute cardiac death. Water contents of the spleen and kidney were lower for hypothermia and intoxication, respectively.
Conclusions. These findings suggest that tissue water contents indicate brain edema, aspirated water in the lungs of drowning cases, and congestion/edema of other viscera.

P 93
Subdural hemorrhage due to secondary vitamin K deficiency bleeding

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Introduction. Extrahepatic biliary atresia (EHBA) is a rare disease which is characterized by progressive and obliterative cholangiopathy in infants. EHBA is one of the major causes of secondary vitamin K deficiency bleeding (VKDB) due to cholestasis-induced fat malabsorption. Breast feeding also increases the bleeding tendency because human milk contains low levels of vitamin K. Here we report a case of sudden unexpected death as subdural hemorrhage by secondary VKDB due to biliary atresia.
Methods. A 2-month-old female infant was unexpectedly died with vomiting and seizures. She presented normal growth and development. She was a breast-fed and given vitamin K prophylaxis orally. In an emergency hospital, a premortem CT scan demonstrated an intracranial hematoma and a mass effect with midline shift.
Results. The extrahepatic bile duct showed totally atretic. A subdural hematoma was found in the brain without any injuries. Post-mortem

hematological examinations indicated that the infant had been cholestasis and vitamin K defiency.

Conclusions. Autopsy findings suggest that subdural hemorrhage caused by VKDB due to EHBA. It occurs even when vitamin K prophylaxis is continued as the presented case. In infant autopsy cases with subdural hemorrhage, not only trauma but intrinsic factors such as secondary VKDB (e.g. EHBA, neonatal hepatitis and chronic diarrhea) should be considered.

P 94
Functional adrenal lesions in three autopsy cases and their relation to the cause of death

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Three autopsy cases with adrenal lesions are reported. Case 1: A male (late 40s) complained of epigastralgia and respiratory disturbance after abdominal ultrasonography and intravenous injection of Buscopan^{R}, and died 12 hours later. The heart (430 g) showed slight coronary artery atherosclerosis. The lungs exhibited marked congestion and edema. In the left adrenal medulla, a chromogranin A-positive tumor was observed. Post-mortem blood analyses showed high levels of VMA (2523.4 ng/ml) and normal levels of tryptase (5.5 ng/ml). Case 2: A male (late 60s) was found dead on the road. The heart (570 g) showed mild left ventricular hypertrophy and slight coronary artery atherosclerosis. The lungs exhibited marked congestion and edema. In the left adrenal cortex, an aldosterone-positive tumor was observed. High levels of aldosterone (259 pg/ml) and ethanol (3.1 mg/ml) were detected in the blood. Case 3: A female (late 70s) died at home. The heart (465 g) showed left ventricular hypertrophy, thrombus in the anterior interventricular artery, severe atherosclerosis and contraction band necrosis. In bilateral adrenal cortices, aldosterone-positive lesions (adenoma or hyperplasia) were observed. High levels of aldosterone (788 pg/ml) were detected in the blood. We have concluded that the cause of death of Cases 1–3 was acute left ventricular failure resulting from pheochromocytoma, functional adrenal adenoma and acute myocardial infarction, respectively. The adrenal lesions in these three cases may have been related to their death directly or indirectly. Our conclusions indicate that biochemical and immunohistochemical analyses are essential to identify the involvement of adrenal lesions during cause of death determination in autopsy cases.

P 95
Two cases of drowning and "delayed death from drowning" while the victims scuba-dived together

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We describe the deaths of two individuals (male and female) while they were scuba-diving together. A male in his late 30s was found dead in the sea. Autopsy revealed typical findings of drowning including froth in the hilar bronchi, ballooning of the both lungs (left, 720 g; right, 830 g), pleural effusion (left, 225 ml; right, 230 ml), and visceral congestion, except in the spleen. In contrast, the female in her late 20s suffered cardiopulmonary arrest when she was rescued, but was resuscitated. In spite of intensive care, she died approximately 20 hours after hospitalization. Clinical laboratory data revealed hypernatremia and hyperproteinemia at admission, and, thereafter, hypoproteinemia. Autopsy revealed brain edema, ballooning of both lungs (left, 660 g; right, 1000 g) and pleural effusion (left, 150 ml; right, 100 ml). Histopathological examinations revealed hypoxic neuronal changes in the cerebral cortex, hippocampus, cerebellum, midbrain and pons, contraction band necrosis in the endocardium side of the left ventricle, pulmonary edema, local neutrophil infiltration in both lungs, and microthrombi in the liver and spleen. In both cases, diatoms were detected in distant organs (male: liver, female: left kidney), as well as in the lungs. From these findings, we concluded that the man died of drowning and the woman died of hypoxic encephalopathy due to aspiration of sea water. In the latter case, temporal clinical data were useful to estimate the pathophysiology of delayed death after sea water aspiration. In addition, our results suggest that the diatom test may help to diagnose „delayed death from drowning".

P 96
Transmesenteric hernia with two consecutive and inversely forming loops of intestine: a fatal case of a child

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Introduction. Transmesenteric hernia is a very rare and lethal gastrointestinal disease. It is congenital and most of the fatal cases are infants who have severe disorders such as chromosome aberration. We present a rare case of fatal transmesenteric hernia in a normal developed child without serious complication

Methods. A 2.5-year-old girl was taken to a hospital because of abdominal pain. She had no medical history, but chronic constipation. Plain X-ray and echography showed no significant abnormality. As her pain attenuated and the vital signs were stable, the doctor let her return home. However, she was suddenly in a state of cardiopulmonary arrest and died in a few hours.

Results. At autopsy, the small bowel herniated through a mesenteric defect with two consecutive and inversely forming loops. The lengths of the oral and anal loops were 3 cm and 170 cm, respectively. The loops were necrotic and 300 ml of bloody ascites was found in the peritoneal cavity. At histology, little inflammation was observed in the herniated intestine.

Conclusions. This loop formation may explain the changing of her clinical state. Mild abdominal pain was induced by the hernia of the long loop, and then severe shock occurred when the short loop invaginated into the same defect. It is difficult to diagnose transmesenteric hernia since it may cause little symptoms in children like in this case.

P 97
Incidental air angiography as demonstrated by post-mortem CT

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Introduction. Post-mortem CT (PM-CT) often detects intravascular gases due to injury, medical intervention or post-mortem changes. The present study investigates the occurrence and cause of intravascular gases as demonstrated by incidental air angiography.

Methods. PM-CT data of serial forensic autopsy cases (n=136, within 2 days post-mortem) were reviewed.

Results. Intravascular gases in the head, neck and chest, involving cardiac cavity, were often detected in cases with severe injury and/or cardiopulmonary resuscitation (CPR), independent of the cause of death, particularly evident in hospital death cases with severe chest injury. In two cases of injury to neck vessels, intravascular gases appeared associated with the respective open and closed vascular injuries; however, such findings were not seen in injury to chest, abdominal or peripheral vessels. In cases without severe injury or CPR, intravascular gases were sporadically detected in the head, neck, chest, involving cardiac cavity, and/or abdomen in cases of drowning, intoxication, fire fatality and hyperthermia (heat stroke), and in the pelvis of fire fatality and hyperthermia cases.
Conclusions. The present study suggests that CPR involving artificial ventilation can cause advanced air embolism, which is aggravated by combined airway and vascular injuries. Vascular injury-related air angiography can be seen in cases of fatal neck vessel injury. Intravascular gases may be otherwise associated with several specific causes of death when without ante-/post-mortem body destruction or CPR; however, careful consideration is needed in CT diagnosis of air embolism as the cause of death in cases with intensive medical care, including CPR.

P 98
Detection of endothelial progenitor cells in human skin wounds and its application for wound age determination

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Introduction. Endothelial progenitor cells (EPCs), a newly identified cell type, are bone marrow-derived precursors that coexpress stem cell markers and vascular endothelial growth factor receptor 2 (VEGFR2/Flk-1).
Methods. In this study, a double-color immunofluorescence analysis was carried out using anti-CD34 and anti- VEGFR2 antibodies to examine the time-dependent appearance of EPCs, using 53 human skin wounds with different wound ages (group I, 0–1 days; group II, 2–5 days; group III, 7–14 days; and group IV, 17–21 days).
Results. In wound specimens with an age of less than 1 day, CD34+/VEGFR2+ EPCs were not detected. The EPCs were initially observed in wounds aged 2 days, and their number increased in lesions with advances in wound age. In a semiquantitative morphometrical analysis, the average number of EPCs was highest in the wounds of group III. These findings imply that human skin wounds containing EPCs are at least 2 days old. Based on the average number of EPCs in each group, an EPC number of over 25 more strongly suggests a wound age of 9 to 11 days.
Conclusions. The present observations indicate the participation of EPCs in wound healing of human skin inducing vasculogenesis and therefore, detection of EPCs could be a useful marker for wound age determination.

P 99
Characteristics of injuries in traffic accidents of fatally injured in Montenegro (autopsy material)

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Introduction. Road traffic injuries are among ten leading causes of death in the world, nearly 1.3 million people are killed every year. Road crashes are predicted to become the fifth leading cause of death by 2030. Main characteristics of road traffic accidents are polytraumatism, polymorphism and multipicity, multiple stages in injury mechanisms and a disproportion between external and internal injuries.
Methods. We analyzed autopsy reports performed in forensic medical department of the Clinical Centre of Montenegro during 2000–2004.
Results. There were 168 fatally injured, 130 male (77.38%, mean age 46.44 years) and 38 female (22,62%, mean age 45.24 years) fatalities. There were 55 drivers, 28 passengers (10 front-seat, 18 back-seat), 67 pedestrians, 9 motorcycle riders, 8 bicycle riders and 1 horseman. On external examination abrasions, contusions and lacerations were common findings (76.78% had all three) and are often extensive, on internal examination most frequent injuries were rib fractures (72.02%), skull fractures (57.74%) and cerebral contusions (42.86%), 33.93% of cases had lacerations of lungs and 30.36% had liver lacerations. To prove a disproportion between external and internal injuries we used presence of open fractures as a distinctive feature on external examination and found that only 23.21% had open fractures whereas 32.74% had multiple injuries of the locomotor system without open fractures..
Conclusions. Although patterns of injuries may appear obvious on the skin, thorough internal examination remains a golden standard and is the best way to understand the events during the accident.

P 100
CYP2A6 polymorphism affects the high concentration of blood nicotine observed in a smoker who committed suicide

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Introduction. We have reported that smokers who commit a suicide show higher nicotine concentration in blood than non-suicide smokers. The abnormally high concentration of blood nicotine in the suicide victim may suggest that heavy smoking behavior caused by the accumulation of large mental stress for long term with suicidal intention. Blood nicotine level of the suicide victims were abnormally high, but variable individually. We examined the genetic polymorphism of CYP2A6, which is the main enzyme in nicotine metabolism, and investigated whether the metabolic efficiency of nicotine affects abnormally high nicotine level of blood in the suicide victims.
Methods. We surveyed 35 deceased who were smokers, 15 individuals had committed suicide victims and 20 were non-suicide victims. Nicotine in blood collected from the deceased was detected by gas chromatography. We divided the subjects into persons with normal (NM) and poor metabolism (PM) of nicotine according to their genotype of the CYP2A6 gene, which were *CYP2A6*1*, **4*, **7* and **9* detected by PCR. The person with NM show homo- or heterozygote of *CYP2A6*1* alleles, and the person with PM show no allele of *CYP2A6*1*.
Results. The frequency of PM person of suicide and non-suicide were 33% and 30%, respectively. The mean level of nicotine in suicide victims was significantly higher than in non-suicide victims (108.5±84.7 ng/ml versus 23.4±12.8 ng/ml, $p<0.002$).
Conclusions. Smoker who committed suicide shows higher levels of nicotine in blood compared to non-suicidal smokers. Such a tendency is more remarkable in the person with normal metabolism of nicotine than the person with poor metabolism.

P 101
Effect of alcohol on the restoration of the heart beat by cardiopulmonary resuscitation in a drunken person with cardiac arrest after trauma

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Introduction. It was previously shown that drinking alcohol depresses myocardial contractility in healthy adults and patients with heart disease. We investigated whether drinking alcohol has adverse effects on

the ability to return of spontaneous circulation (ROSC) by cardiopulmonary resuscitation (CPR) after cardiac arrest in a patient with severe trauma.
Methods. From 2005 to 2010, we retrospectively examined the medical records and autopsy findings of 38 persons who died after receiving CPR. All cases were classified into three groups depending on the results of the alcohol analysis: alcoholics who died of trauma (group A; n=11, age 47.6±12.6), non-alcoholics who died of trauma (group B; n=12, age 64.7±24.7) and non-alcoholics who died of disease (group C; n=15, age 60.8±13.7). We then compared the period of CPR, injury severity score (ISS) and the rate of ROSC.
Results. There was no significant difference in the period of CPR among three groups. The ISS of the group A and B was similar level (30.4±16.8 and 25.8±19.5, respectively). The degree of the cardiac fibrosis and the coronary stenosis in the group A was mild when compared with other groups. However, the rates of ROSC in group A, B and C were 0%, 41.7% and 26.7%, respectively. The blood ethanol level of the group A was 1.75±0.94 mg/g.
Conclusions. The rate of ROSC in alcoholics was remarkably lower than in non-alcoholics, despite the ISS between alcoholics and non-alcoholics had a similar level. Alcohol appears to have a depressant effect on the ROSC in drunken patients with severe trauma.

P 102
Criteria of assessing the age of posttraumatic leptomeningeal hemorrhage

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Introduction. We studied the macroscopic and microscopic morphological aspects of the posttraumatic leptomeningeal hemorrhage.
Methods. The study comprises 100 autopsied cases of craniocerebral trauma with unoperated leptomeningeal hemorrhage.
Results. Between 2006 and 2010 100 cases with craniocerebral trauma and no signs of neurosurgery where autopsied. Macroscopically, diffuse and focal leptomeningeal hemorrhage was observed. The study group consisted of 81 male subjects and 19 female subjects, ages between 2 and 84 years. 45 cases involved car accidents, 10 involved motorcycle accidents, 39 involved falls and 6 cases were aggressions. We divided the group in 3 subgroups by microscopic and macroscopic aspects at different ages of the lesions: for the first 10 days the leptomeninges was of a reddish tint with erythrocytes of different sizes spread from the crests to the fossae; between 10 and 20 days the leptomeninges were unevenly red with ballooned erythrocytes, visible siderophages and a fibrilar matter with a tendency towards organization; over 20–25 days the leptomeninges were of a brownish-yellow tint with numerous macrophages.
Conclusions. We observed that by correlating the macroscopic aspects of the leptomeningeal hemorrhage with the hemorrhage pattern of evolution which includes the apparition of siderophages and the destructuration of the erythrocytes we were able to classify the post-traumatic time frame into 3 periods. This morphological classification is useful especially when the available history information if scarce.

P 103
Medical intervention against domestic violence – pilot project in Germany – target group medical practice

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Introduction. Intimate partner violence is a common health-care issue. It is already known that health professionals play an integral role in assessing the risk of violence in their patients. Physicians want to help victims of domestic violence but face complex barriers to do so.
Methods. Dealing with the barriers and ambivalences the following aspects were focused in a German pilot project (*Medical intervention in domestic violence against women*; www.migg-frauen.de, supported by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth) addressing the development of a training program for physicians: awareness training for signs and signals of violence; definitions and limits of their role in intervening with victims; support by problem oriented learning and networking. Based on the forensic experience we created one part of the pilot project and the new intervention -program in domestic violence was integrated in offices medical practices of general practitioners (family doctors) and gynecologists. The medical practices working with the medical practices were linked to the ambulance proposals supply in 3 institutes of legal medicine in large university hospitals (Düsseldorf, Kiel, Munich) as important partners in the network to support victims of violence.
Results. The doctor's practices, attracted into this project, gave the following feedback: est help by contact to the network partners and problem based learning by doing.
Conclusions. More details of the pilot project and results will be presented.

P 104
Pulmonary bone marrow embolism by chest compression at resuscitation in forensic autopsy cases

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Introduction. Pulmonary bone marrow embolism has frequently been observed in routine autopsy cases which had received cardiopulmonary resuscitation before death. However, the incidence of pulmonary bone-marrow emboli (PBME) as a complication of closed chest compression has rarely been reported in Japan.
Methods. From 2005 to 2010, we retrospectively examined the medical records and autopsy findings of 61 persons who died after receiving chest compression. The histological sections of lung tissue were stained by hematoxylin-eosin and PBME was confirmed by careful observation of about 4 sections per case.
Results. PBME were found in 20 of the 61 patients (32.8%). Of 34 patients without traumatic fracture before chest compression, 11 (32.4%) showed PBME. Of 27 patients with the fracture before chest compression, 9 (33.3%) showed PBME. Rib fractures were recognized in 17 of 20 subjects (85.0%) with PBME positive and in 22 of 41 subjects (53.7%) with PBME negative. However, there was no difference in the number of rib fractures between PBME positive and negative patients.
Conclusions. PBME were found in 32.4% of 34 patients without traumatic fractures before chest compression. Given that microscopic sections investigated are only a small part of the whole lung, our data may suggest that successfully-resuscitated patients appear to have a higher incidence of pulmonary bone marrow embolism as a complication of chest compression.

P 105
Crime and punishment of corpse dismemberment after homicide in Japan

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Introduction. Corpse dismemberment is a relatively rare method whereby after killing the victim, the murderer severs the victim's head, trunk, and/or limbs.
Methods. Using the national newspaper Internet databases, we collected articles of criminal cases for accused person who were charged of a murder and destruction of corpse, for a period from 1987 to 2010 in Japan.
Results. 47 cases were identified. 53 offenders, 40 of them were males and 13 were females. The average age of offenders was 43.4, that of male was 44.9 and of female was 38.8. The number of the victims was 53, of which 25 were males and 27 were females. The average age of victims was 41.2, that of male was 42 and of female was 38.3. In the relationship between the offender and the victim, males tend to victimize their extramaritial partner or acquaintance while females tend to victimize family members. The average term of *kyukei* was 19 years and sentence was 15.4 years. The average rate of the court sentence to the *kyukei* against the offenders was approximately 0.8 regardless of sex.
Conclusions. In Japanese criminal law, although statutory penalty of corpse dismemberment itself is imprisonment for not more than 3 years, we can see a tendency of the court to impose severe punishment for an offender regardless of age, sex, motive or method of the murder because the act that the murderer damages the victim's body is regarded to make the murder worse.

P 106
Pregnancy-related maternal deaths in Okinawa, Japan, from 2002 to 2010

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Introduction. Pregnancy-related maternal death can be defined as the death of a woman resulting from, or related to, her own pregnancy/postpartum condition. An autopsy is essential to clarify the cause of pregnancy-related maternal deaths; however, there is not enough investigation of the cause of maternal death in Japan.
Methods. From 2002 to 2010, we retrospectively reviewed the medicolegal autopsy cases of pregnancy-related maternal deaths at our institute. We surveyed each women's age, pregnancy course and history, cause of death, and the information about the child.
Results. There were 10 pregnancy-related maternal deaths among 1808 autopsies. The age range was from 28 to 43 years (average 36.5 years), and victims were 1 primipara and 9 pluripara. The most common cause of death was postpartum hemorrhage (4), followed by amniotic fluid embolism (2), postpartum cardiomyopathy (2), coronary artery dissection (1) and high spinal anesthesia (1). Nine deaths occurred during labor/birth and one death occurred on the 14th day after delivery. All pregnancies were single. The babies were 3 males (2 deaths) and 7 females (1 death) and weighted from 2080 g to 3700 g (average 3200 g).
Conclusions. In some cases, it might be difficult to be saved, conversely some deaths could be avoided by appropriate treatment, such as deaths from postpartum hemorrhage. Pregnancy is a normal biological process, but due to various circumstances, pregnancy involves a risk to the life of the mother. To prevent pregnancy-related deaths, adequate autopsies are required to reveal the cause of the death.

P 107
Development of e-Learning modules for toxicology at the Institute of Legal Medicine Leipzig

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Introduction. The university Leipzig offers a study course toxicology for natural scientists for further education. Within the framework of promotion from ESF the project Development of e-Learning modules for toxicology was launched in 2009 at the Institute of Legal Medicine Leipzig.
Methods. Scientists, editors and computer scientists develop together e-Learning courses to support multimedia lectures for the multi disciplinary research field toxicology. The conception of designing modules is illustrated by way of example with the module chemical analytics and the course forensic toxicology depending on it. The variety of analytical methods is presented and brought into relation with toxicological issues. The study program allows the students to deepen their knowledge in chemical analytics and to develop further understanding for recent methods in this area. On basis of individual knowledge the students will learn new methods or deepen their existing knowledge by tests.
Results. Hereby the focus of education relies on multimedia based presentation in connection with traditional lectures. A virtual net offers new and alternative learning strategies. This allows for decentralized working of students and lecturers.
Conclusions. At the end of project all created content will be combined with the offer of study course toxicology in a joint web portal and thus made available to students, alumni and interested professional visitors.

P 108
Experimental study of injury caused by locally applied negative pressure

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Introduction. Although previous studies have reported some patients who developed compartment syndrome or died as a result of locally applied negative pressure, there is no detailed investigation of pathological changes caused by negative pressure-induced injury reported in the literature.
Methods. A total of 30 male Wistar rats were randomly assigned into 6 groups. Negative pressure was applied to the right hindlimb of each animal in each group for periods of 0 (sham operated), 30, 60, 90, 120, or 180 min. We examined the weight and morphological changes of the hindlimbs and the biochemical and immunological changes in the serum.
Results. After exposure to negative pressure, subcutaneous and intramuscular haemorrhages were obvious after 30 min and were exacerbated with time. The weights of injured hindlimbs also increased progressively. Microscopically, the proportion of degenerated muscle cells was higher in the deep portion of the injured hindlimb. Serum potassium and creatine kinase levels were significantly increased ($p<0.01$) after 120 and 180 min compared to those in sham group animals.
Conclusions. Muscle degeneration caused by local negative pressure was more severe in the deep field of the hindlimb. The weight increase in the hindlimb may be useful as an index of severity of the damage caused by local negative pressure. It was demonstrated that the application of negative pressure to a rat hindlimb causes blood shift reaching 30% of whole blood and that local negative pressure can induce hypovolemic shock.

P 109
Sudden infant death due to infectious endocarditis

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Introduction. Case report: A 4-month-old boy with cough and slight diarrhea for 2 days went to a hospital for an examination on the day of the death. His body temperature was 36.8°C and antibiotics and some medicines for a cold were given. At night around 21:00 fever rose to 37.7°C and respiratory symptoms went worse. Because the hospital and most of other clinics denied accepting the ill baby in the night, the parents took him to another hospital in the neighboring city taking 2 hours by their own car. However the baby got in CPA just on arrival and resuscitation was not successful.
Methods. Autopsy findings: The infant was normally developed (height 65 cm, body weight 6.5 kg). The heart had neither anomaly nor other macroscopic special findings. Microscopically, however, marked neutrophilic infiltration was found in biatrial endo-/myocardium, septal membrane, tricuspid and mitral valves, and in some parts of biventricular endocardium. Macro- and microscopically no special findings were observed in other organs
Results. Autopsy diagnosis: The cause of death was diagnosed as infectious endocarditis (IE).
Conclusions. IE is rare among children. In addition, according to the authors' knowledge, all of the reported cases of infantile IE are associated with congenital heart disease (CHD). We experienced a fatal case of an infant due to IE without CHD nor typical clinical symptoms, high fever, signs of heart failure, etc. IE should be taken into consideration as a differential diagnosis, in case only upper respiratory symptom or no fever was observed at the first consultation.

P 110
Blood nicotine detected in autopsy cases of infant and its socio-medical implication

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Introduction. The adverse effects of maternal smoking on the child health have been well documented. However, basic data on blood nicotine levels of fetus and infant that were exposed to tobacco smoke from their mother is inadequate.
Methods. We investigated 15 infants, and 68 adult habitual smokers as control subjects, which were autopsied 2002–2010. We used blood and muscle samples for analysis of nicotine and cotinine by GC-FTD.
Results. Of 15 infants, nicotine and/or cotinine was detected in six infants, where the mothers were smokers. The routes through which nicotine enters the infant's body were transplacental transfer in the prenatal period (3 cases), ingestion of breast milk (1 case) and inhalation of smoke (2 cases). In nicotine exposure via placenta, nicotine and cotinine levels were 10.6–84.4 ng/ml and 20.3–183 ng/ml in blood of two cases, and 43.9 ng/g and 308 ng/g in muscle of the remaining case, respectively. Nicotine and cotinine levels of blood in nicotine exposure via breast milk were 19.1 ng/ml and 87.1 ng/ml, and in smoke inhalation were zero ng/ml and 14.6–20.1 ng/ml, respectively. In 68 adult habitual smokers, the mean blood levels of nicotine and cotinine were 30.0 ng/ml and 247 ng/ml, respectively.
Conclusions. Our results seem to indicate that blood nicotine levels in fetus and infant where the mother is smoking are the same or higher than those in adult habitual smokers. Smoking circumstances of infants may affect their normal growth and induce various health disorders.

P 111
Mechanism of fracture in hyoid bone – analysis from post-mortem CT

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Introduction. A hyoid fracture is well known to be caused by cervical compression. It is found, in particular, in the case of manual strangulation. These are very important findings in forensic autopsy. However, it is difficult to determine a relationship between the position of fracture and the point of compression because that judgment is made after the preparation, which separates skin from subcutaneous tissue. There are few comments about the mechanism of a fracture in literature. These concern the neighborhood with cervical spine, which are considered anatomically important. PMCT(post-mortem CT) should provide additional information.
Methods. We analyzed 30 cases of suicidal hanging using CT images performed in Hamburg University in 2008–2009. We reconstructed three dimensional images from CT images to investigate hyoid fractures and noose marks.
Results. Among the cases, 7 showed hyoid fractures. Bleeding from fracture could not be seen in all the images. Some cases showed differences between the fracture point and position of compression by ligature.
Conclusions. We could confirm the fracture of a hyoid bone in 3D images reconstructed from CT. This observation confirms that some hyoid bones fractured not by direct, but indirect force.

P 112
Sudden death caused by chronic Chagas disease in Japan

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Introduction. Chagas disease remains prevalent in Latin America. The pathogenic parasite is *Trypanosoma cruzi*, which is transmitted to humans via blood-sucking assassin bugs. After the acute stage, the disease has been prolonged for years with gastro-intestinal symptoms caused by the megaesophagus and megacolon. Another complication of cardiomyopathy is often fatal. In the present report, a sudden death from chronic Chagas disease is demonstrated.
Methods. A 48-year-old Brazilian who had stayed in Japan collapsed unexpectedly at work. The male had been asymptomatic with a history of Chagas disease in his youth. A full autopsy was performed 18 hours after death. An indirect fluorescent antibody test (IFA) was performed for the serological examination. DNA from blood was amplified by PCR according to the method by Moser. After electrophoresis in agarose gels, DNA fragment was sequenced by direct sequencing.
Results. At gross examination, the heart, weighing 450 g, was dilated, accompanied by the loose and reddish left ventricular wall. The esophagus and large intestine were dilated. In histology, interstitial inflammatory infiltration was evident in the myocardium, in particular around the bilateral bundle branches. The esophagus showed muscular hypertrophy and lymphocyte infiltration. In IFA, specific IgG was positive up to a 640-fold dilution, but not IgM. The molecular amplification yielded the expected product of 188 bp that involved the satellite region of *T. cruzi* genome.
Conclusions. In this series of investigations, we concluded that the victim died suddenly of cardiomyopathy due to chronic Chagas disease over 20 years. The serological and molecular examinations were effective to prove the parasite infection. Japan is a non-epidemic country, but pathologists need to know the possible involvement of Chagas

disease among sudden unexpected deaths in the current globalized society.

P 113
Histopathological findings in correlation to the risk of sudden cardiac death following long-term intravenous drug abuse

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Introduction. Long-term intravenous drug abuse leads to well known and more or less severe inflammatory and/or toxic alterations of the myocardium. These alterations increase the risk of drug-associated sudden cardiac deaths independent from drug abuse.
Methods. From drug addicts dying after long-term intravenous drug abuse myocardial samples were taken from defined locations of the heart. The samples were investigated by routine-histology using hematoxylin-eosin staining and elastica van Gieson staining.
Results. Histopathological investigations reveal a broad spectrum of findings including perivascular an interstitial fibrosis, focal fibrosis of the endocard, focal fibrosis inside the myocardium and myocarditic alterations, which can be regarded as virus-induced, as allergic-anaphylactic with eosinophils or as slight simple inflammatory reaction in cases of e.g. viraemia due to hepatitis B or C.
Conclusions. Histopathological investigations are helpful to clarify the risk of sudden cardiac deaths even in cases of drug abuse and preexisting damages may allow to verify a higher disposition to develop sudden heart failure.

P 114
Fatal aconitine intoxication and thyroid storm?

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Introduction. An 18-year-old female was found dead in the bedroom of her father's apartment. At the death scene a glass containing a brown liquid with plant remnants was found. PMH showed that the woman had been suffering from depression and anorexia.
Methods. External inspection, autopsy and histology tests were performed. Laboratory tests and toxicological analysis for common legal and illicit drugs and finally targeted LC-MS/MS analysis were run. Plant remnants were classified morphologically by a botanist.
Results. On inspection the female's corpse did not show any signs of harm or physical violence. Autopsy findings were unspecific: signs of elevated intracranial pressure, lungs rich in edema and congested with blood were seen. Laboratory results indicated thyrotoxicosis factitia, a rare form of hyperthyroidism caused by misuse of thyroid hormones. Toxicological analysis revealed high concentrations of aconitine, the major active compound of Aconitum napellus, Europe's most toxic plant, in all specimens and the brown liquid on site. Plant remnants were classified as leaves of Aconitum napellus ssp. hians in the botanical appraisal.
Conclusions. No evidence for third party fault could be found on external inspection or in autopsy. Due to frequent association of misuse of thyroid hormones in eating disorders and due to the patient's PMH of anorexia thyroid hormone levels were analyzed and showed specific findings for thyrotoxicosis factitia, a condition eventually leading to thyroid storm. Aconitine was detected in lethal concentration in all specimens. Therefore the aconitine intoxication establishes the cause of death.

P 115
Size of exit wound

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Introduction. Exit wounds are typically slit-shaped or stellate, can usually be approximated and are very variable in size.
Methods. Experimental studies using compound models show the influence of the exit plane (with the respective diameter of the temporary cavitation) on the size of the exit wound.
Results. If the exit plane is localized within the "narrow channel", even high-energy projectiles produce only small exit wounds. If the exit plane is in the area of the maximum cavitation, the skin tears (caused by overstretching) at the exit wound are considerably longer.

P 116
A case of acute myocardial infarction in a young female with hyperthyroidism

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Introduction. Thyreotoxicosis is well known as the cause of sudden unexpected death. Here, we report a case of acute myocardial infarction in a young female with untreated hyperthyroidism.
Methods. Case profile: A 25-year-old female consulted a neighbor clinic, because of her pericardial pain. Although there were no significant findings in both electrocardiogram and blood chemistry, she was medicated with analgesics. One and half hours later she suddenly suffered cardiopulmonary arrest. Although, she had suffered from hyperthyroidism, she never consulted her physician for the past two years.
Results. Autopsy findings: There were no severe injuries leading to death. The heart weighed 300 g, and there were 500 ml of dark-reddish intracardiac blood with no soft hemocoagula. Myocardial fibrosis could be faintly observed at the anterior wall of the left ventricle. The thyroid gland (57.6 g) was diffusely enlarged. Histopathological findings: In the heart, contraction band necrosis indicating fresh ischemic heart attack could be also seen on the interventricular septum. The anterior interventricular and diagonal branch of the left coronary artery were significantly stenosed due to intimal thickening. In the thyroid gland, follicles were irregular in size, indicating a typical pattern of hyperthyroidism. Post-mortem endocrinological analyses: Thyroid function was examined as follows: T_3; 6.65 ng/dl (0.70~1.76), free-T_3; 10.5 pg/dl (2.2~4.1), T_4; 11.1 µg/dl (4.8~10.5), free-T_4; 1.89 ng/dl (0.88~1.81), and TSH: <0.03 µU/ml (0.35~3.73).
Conclusions. The cause of her death was diagnosed as acute myocardial infarction associated with hyperthyroidism.

P 117
Fatal colchicine poisoning due to accidental uptake of meadow saffron (*Colchicum autumnale*)

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Introduction. Colchicine, the alkaloid of meadow saffron (*Colchicum autumnale*) has been used for centuries in the treatment of gout. However, poisoning cases of colchicine sometimes occur accidentally. Here, we report a fatal case of colchicine poisoning due to accidental uptake of meadow saffron (*Colchicum autumna*).
Methods. Case profile: A 69-year-old male suffered from severe diarrhea and vomiting. Three day later, those symptoms were severely

aggravated, and he was hospitalized in our university hospital. Blood chemical analyses indicated the presence of DIC (disseminated intravascular coagulation), as evidenced by elevated plasma FDP and D-dimer, and decreased platelet counts. In spite of intensive care, he died due to multiple organ failure two days after admission. At that time, the cause of his death was unknown. According to his wife, he had eaten meadow saffron (*Colchicum autumnale*) by mistake.
Results. Autopsy findings and toxicological analyses: There were lots of subcutaneous and petechial hemorrhages in the body. Internally, subepicardial and subendocardial bleeding was noted. However, there were no pathological lesions in any other organs. The colchicine concentration of blood was measured to be 6 ng/ml by high pressure liquid chromatography and UV-detection.
Conclusions. The cause of death was diagnosed as acute colchicine poisoning due to accidental uptake of meadow saffron (*Colchicum autumnale*).

P 118
Autopsy case of butane gas abuse

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Introduction. The n-butane is a low molecular weight aliphatic hydrocarbon. In case of fatalities by butane inhalation, the cause of death may be due to asphyxia, vagal inhibition, respiratory depression or cardiac arrythmia. We present here two cases of fatal butane gas inhalation.
Methods. Case 1: A young female suddenly collapsed after getting out of her friend's car. Three empty gas containers were found near her seat by the authorities. The autopsy showed severe congestion of the lungs. Histological examination revealed a large number of lipofuscin deposits around the nucleus of the myocardium. Drug screening test was negative and no ethanol was detected. The concentration of n-butane in the victim's femoral blood was 6.8 µl/ml.
Case 2: A female in her thirties was found dead in her bed, holding a vinyl bag in her hand. Empty fuel gas containers were found near her. The autopsy revealed severe congestion of the lungs. Drug screening test were positive for benzodiazepines and barbiturates. The concentration of n-butane in the femoral blood was 10.5 µl/ml and psychotropic drugs within a therapeutic range were also detected.
Conclusions. The n-butane concentrations in these two cases were within the range of previously reported fatal cases of n-butane poisoning (0.11–15.8 µl/ml). From the autopsy findings and the results of the toxicological examinations, we conclude that the cause of death in both cases were n-butane poisoning.

P 119
Atypical gun shot wound

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Introduction. There is a wide range of atypical gun shot wounds caused by both various firearms and mishandling of the weapon.
Methods. We report a case of a 21-year-old man who shot himself in the chest during a suicide attempt.
Results. Through an unknown mechanism, the spring from within the firearm was hit by the bullet and pulled through the entry point on the body and into the left thoracic cavity. The projectile destroyed the 3rd left rib, pierced pericardium, left ventricle, diaphragm, fundus of the stomach, spleen, both lobes of the left lung, and became lodged in the left musculus latissimus dorsi. The tip of the projectile showed indentations matching the front end of the spring demonstrating that the bullet caught the spring as it was fired from the barrel. It could not be determined whether this was due to a defective firearm or mishandling of the firearm. Surprisingly, the man was able to walk about five meters and communicate that he had shot himself before he collapsed and died.
Conclusions. Given his actions after rupturing his left ventricle and pericardium, we need to reconsider the amount of time one is capable of action after receiving such extensive injuries.

P 120
Application of oximeter AVOX 4000 in the forensic practice

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Introduction. We investigated the application of AVOX 4000 (AVOX), a portable oximeter in the forensic practice, for the measurement of carboxyhemoglobin saturation (%COHb), oxygen saturation (sO_2) and oxyhemoglobin saturation ($\%O_2Hb$).
Methods. Blood samples were obtained from forensic autopsy cases at the Department of Forensic Medicine, Kagawa University. In seventy autopsies, including cases of fire-related deaths, carbon monoxide poisoning, hypothermia, trauma, natural death and drowning. Blood samples were collected from the left heart chamber, right heart chamber and femoral vein in each case. The values of %COHb, sO_2 and $\%O_2Hb$ were measured using AVOX according to the manufactures instruction. The %COHb was also measured by conventional spectrophotometer. The post-mortem interval ranged from about 12 hours to 7 days.
Results. In fire-related death and carbon monoxide poisoning cases, there was a good correlation between the values obtained by AVOX and by the conventional method, within the range of 10–75% of %COHb. When the conventional method indicated values over 75%, AVOX indicated ">75%" in all cases. In hypothermia case, the value of sO_2 in left heart blood is greater than that of right heart blood, and the sO_2 value in left heart blood is over 40% in most cases.
Conclusions. The values of %COHb, sO_2 and $\%O_2Hb$ can be easily measured using the AVOX. The device is useful and suitable in forensic practice, because there are many advantages such as its portability, no necessity of sample preparation, easy handling of small samples, in comparison with conventional methods.

P 121
Examples of bite marks in children

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Introduction. Bite marks are commonly described as oval or crescent-shaped haematoma or bruising. Due to the curved body surface and the elasticity of the skin injuries show frequently an atypical shape.
Methods. Among our collective of injured persons are several bite marks in children. The bitten children were of different age and the injuries in various locations.
Results. The age-dependent variation of bite marks is shown and substantiates the diagnostic difficulties.

P 122
Illicit drug detection covered by excessive alcohol consumption regarding juveniles offending § 24a StVG during the period of July to December 2010

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Introduction. According to the statistical review of 2009 performed by the statistical federal office of Germany, Mecklenburg-Vorpommern takes the lead in traffic accidents. In fact the young population up to 25 years seems to play a significant role under the influence of alcohol. The question arising is the extent of uncovered illicit drug consumers because of the prominent alcoholisation.
Methods. In the period of July to December 2010, 1274 samples incurred the institute of Legal medicine Greifswald. From these samples, 271 (27.2%) stem from juveniles up to 25 years and showed no indication for drugs of abuse. Out of these samples with an average blood alcohol concentration of 1.56‰, several were tested positive regarding drugs of abuse underlying § 24 a StVG. Two immunoassays, the MTP-EIA as well as the MGC 240 were used as pre-tests. As a confirmation method GC-MS was used.
Results. 17% were qualitatively tested positive for Cannabis, approximately 9% for amphetamines and almost 2% for opiates and cocaine. A quantitative confirmation is still remaining to be conducted.
Conclusions. As a matter of fact a significant number of traffic accidents result from both alcohol and drug abuse. Consequently it has to be focused on the detection of illicit drugs, especially in case of high alcohol consumption.

P 123
No punishment for child abuse?

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Introduction. We reported about child abuse.
Methods. In the two year study period, we collected data on 48 cases of initial suspicion of child abuse or child neglect which were examined jointly by the Institute of Legal Medicine and the University Children's Hospital's sociomedical outpatient department.
Results. The study showed that male and younger children were significantly more affected. Only in a few cases, clinical and forensic examinations were able to remove the suspicion that the child had been abused. Three children, for instance, were found to suffer from a hitherto undiagnosed coagulation disorder which had to be included into the evaluation of these cases. We found, however, no undiagnosed metabolic diseases. Approximately one third of all cases involved fractures of the bone and/or injuries to organs. The Department of Public Prosecution was asked to provide access to the files in any cases that had been reported to the police. It was highly noticeable that in several of the investigations or criminal proceedings the charges had been dropped despite the fact that the children had suffered serious, sometimes even life threatening injuries. This was mainly due to an inability to identify the abuser with the required certainty.
Conclusions. Psychosocial intervention to ensure the child's wellbeing is, besides criminal prosecution, an essential component of case management. Social Services had been involved in approximately 90% of suspicious cases. For this reason, the study also included the follow-up measures taken by Social Services and the outcome of custody proceedings.

P 124
Distinction between natural and suspicious criminal deaths in the bathroom in a five year period in Szeged (Hungary)

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Introduction. There are three types of autopsies in Hungary: anatomical, clinical, and medico-legal (forensic). Medicolegal autopsies can be divided into non-criminal deaths (accidents, suicides, sudden natural causes, medical treatment, etc.) and suspicious criminal deaths. Death in the bathroom is a complicated form of home accidents. There is a need to distinguish between a real accidental death and homicide.
Methods. We analysed 2246 autopsies in our Department in this five year period (2005–2009). There were 44 cases (1.95% of all autopsies) of sudden deaths in the bathroom.
Results. Natural death were proved in 25 (56.8%), while unnatural death in 18 (40.9%) cases. Among unnatural deaths 8 suicide cases (4 hanging, 1 immersion in water, 1 electric shock, and 2 drug poisonings), two accidental electric shocks, 3 suffocations, one death by blunt force (fall), 2 scalds, and 2 carbon-monoxide poisonings were found. The cause of death was unknown in 1 case (2.3%).
Conclusions. In 6 cases taking a difference between homicide and suicide was possible only on the basis of documents of police investigation. In this respect the most difficult cases were the deaths caused by electric shock.

P 125
Sudden death caused by spotty amyloidosis of cardiac conduction system case report

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Introduction. Sudden unexpected death is a frequent challenge for a forensic pathologist. In this paper we present spotty amyloidosis surrounded by fibrosis impinging on the conduction system, which probably caused death.
Methods. Case report: An 80-year-old woman was found dead at home. She had a history of diabetes for more than 30 years and due to two hip fractures she was bedridden for 6 years. 3 years prior to death she underwent midfemoral amputation for gangrene.
Results. Post-mortem examination at the home of the deceased revealed a minimum sacral bedsore, post-mortem hypostasis and no rigor. The autopsy revealed diabetic nephropathy, old ischemic brain infarctions, myocardial hypertrophy and generalized atherosclerosis, but no significant stenoses of the coronary arteries. Toxicology and post-mortem biochemistry were non conclusive. Histological examination revealed massive spotty reddish deposits surrounded by fibrosis in the area of atrial septum and central fibrous body impinging on atrioventricular node. Additional stainings identified these deposits as amyloid. No significant amyloid deposits were found in other parts of the heart. No acute ischemic lesions were found in the myocardium.
Conclusions. Cardiovascular amyloidosis is well known in the clinical practice but rarely diagnosed in forensic autopsies. Usual clinical presentation of cardiac amyloidosis is restrictive cardiomyopathy, occasionally with conduction system disease. The autopsy in the presented case revealed the latter – spotty amyloid deposits surrounded by fibrosis affecting cardiac conduction system. Since no acute ischemic lesions of the myocardium were found, we concluded that cardiac arrhythmia due to spotty amyloidosis impinging on the cardiac conduction system was the most probable cause of death.

P 126
Toward the establishment of a medical-related death notification system and a neutral professional organization in Japan – to resolve (avoid) the conflict between patients and healthcare workers/institutions

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Introduction. Although opinions have been considerably variable, medical-related death means a death caused by some kind of inappropriate medical intervention. Because of the uncertainty of definition of the case, dealing with medical-related death is not good enough in Japan. We consider that it is necessary to establish well-considered neutral systems to deal with conflicts and/ or miscommunications between patients and medical professionals. The objective of this presentation is to compare the medical conflict resolution systems in Western countries from the point of view of applicability to medical practice in Japan, and to illustrate how to establish a desirable systems.
Methods. Comparing systems in Japan with in other Western countries, for example, Medical Malpractice Screening Panels in USA, National Patient Safety Agency (NASPA) in UK and mediation committees (Schlichtungsstellen) in Germany, we revealed and pointed out the advantage and/ or the controversial aspects in each system. For the same purpose, furthermore, we reviewed actual cases reported not only in Japan but also in other countries.
Results. We found that the Japanese system under consideration is close to the German system when compared how to deal with medical-related death cases in each country. However, there are many differences in medical systems and public awareness between the two countries, so it would appear that we must establish an original system in Japan by using appropriate examples of the German systems.
Conclusions. It is necessary that eligible neutral professionals should actively cooperate on assessments of medical-related death rather than continuing to depend on existing Japanese legal process.

P 127
Three bomb disposal experts killed by World War II bomb

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Introduction. During World War II the Allies dropped 1.9 million tons of bombs onto Germany of which an estimated 95,000 to 285,000 tons are unexploded. This results in a disposal of more than 2000 tons of air bombs and other kinds of munitions annually in Germany. However, fatalities are a rare incidence and to our knowledge little has been published on this issue.
Methods. A USA semi-armour-piercing (SAP) 1000 pound bomb with an estimated total weight of 450 kg and an averaged amount of 148 kg of TNT or Amatol was prepared for demining by a team of bomb disposal experts. During the dislocation of the bomb an explosion occurred. Three members of the disposal team standing within a close circumference were killed and further were injured. Autopsy was performed to identify the corpses and to diagnose the cause of death. Furthermore the circumstances of the detonation were analysed by a bomb disposal expert.
Results. The SAP bomb was provided with a chemical long-delay booby-trapped fuse with a maximal 144 h attempted withdrawal. Due to the detected signs of destruction the detonation velocity was estimated to 1000 m/s. All three deceased sustained massive multiple trauma as cause of death with major head injuries. They further presented signs of blunt trauma, as well as penetrating injuries including amputations and burns. Identification of the bodies was positively achieved.
Conclusions. Although military action has been absent in Germany for more than 65 years now, its inhabitants still have to face imminent dangers due to unexploded ordnance. Therefore forensic scientists will be confronted with identification, diagnosis of death and reconstruction of detonation incidences in future.

P 128
Atypical close-range gunshot wound with extensive powder tattooing

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Introduction. In the case of handguns, powder tattooing usually occurs when the muzzle-target distance exceeds 10 mm. The presence of powder tattooing is essential for the classification of an intermediate range gunshot wound. The extent and the intensity of powder tattooing predominantly depends on the type of gun powder and the character of the used firearm. Extensive powder tattooing can be due to a number of ballistic reasons, such as the use of an ammunition with magnum gun powder load, the use of a black powder gun, the use of a gun with exceedingly short barrel, or a weapon without barrel. In certain cases pseudo-powder stippling could be misinterpreted as a vast powder tattooing. A gunshot suicide from self-fabricated single shot handgun is presented. Due to highly unusual combination of circumstances an extraordinary extensive powder tattooing was present around the perforation site of the gunshot wound.
Methods. In a family house in the basement garage, a dead body of a 59-year-old male was found. The dead body was situated at the rear of the garage in the sitting position in the cushioned chair. An external examination and autopsy of the victim's body uncovered an entrance gunshot wound in the right temporal region. The entrance wound defect of the skin had a circular-shaped character with proportions of 1.2×1 cm. In the vicinity of the entrance wound defect, numerous small skin abrasions and minor lacerations were found in the area of 5×6 cm together with soot deposition. Towards the periphery an extraordinary extensive zone of powder tattooing of 15 cm in the width was situated. There was no soot deposition within wound track and at underlying bone surface. In the left occipital region the exit gunshot wound was identified in the form of an irregular star-shaped laceration with a diameter of 4 cm.
Results. The weapon consisted of a grip containing a welded up breech with a bed for the cartridge case bottom and a gap for the primer. A simple firing mechanism based on a geared trigger which was attached rotationally to the grip. The gun barrel was formed by a 102 mm long steal tube with a diameter of 22 mm; the bore was smooth and consisted of a tubular cartridge chamber with a diameter of 11 mm and 28 mm of length and with a guiding bore of 8,8 mm in diameter and 74 mm of length. The gun barrel was attached rotationally to the grip by a screw, hexagonal nut and a welded up steal pole of a circular diameter. The weapon's capability for shooting projectiles of the caliber 7,62×39 was tested by a test firing. The diameter of the gun barrel bore was larger than the diameter of the used projectile, in consequence of which, at shooting, the powder gases flowed around the projectile followed by a blast of the fire and powder particles, as revealed during the test shooting.
Conclusions. The atypical external wound morphology was caused by highly uncommon combination of circumstances: self-constructed firearm was used, the projectile diameter was smaller than the inside diameter of the barrel of the used firing system, the absence of the rifling in the barrel bore, but also by a larger volume of the gun powder load of the used ammunition, as well as by an inadequate length of the firing system's barrel, regarding the ballistic performance of the used ammunition. A self-made gunshot device could cause complica-

tions for professionals examining the crime scene and investigating the body. Such weapon itself might be overlooked during the initial search or, if observed, not given much consideration due to its innocuous appearance. In addition, the atypical appearance of the entrance wound, which could be expected with the use of a self-fabricated gunshot device, might cause the wound to be mistaken for a laceration/contusion type wound, burn or stab wound.

P 129
Sudden death of a 61-year-old woman with arteriovenous malformation

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Introduction. Arteriovenous malformations (AVM) are abnormal connections between veins and arteries with no regular intervening capillary bed. They are rare and can appear in various parts of the body. Often they are found in the frontal temporal or parietal lobe of the brain. The surrounding brain tissue is often thickened, functionless or even absent.
Methods. A 61-year-old woman was found dead in her bed by her husband. It was known that she had hypertension, hypercholesterolemia and had undergone mammarial ablation on both sides because of an invasive ductal carcinoma of the left breast. The treating doctor signed the cause of death as "unknown" since the anamnesis could not explain the death.
Results. The autopsy of the 61-year-old woman showed an arteriovenous malformation in the area of the right occipital lobe. Rupture of this vascular anomaly led to bleeding with connection to the cerebral ventricles.
Conclusions. Symptoms of arteriovenous malformations can include epileptic seizures, focal-neurological deficits, pulsatile tinnitus and headaches. Since there are also asymptomatic arteriovenous malformations, like in this case, they can lead to sudden death.

P 130
Expression of dopamine transporter in the different cerebral regions of methamphetamine dependent rats

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Introduction. To observe the expression of the dopamine transporter(DAT) in six cerebral regions of rat methamphetamine (METH) dependent model, which were frontal cortex nucleus accumbens septi, striatum, hippocampus, substantia nigra and ventral tegmental area. The relationship between the expression of DAT and the mechanism of methamphetamine dependence is discussed.
Methods. To rats 10 mg/kg of METH were administrated i.p. continuously over 10 days, then the behavior changes of animals were measured via the score of stereotyped behavior (SB) and conditioned place preference (CPP) to affirming the animals were addicted. Subsequently, the animals were injected with METH during one week, 2, 4 and 8 weeks, respectively, to establish different periods of the METH dependent model. The expressions of the DAT in six regions were detected by the methods of immunochemistry, in situ hybridization, reverse transcription PCR and Western blotting.
Results. Compared with the control group, the results of stereotyped behaviors and CPP were significantly different in all four experimental groups($p<0.05$). The expression of DAT showed dynamic changes in the same cerebral region. Compared to the six different regions in the same experimental group, DAT exhibited also significant differences in several cerebral regions ($p<0.05$).
Conclusions. The DAT expression was different in the six cerebral regions at the same time period and different time periods in the same region. The DAT may play a crucial role in the neuromechanism of METH dependence.
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P 131
Regulation of research on cadavers, human tissues and cells in Belarus: how does it impact the development of research in forensic medicine?

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Introduction. It has long been recognized that research on cadavers, human tissues and cells is the main tool for advancement in forensic medicine. However, at the moment, those types of research have to comply with different regulations, introducing limitations related to consent of donors, confidentiality protection and ethical approval. Despite growing attention paid to these issues in Western Europe, little is known about current state of the problem in the Central and Eastern Europe and, particularly, in Belarus. The objective of the study was to examine how the legal and regulatory framework for research on cadavers, human tissues and cells in Belarus impact the development of research in forensic medicine.
Methods. An analysis of Belarusian legal and regulatory documents has been performed with special emphasis on how issues of obtaining consent, confidentiality protection and authorization are addressed.
Results. Although there is no specific regulation in Belarus with regard to the research on cadavers and cadaveric biological materials, a number of national legal acts and regulatory documents contain provisions addressing issues of consent, personal data protection and authorization of research involving biological materials from dead persons. However, these provisions are far less stringent than those in most of European and other international documents relevant to the issue.
Conclusions. Existing regulation of research on cadavers, human tissues and cells in Belarus is quite supportive for the development of research in national forensic medicine, but could give rise to problems when it comes to international cooperation.

P 132
Incidence and characteristics of multiple deaths cases in acute carbon monoxide poisoning

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Introduction. Aim: this study wanted to determine the incidence and the particular aspects of cases of multiple deaths by carbon monoxide poisoning.
Methods. We conducted a retrospective study of forensic autopsies performed at the Institute of Legal Medicine Timisoara over a period of five years (2006–2010). From a total of 44 deaths due to carbon monoxide poisoning three cases are reported.
Results. In the first case, two people from the countryside, LM, male, 67 years old and LM, female, 63 years old, husband and wife, both were

found dead at home on 31.01.2006. In the second case, two people from the countryside, CC, male, 23 years old and VMR, female, 20 years old, both were found dead at home on 31.03.2008. In the third case, two children from the countryside, MPA, male, 3 years old and MA, female, 5 years old, both were found dead at home on 17.03.2009.
Conclusions. During the studied period we noticed the presence of three cases with multiple deaths, three male and three women, aged between 3 and 67 years, from the countryside, death occurred during the cold season of the year. In all cases we noticed close values of COHb (carboxihemoglobine; 90% COHb and 96%COHb; 68%COHb and 73% COHb, 73% COHb and 78% COHb).

P 133
Other forms of CAN syndrome (child abuse and neglect syndrome)

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Introduction. In Czech Republic, various unusual forms of child abuse can be seen lately as a result of an alternative lifestyle of parents.
Methods. Educated vegetarian parents performed childbirth at home and the child had no medical attention throughout childhood. It suffered from cow's milk intolerance which was treated in alternative way by a healer and severe protein deficiency developed. Cause of death was Kwashiorkor-like syndrome.
Results. Educated vegetarian parents kept their child out of sun in fear of reproducing grandparent's death of melanoblastoma. The child did not get any vitamine D until it was 3 years old and then severe acute rickets was diagnosed.
Conclusions. Courses for parents and their children need to be organized. "Flying with child ", i.e. the result of spinning infants and toddlers, violent forces are considered to be the cause of trauma to the head.

P 134
Post-mortem evaluation of cardiac, renal, and pulmonary morphology in sudden arrhythmic death syndrome (SADS)

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Introduction. In 1–5% of all sudden deaths an identifiable cause is not found and they are classified as sudden arrhythmic death syndrome. It includes a series of clinical entities like Brugada syndromes, congenital long QT syndrome, Wolff-Parkinson-White syndrome, idiopathic ventricular fibrillation, or coronary artery spasm, all with unidentifiable morphological pathologies during routine autopsy practice. The purpose of this study is to analyze the basic morphological characteristics of the heart, kidney and lungs in sudden arrhythmic death syndrome.
Methods. A total number of 89 cases of sudden deaths without an objective cause of death were selected and divided into two groups - one with minor cardiac morphological changes and one with normal heart morphology and histology. Heart, lung, liver and kidney samples were taken and analyzed histologically using a semi quantitative scoring system.
Results. SADS is associated with increased lung fibrosis and epicardial lipomatosis. Significant correlations were found between cardiac and pulmonary stasis, cardiac stasis and pulmonary fibrosis, renal fibrosis and pulmonary fibrosis.
Conclusions. In the pathogenesis of SADS a possible involvement of the renin-angiotensin system is hypothesized. More studies are currently in progress to analyze this hypothesis.

P 135
Accidental postitonal asphyxia in children

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Introduction. Positional asphyxia is one of the leading causes of deaths in infancy, childhood, and adolescence in western countries. Children are particularly endangered by a variety of hazardous situations with an increased risk of fatal accidents. Risk factors may be low physical resistance, relative immobility of infants, childish curiosity, or the neglect of duty of supervision.
Methods. We analysed autopsy and death scene examination records from 1988 to 2011 of the Department of Legal Medicine in Hamburg. All recorded cases of unexpected death in children (aged birth to 16 years) due to accidental positional asphyxia were reviewed. Suspected cases of sudden infant death syndrome (SIDS) or cases of co-sleeping in a bed with an adult were excluded.
Results. The total occurrence of accidental positional asphyxia in children presented was low (about one case per year). Most of the cases were previously healthy children of all age-groups with a maximum in infants. The circumstances of death included unsafe sleeping environment (mainly in younger children) and unsafe playing environment (mainly in older children). Most of the cases occurred in domestic surroundings.
Conclusions. Deaths by accidental positional asphyxia are rare and effect children of all ages. The circumstances of death are often preventable. The forensic pathologist can help to identify specific hazards and thereby help to prevent fatal accidents. Death scene reconstruction is of particular importance, as autopsy findings in accidental positional asphyxia are often discreet or nonspecific and can mimic those of SIDS.

P 136
Vital reaction (blood infiltrate) a possible hint of succession of fatale traumatic lesions – case presentation

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Introduction. Often, in the forensic expertise process, it is necessary to differentiate lesions produced during life from those produced after death. The identification of vital reaction is important for: if lesion was produced during life or after death, the age/timing of the lesions, finding the lesions done for hiding the real cause of death.
Purpose. The purpose of this study is to show the importance of vital reaction.
Methods. Death cases with stabbed wounds from IML Timisoara from 2009 to 2011 were studied.
Results. The traumatic lesions may be produced before death and they have a strong vital reaction. Lesions produced during agonal period have a weak vital reaction and lesions produced after death have no vital reaction.
Case presentation.

1. 65-year-old male, violent death. The lesion that produced death was a stabbed wound through the heart. Numerous wounds produced before and after death were identified. The body was cut in pieces. Solving this case required identification timing of the lesions, before or after death because two persons were involved as culprits.

2. Male hip, identified to be approximately 41-year-old. Case of death is unknown. Solving this case required identification of vital reaction in lesions and timing of these lesions.
3. Male, 74-year-old, victim of an aggression. Incised wound of the carotid artery caused the death. There were several stabbed and incised wounds produced before and after death.

Microscopic examination of the soft tissues from the wounds showed the presence of blood infiltrate whose degree correlates with the age of the lesions.

Conclusions. The study shows the importance of identification and grading of the blood infiltrate as a hint for timing of the lesions that produced death.

P 137
Analysis of collisions involving bicycles and motorcycles – impact position and severity of injuries

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Introduction. The aim of this retrospective study is to explore the relationship between collision type, speed of motorcycle/bicycle and other involved vehicles, and severity of sustained injuries measured on the injury severity score (ISS) and revised trauma score (RTS).

Methods. A total of 48 cases of collisions were analysed, involving bicycles/motorcycles which collided with other vehicles. From medical records and autopsy findings ISS was calculated. Collision reconstruction was performed from accident reports, from evaluation of technical details.

Results. Most of the analysed cases were collisions of bicycles/motorcycles with automobiles (77.1%), and the rest of cases comprises collisions with trucks (8.3%), vans (4.2%), tractors (4.2%), two cases were collisions with a bus or with an another motorcycle. In 59.2% cases there was a frontal impact (angles ranging 315–45°), rear impact in 22.4% of collisions (angles ranging 135°–225°) and lateral in 18.4% (angles ranging 45°–135° and 225°–315°). The values of ISS ranged from 5 to 75, while RTS rang was 0–7.841. Out of total 48 cyclists/motorcyclists – 60.4% survived the initial injuries with an outliving period ranging from 1 to 64 days. The cause of death was in more than half of cases (54.2%) due to isolated craniocerebral trauma, which was in additional 10.4% of cases combined with haemorrhagic shock as cause of death.

Conclusions. This study puts forward interdisciplinary collaboration in analysis of bicycle or motorcycle accident investigation, both for medical and technical purposes. The data presented on the nature and severity of injuries sustained may assist with planning and prevention strategies.

P 138
Complication of surgery for inverted papilloma – lethal intracranial bleeding from the internal carotid artery

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Introduction. Inverted papillomas are primarily benign tumors. They must be removed surgically because of the high recurrence rate, the risk of destructive growth and malignant degeneration. The incidence of these tumors is 0.2–0.6/100,000 patients per year.

Methods. Presented is the case of a 77-year-old woman with inverted papilloma. During the endoscopic excision of the nasal tumor haemorrhage in the area of the sphenoid sinus occurred. With a nasal tampon the bleeding stopped, but five days after surgery, the patient died due to a brainstem impaction with space-occupying subdural haemorrhage.

Results. At forensic autopsy, damage of the sphenoid wall and the internal carotid artery in the carotid canal with consequent subdural haematoma was found.

Conclusions. Lethal complications as a result of arterial injury due to endonasal endoscopic surgical procedures are rare. The success of endoscopic surgery depends at a high rate on the skills and experience of the surgeon, the anatomy and the underlying disease. Due to increasing experience in practice, endonasal endoscopic surgical procedures offer a good alternative to open traditional surgical procedures.

P 139
Gerichtsmedizinische und Geschichtliche Betrachtungen zum „Grab des Musikers" aus Daphne, Vorort von Athen, Attika Griechenland

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Einleitung. Im Jahre 1981 wurden bei Bauarbeiten im Vorort Daphne etwa 4 km südöstlich vom Zentrum Athens zwei antike Gräber entdeckt. Im einen von denen neben den knöchernen Menschenreste wurden Gegenstände d. h. Grabbeigaben gefunden, die darauf verweisen, dass der Tote ein Musiker war. So wurde dieses Grab als „Grab des Musikers" bezeichnet. Die Befunde sind von großer Bedeutung für die Archäologie und die Geschichte der Musik. Prof. Egert Poehlmann, Erlangen, bemerkte, dass auf der Skizze der Ausgrabung dem Skelett der Kopf und die HWS fehlten und hat den Verfasser dieses Berichtes eingeladen, dazu Stellung zu nehmen.

Methoden. Ein Algorithmus wird erstellt, um aus der Gesamtheit der möglichen Erklärungen für das Verschwinden des Schädels und der HWS diejenige zu erhalten die plausibler scheint. Diese ist dass die Post-mortem-Entfernung des Kopfes. Dabei wird der Fall mit den wichtigsten historisch dokumentierten Fällen von Post-mortem-Enthauptungen verglichen, die gesammelt und vorgestellt werden.

Ergebnisse. Die Meinung des Verfassers ist, dass der Kopf des Musikers aus rituellen Gründen nach seinem Tode entfernt wurde. Der gerichtsmedizinische und geschichtliche Gedankengang, der zu diesem Schluss per exclusionem geführt hat, wird erläutert.

Schlussfolgerung. Wenn es sich hier um eine rituelle Post-mortem-Enthauptung handelt, dann liegt eine Verknüpfung mit dem orphischen Kult nahe.

P 140
Unresolved homicides in Montenegro in the new century (autopsy material)

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Introduction. In Montenegro, unfortunately, homicides still represent very common forensic work. Although the law prohibits possession of firearms, citizens of Montenegro obviously still own large number of hand guns and revolvers. Unlike suicides, in Montenegro, all homicide victims undergo autopsy. The aim of the study is to present data considering unresolved homicides with purpose of preventing.

Methods. Autopsy material of homicide victims on the territory of Montenegro 2001–2010.

Results. Based on autopsy material, in a given time period, there were 224 homicides, of which 19 (8,48%) remained unresolved until today. The highest number was in 2001 and 2009, 5 in both years (26.32%). Out of this 19 victims, 2 (10.52%) were male newborns. From the rest, there were 15 (88.24%) male, average age of victims was 35.47, married (50.00%), with secondary school education (75.00%) . By hand guns were murdered 14 (82.35%) of adult victims, 1 (5.88%) with a knife and 1 (5.88%) died of blunt force trauma. In most cases killers were shooting from distance (92.86%), with more than one shot (71.43%), in the

head and back (92.86%), and in the night hours (75%) . Under influence of alcohol was 1 victim (5.25%). The highest percentage of unresolved homicides took place in capital Podgorica (36.83%).
Conclusions. According to data provided by the Ministry of Internal Affairs, none of these cases is being neglected and there are still ongoing investigations. Despite introducing modern forensic techniques, there is no significant decline in number of unresolved homicides.

P 141
Homicide by smothering covered as a plastic-bag suicide

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Introduction. Asphyxial death can sometimes be a complicated subject and physical evidence plays in many cases a critical role in forensic decisions to set the case as homicide or suicide. The approach to all the elements of the scene (environment; human corpse; biological traces) should be objective, rational, meticulous and thoughtful, because some evidence may become relevant in a second time.
Methods. A woman aged 45, was found lying death in bed by her 10 y.o. son with her head enclosed in a plastic bag, loosely tightened round her neck by 2 yellow rubber elastic bands. The crime scene appears immediately complex and therefore the police officer decided the complete video and audio recording of all the crime scene examination. Numerous recent hematomas at the upper limbs, some slight fresh bruising on the face, especially around the mouth and at the upper lips mucosa, were found. Under the bed three small sheets of different plastic bags were found. On one of this plastic sheet a brownish smear was visible, a quick test confirms it as a blood smear. The husband reported a violent discussion with his wife the night before, therefore he slept alone upstairs on a coach, being wakened only in the morning by the shouting of his son.
Results. External examinations confirms recent numerous hematomas at the upper limbs and fresh bruising on the face and around the mouth area with bruising and ecchymoses of the upper lips mucosa outlining the profile of the irregular incisive tooth. Autopsy and laboratory findings were characterized only by some aspecific elements - pleural petechial hemorrhages, pulmonary and cerebral edema – and negative toxicological findings.
Conclusions. In this case the autopsy features were subtle, but the signs at external examinations were clearly not compatible with a classic suicidal plastic bag suffocation. Forensic examination of the crime scene has played an important role in bringing criminal investigations to coherent conclusions. At the end of the trial all elements brought to interpret the case as a premeditated murder committed by the husband and covered on purpose as a suicide in a depressed woman worn out from the recent discovering of her husband's infidelity.

P 142
Homicide discovered by pre-cremation post-mortem external examination

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Introduction. A post-mortem external examination at the crematorium is not only the last opportunity to resolve ambiguities with regard to cause and manner of death, but also to detect possible cases of homicide or other violent or other external causes of death. Legal regulations in Mecklenburg-Western Pommerania require the second post-mortem examination prior to cremation to be conducted by a forensic pathologist. When inspecting the post-mortem examinations carried out at our institute, it becomes apparent that there are several reasons which might stop the usual course of a scheduled cremation.
Methods. The documents of all second post-mortem external examinations, which stopped a scheduled cremation, we examined and evaluated.
Results. In approximately 2–6% of all cases we found irregularities which initially stopped the course of the cremation. In many cases the manner of death documented on the death certificate was incorrect. In other cases the body showed signs of trauma which had not been detected at the first post-mortem external examination or which had not been taken into account when the manner of death was determined. One case showed that a 67-year-old woman had been the victim of a homicide that had been overlooked at the first post-mortem examination. Substantial injuries to the face and neck and intensive petechial bleedings had not been detected.
Conclusions. The physician conducting a external post-mortem examination should carefully examine the undressed body including all orifices. Documenting the manner of death requires the same degree of care. Both procedures are possible sources of error. The quality of the first, mandatory post-mortem external examination we investigated, which were carried out by physicians, differed widely. In 2–6% of all cases there was further need for investigations. In one case a homicide was overlooked. Therefore the pre-cremation post-mortem external examination should be conducted by an experienced forensic pathologist.

P 143
Undetected homicides of modern slaves

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Introduction. The criminal case of two persons for which some people worked in hidden underground rooms as slaves in Kirov region of Russia was happened.
Methods. Four of captive people were killed. The types of death and the killing mechanisms have been detected by means of talking about homicides history by two criminal persons to the inspector of Public Prosecutor after the period of time from 5 till 6 months.
Results. The cause of death in three cases as a result of autopsy and remains examination were not found due to extensive putrefaction. In two cases of female's death the antifreeze substance infusions into veins were performed. The following suspicious substances were not found in tissue of stomach, intestine, liver, kidney: ethylene glycol, spirits and chemical elements: Pb, Ba, Mn, Cr, Ag, Cu, Sb, As, Bi, Cd, Zn, Ta, Hg. One person, male, was killed by electricity shock. The electricity marks on the victim's body were not found. The cause of the death of the other male was hypothermia and could be proved by autopsy two days after the death.
Conclusions. It is very important to examine the dead body as soon as possible to reveal all necessary signs of violence. Even the influence of low temperature may be one of the types of violence of undetected homicide.

Deutsche Poster der der 90. Jahrestagung der Deutschen Gesellschaft für Rechtsmedizin

German Posters of the 90th Annual Conference of the German Society of Legal Medicine

PG 1
Skelettfund vom Ende des II. Weltkrieges – morphognostische, morphometrische und molekulargenetische Untersuchungen

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Im Mai 2010 wurden bei Ausgrabungen im Auftrag des Landesamtes für Archäologie Dresden in der Altstadt von Plauen neben dem Rathaus Reste eines Skelettes gefunden. Aufgrund des Grabungsortes und des Erhaltungszustandes der Skelettreste entstand der Verdacht, dass es sich um ein Opfer des II. Weltkrieges handeln könnte. Als Folge der zahlreichen Berichte in den örtlichen Medien haben sich mehrere Bürger, die noch immer nach ihren vermissten Verwandten suchen, für die Identität des Skeletts interessiert. Davon ausgehend machte sich zunächst eine Liegezeitschätzung erforderlich. Es folgten morphologische und metrische Untersuchungen, um erste Hinweise auf das Alter, das Geschlecht und eventuelle pathologische Veränderungen zu erhalten. Für die Untersuchungen standen ein weitgehend vollständiges Cranium und Knochen der oberen Körperhälfte (im Wesentlichen Claviculae, Scapulae, Humeri, Vertebrae, Costae) zur Verfügung. Die Individualanalyse wird durch molekulargenetische Untersuchungen, die sich aufgrund fehlender Zähne und kompakter Femora problematisch gestalten, abgeschlossen.

PG 2
Ereignisort Autobahn – Rolle der Rechtsmedizin bei Großschadensfällen

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Einleitung. Die Massenkarambolage auf der Bundesautobahn 19 im April 2011 wird als der schwerste Verkehrsunfall auf deutschen Autobahnen seit 20 Jahren angesehen. Als Unfallursache galten unter anderem stark eingeschränkte Sichtverhältnisse durch einen Sandsturm und unangepasste Geschwindigkeiten. Fahrzeugbrände verkomplizierten die Unfallsituation bis zum Katastrophenausmaß. In den ausgebrannten Wracks wurden 8 hochgradig hitzegeschädigte Todesopfer geborgen, deren rasche Identifizierung eine Herausforderung an die Zusammenarbeit von Medizinern und Kriminalisten darstellte.

Methoden.
- Rechtsmedizinische Leichenschauen am Ereignisort
- Post-mortem-CT und Rekonstruktion
- Gerichtliche Sektionen
- Toxikologische Untersuchungen
- Molekulargenetische Untersuchungen
- Nachuntersuchungen der geborgenen Unfall-Kfz
- Identifizierung nach gängigen Standards der IdKo

Ergebnisse. Durch Hinzuziehung des rechtsmedizinischen Bereitschaftsdienstes konnte eine suffiziente Sicherung von zur Identifizierung geeigneten Merkmalen und eine kontrollierte Bergung der 8 tödlich Verunglückten erfolgen. Post-mortem-CTs lieferten vorab u. a. Hinweise auf Verletzungsmuster, mögliches Geschlecht und Alter der Verstorbenen. Die Obduktionsbefunde in Kombination mit den Ergebnissen der toxikologischen Untersuchungen ermöglichten einzelfallabhängig Aussagen zur Todesursache. Ein vollständiger Zahnstatus war nicht in allen Fällen zu erheben. Über die Zusammenführung odontologischer, morphologischer und medizinischer Merkmale in Ergänzung zur molekularbiologischen Analyse von Leichen- und geeignetem Vergleichsmaterial konnten alle 8 Verstorbenen zeitnah identifiziert werden. Eine Nachbesichtigung der relevanten Kfz wurde seitens der Staatsanwaltschaft angeordnet.

Schlussfolgerungen. Bei Großschadenslagen mit unbekannten Todesopfern ist eine gut organisierte Zusammenarbeit von Ermittlungsbehörden und Rechtsmedizinern zur schnellen und sicheren Identifizierung der Verstorbenen notwendig. Auch bei hochgradigen thermischen Schädigungen der menschlichen Überreste können Hilfestellungen für die Unfallrekonstruktion gegeben werden.

PG 3
Neuroleptika und Erregungsleitungssystem – Kombination von arrhythmogenen Faktoren

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Einleitung. Es wird über den plötzlichen Tod einer 43 Jahre alt gewordenen, alkoholkranken Frau berichtet, die wegen einer schizophrenen Psychose mit einem Neuroleptikum behandelt worden war. Neuroleptika sind bekannt für ihr arrhythmogenes Potenzial (QT-Intervall-Verlängerung). In Fachinformationen werden hierüber Warnhinweise ausgesprochen.

Methoden. Die Frau wird tot in ihrer Wohnung aufgefunden. Am Vortage sei sie bei scheinbar gutem Gesundheitszustand gewesen. Bekannt sind eine alkoholtoxische Kardiomyopathie bei chronischem Alkoholabusus, eine arterielle Hypertonie sowie eine schizophrene Psychose. Aktuell sei sie auf das Neuroleptikum Serdolect® (Sertindol) umgestellt worden.

Ergebnisse. Sektionsergebnis: keine makroskopisch sicher feststellbare Todesursache, mäßiges Lungenödem, Hyperämie und Zyanose der Parenchyme, erhöhte Herzmasse (468 g; Körpergröße 177 cm, Körpermasse 78 kg). Routinehistologie und toxikologisch-chemischen Untersuchungen: kein todesursächlicher Befund. Nachweis von Sertindol in übertherapeutischer Konzentration (515 ng/ml). Blutalkoholkonzentration: 0,29 Promille. Histologie Erregungsleitungssystem: Verfettung des AV-Knotens (bis 60%) und des His-Bündels (bis 50%). Sinusknoten und Bündelschenkel unauffällig.

Schlussfolgerungen. Im vorliegenden Fall ist am ehesten von einem akuten Herztod bei einer Kombination von zwei verschiedenen arrhythmogenen Faktoren auszugehen. Einerseits der Ersatz von Erregungsleitungsmuskulatur durch Fettgewebe möglicherweise als Folge eines chronischen Alkoholabusus, andererseits die Sertindoltherapie. Sertindol ist 1998 kurz nach seiner Markteinführung in Europa wegen schwerer kardialer Störwirkungen mit Todesfällen vom Markt genommen worden. Unter Sertindoltherapie seien Verlängerungen des QT-Intervalls aufgetreten. Das Risiko für tachykarde Herzrhythmusstörungen ist hierdurch nachweislich erhöht. In den USA ist Sertindol wegen seiner Kardiotoxizität nie zugelassen worden.

PG 4
Postmortale Evaluation von Verletzungen nach Reanimation mit LUCAS™ 2

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Einleitung. Mechanische Reanimationshilfen, wie das Lund University Cardiac Assist System (LUCAS™ 1/2) erobern zunehmend den Markt. Vollautomatisch werde mittels gleichbleibenden, den Guidelines des ERC (European Resuscitation Council) von 2005 entsprechenden Vorgaben zu Tiefe, Frequenz und Druckpunkt der Thoraxkompressionen eine im Vergleich zur manuellen effektivere Reanimation

generiert. Eine Pilot-Studie mit LUCAS™ 1 beschreibt im direkten Vergleich zur manuellen Reanimation kein erhöhtes Verletzungsrisiko. Es erscheint uns deshalb angezeigt, das Verletzungsmuster des modifizierten Nachfolge-Modells LUCAS™ 2 zu überprüfen.

Methoden. Retrospektiv wurden dazu die Fälle der erfolglos verlaufenen Reanimationen mit LUCAS™ 2 der Jahre 2009 bis Mitte 2011 ausgewertet. Von insgesamt 14 Fällen konnten elf natürliche Todesfälle in die Studie eingeschlossen werden. Diese wurden anhand der Autopsiebefunde auf eine mögliche Korrelation des Verletzungsmuster mit Alter, Geschlecht, BMI, stattgehabter Laien-Reanimation, Gesamtdauer der Reanimation und dem Auftreten von Petechien untersucht.

Ergebnisse. Bei kleiner Fallzahl zeigte sich letztlich, dass das Verletzungsrisiko von Männern geringer als das von Frauen zu sein scheint. Ebenso dürfte das Verletzungspotential Normalgewichtiger als weniger hoch einzustufen sein. Nach zusätzlicher Laien-Reanimation, mit zunehmender Gesamtdauer der Reanimation sowie mit zunehmendem Alter stieg die Zahl der Verletzungen. Ein Zusammenhang zwischen dem vermehrten Auftreten von Verletzungen und Petechien konnte ebenso wenig wie eine Korrelation mit der Reanimationsdauer erhoben werden.

Schlussfolgerungen. Es werden die Autopsieresultate präsentiert und das Verletzungspotential von LUCAS™ 2 unter Berücksichtigung der aktuellen Literatur diskutiert.

PG 5
Eine ungewöhnliche Suizidmethode – Selbstlaparotomie mittels Nagelschere

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Einleitung. Im Münchner Sektionsgut finden sich pro Jahr mehr als 200 Suizide. Die am häufigsten angewandte Methode der Selbsttötung stellt hierbei nach wie vor die Strangulation dar, gefolgt vom Sprung, Schuss und der Vergiftung. Der Suizid mittels scharfer Gewalt ist hierbei als eine eher vernachlässigbare Methode der Selbsttötung anzusehen. So fanden sich im Jahr 2010 16 Suizide durch scharfe Gewalt, wobei am häufigsten Pulsaderschnitte zum Tode führten. Umso mehr stellt der sich im ersten Halbjahr 2011 im Umland von München ereignete Suizid einer älteren Dame mittels einer Nagelschere eine Besonderheit dar.

Methoden. Die 73 Jahre alt gewordene Frau H. habe gemeinsam mit ihrer Familie auf einem Bauernhof gelebt. Aufgrund eines Kniegelenkserguss sei sie die letzte Zeit vor ihrem Tod immobil gewesen. Des Weiteren sei sie häufig verwirrt gewesen und habe sich große Sorgen darüber gemacht, ein Pflegefall zu werden und ihrer Familie zur Last zu fallen. An weiteren Vorerkrankungen haben ein Zustand nach Mitralklappenersatz vor längerer Zeit, der eine Marcumareinnahme erforderlich gemacht habe, eine Herzinsuffizienz und Herzrhythmusstörungen bestanden. Am Vorfallstag sei Frau H. durch ihre Enkelin in der Badewanne liegend aufgefunden worden. Bei der Auffindung seien die Vitalfunktionen der Frau H. noch vorhanden gewesen, jedoch sei diese nicht ansprechbar gewesen. Der sofort alarmierte Notarzt habe Frau H. in die chirurgische Abteilung eines nahe liegenden Kreisklinikums verbracht, wo sofort eine Notoperation eingeleitet worden sei. Frau H. sei allerdings ca. 11 Stunden nach dem Vorfall verstorben.

Ergebnisse. Die Bauchdecke der Frau H. war mit einer Nagelschere durch eine Längslaparotomie über ca. 6 cm eröffnet und der gesamte Dünndarm war mobilisiert, dieser lag auf der Bauchdecke. Der Dünndarm selbst war an einigen Stellen durchtrennt, ein ca. 80 cm langes Stück war komplett aus dem Verbund entfernt worden und lag in drei Teilen in der Badewanne. An der Wand und in der Badewanne zeigten sich reichlich Blutspritze, die auf eine Eröffnung der Gekrösearterien zurückgeführt werden können. Zudem fand sich an der linken Handgelenksstreckseite eine 4 cm messende Hautdurchtrennung, wie bei einem Zauderschnitt. Beim Tatwerkzeug hat es sich nach polizeilichen Ermittlungen um eine Nagelschere gehandelt. Die unmittelbare Todesursache sei Verbluten als Folge einer Schnittverletzung im Abdomen bei bestehender Marcumarisierung bei Z. n. Mitralklappenersatz gewesen.

Schlussfolgerungen. Der dargestellte Fall wird im Hinblick auf die Morphologie der Verletzungen, der Handlungsfähigkeit und des Blutspurenmusters erörtert.

PG 6
Maßkrugschlag – mechanische Einflussfaktoren auf die resultierende Verletzungsgefahr

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Einleitung. Unsere frühere Studie zum Thema Maßkrugschlag führte zur Erkenntnis, dass die Festigkeit fabrikneuer Maßkrüge die des menschlichen Schädels überschreitet. Eine Analyse von Gutachtenfällen entdeckte jedoch, dass Maßkrüge häufig zerbrechen und Schädelfrakturen ausbleiben. Als mögliche Ursachen dieses Widerspruchs wurden die Auftreffstelle am Maßkrug (Seite vs. Boden) und der Gebrauchzustand (neu vs. gebraucht) identifiziert.

Methoden. Labormessungen wurden mit fabrikneuen sowie mit gebrauchten Maßkrügen (nach Oktoberfest, Anzahl der Waschgänge unbekannt) durchgeführt. Bei Schlägen auf ein Kopfsurrogat (Alu-Kern des Kopfes des Hybrid III, überzogen mit 0,8–1 cm Silikonschicht) wurde die Kontaktkraft (als Bodenreaktionskraft) gemessen. Geschlagen wurde mit dem Boden oder mit der Seite der Maßkrüge.

Ergebnisse. Alle gebrauchten Maßkrüge gingen bei seitlichem Aufprall (n=10) bei Kräften zwischen 3,5 kN und 6,3 kN zu Bruch, beim Aufprall mit dem Boden (n=8) zerbrach nur die Hälfte der Krüge (4,9–8,7 kN), die übrigen blieben trotz Kräften von über 10 kN unversehrt. Von fabrikneuen Maßkrügen zerbrachen bei seitlichem Aufprall (n=12) nur zwei, die restlichen wurden trotz Kräften von über 10 kN nicht beschädigt. Beim Kontakt mit dem Boden (n=10) des Krugs konnten bei Kräften von bis zu 10 kN keinerlei Brüche festgestellt werden. Die Schädelfestigkeit wäre aber bereits überschritten und die Möglichkeit der Entstehung von schweren Verletzungen gegeben.

Schlussfolgerungen. Maßkrüge sind beim Aufprall mit dem Boden stabiler als beim Aufprall mit der Seite. Fabrikneue Maßkrüge sind stabiler als der menschliche Schädel, durch Gebrauch kann die Festigkeit der Gläser jedoch stark herabgesetzt werden.

PG 7
Nachweis der Anwendung von RU-486 (Mifepriston)

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Einleitung. Mifepriston ist ein steroidaler Progesteron-Rezeptoragonist, der für verschiedene medizinische Anwendungen eingesetzt wird. Insbesondere als Abortivum in Form der sog. Abtreibungspille RU-486 kann es bei forensisch-toxikologischen Fragestellungen eine Rolle spielen, wenn Mifepriston-haltige Präparate ohne ärztliche Verordnung außerhalb der hierfür vorgesehenen Einrichtungen nach der 9. Schwangerschaftswoche eingenommen werden. Eine Mutter hatte Mifepriston und Prostaglandintabletten (Misoprostol) zur Wehenförderung illegal erworben, womit sie nach der 9. Schwangerschaftswoche einen Schwangerschaftsabbruch durchführte.

Methoden. Es wurde ein Verfahren zur quantitativen Bestimmung von Mifepriston entwickelt. Nach der Probenvorbereitung mit Flüssigextraktion und chromatographischer Trennung des Extraktes an einer Luna 5 µ Phenyl-hexyl (50–4,6 mm) C18 (2) 100 A (150×2 mm) Säule wurde die Probe mittels Tandem-Massenspekrometrie (LC-MS-MS,

API 4000 QTrap) bei Elektrosprayionisation (ESI) im positiven Modus untersucht.
Ergebnisse. Mit der Methode kann der Wirkstoff bis in den Sub-ng/ml Bereich in Blut- und Serumproben bestimmt werden, zusätzlich sind Mifepriston-Metabolite (z. B. Monodemethyl-Mifepriston) qualitativ nachweisbar. Im oben beschriebenen Fall wurden die Analyten im Blut der Mutter sowie in Körperflüssigkeiten und Gewebsproben des verstorbenen Foeten in relevanten Konzentrationen nachgewiesen.
Schlussfolgerungen. Es konnte gezeigt werden, dass die vorgestellte Methode prinzipiell geeignet ist, bei Fällen einer vermuteten illegalen medikamentösen Abtreibung durch forensisch-toxikologische Untersuchungen in postmortal vom Foetus asserviertem Material die Applikation von RU-486 nachzuweisen.

PG 8
Tödliche Schussverletzung durch Schreckschusswaffen

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Einleitung. Die Gefährlichkeit von Schreckschusswaffen ist ebenso wie die potenzielle Letalität von Umbauten hinreichend bekannt. Wir berichten über eine mit normalen handwerklichen Fähigkeiten mögliche Modifikation zu einer sicher tödlichen Waffe.
Methoden. Ein 53 Jahre alt gewordener Mann wurde als teilmumifizierter Leichnam aufgefunden. Auf dem Bauch, gehalten in der rechten Hand, ein Schreckschussrevolver. Die erste Leichenschau blieb ohne Hinweis auf eine Todesursache. Bei der Obduktion fand sich ein durch den knöchernen Gaumen zur linken Hemisphäre führender Wundkanal. In der Dura mater links ein rechteckiger Defekt mit korrespondierender Impressionsfraktur am Schädeldach innen. Im fäulnisverändertem Hirngewebe ein schmetterlingsartiger, silbrig glänzender, ca. 33 mm langer, an der Basis runder Gegenstand.
Ergebnisse. Die Rekonstruktion ergab, dass es sich um ein aus einem Aluminiumstab gefertigtes, der Laufsperre vorladbares Projektil von annähernd Kaliberdurchmesser handelte. Nach Anfertigung von Vergleichsprojektilen und Beschussversuchen waren eine mittlere V1 von 106 m/s und eine E1 von 17 J zu messen.
Schlussfolgerungen. Bedingt durch das Anfeilen der Projektilspitze eines vor der Laufsperre vorgeladenen Eigenbauprojektils sind die von uns festgestellten tödlichen Verletzungen hinreichend zu erklären.

PG 9
Analyse der Misshandlungs- und Missbrauchsfälle von Kindern der Jahre 2006 bis 2009 am IRM Mainz

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IRM Mainz, IRM Mainz, Mainz

Einleitung. Die Begutachtung von Kindern und Jugendlichen unter dem Verdacht einer stattgehabten Misshandlung bzw. eines sexuellen Missbrauchs ist klassisches Aufgabengebiet eines Rechtsmediziners. In diesem Kontext werden an der Forensischen Ambulanz am IRM Mainz jährlich ca. 500 Kinder begutachtet.
Methoden. Die Durchsicht der rechtsmedizinischen Akten der Jahre 2006–2009 erbrachte, dass in diesem Zeitraum insgesamt 640 Kinderuntersuchungen durchgeführt wurden. Die Fälle wurden nach vielfachen Kriterien ausgewertet, die dazu dienen sollen, neben epidemiologischen Aspekten zu Opfern und/oder Tätern eventuelle Risikofaktoren für eine Misshandlung/einen sexuellen Missbrauch von Kindern festzustellen. Hierzu wurden zudem die Ermittlungsakten der Staatsanwaltschaften zur Auswertung herangezogen. Ferner erfolgten ausgedehnte Bemühungen um eine Kooperation mit den involvierten Jugendämtern in Form eines speziell entwickelten, an die Kaufmann Assessment Battery for Children angelehnten, Fragenbogens, um Informationen zum familiären und weiterführenden sozialen Hintergrund der Kinder und Jugendlichen zu erhalten. Dies gestaltet sich derzeit noch schwierig, so dass bisher noch nicht alle Parameter erfasst und ausgewertet werden konnten.
Schlussfolgerungen. Abschluss der Datenauswertung soll letztendlich, anhand eventuell abgeleiteter Risikofaktoren, diskutiert werden, ob hierdurch neue oder affirmative Impulse für die Präventionsstrategien sexuellen Missbrauchs bzw. körperlicher Misshandlung von Kindern und Jugendlichen gewonnen werden können. In dem Poster sollen die ersten Ergebnisse präsentiert und zur Diskussion gestellt werden.

PG 10
Urteilsanalyse arzthaftungsrechtlicher Verfahren durch das Landgericht (LG) Kassel

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Einleitung. Ziel dieser retrospektiven Studie ist eine deskriptive und statistisch valide Auswertung von Gerichtsakten/Urteilen zu Arzthaftungssachen des LG Kassel.
Methoden. In die Analyse wurden alle von 2006 bis 2009 ergangenen 109 arzthaftungsrechtlichen Gerichtsurteile des LG Kassel einbezogen. Eine Auswertung erfolgte u. a. nach medizinischen Fachdisziplinen, Diagnosen, Therapien, betroffener Versorgungsebene, Pflichtverletzungsvorwurf durch die Klägerseite, Verfahrensausgang und Prozesskostenverteilung.
Ergebnisse. Am häufigsten waren Chirurgie (27,5%) und Orthopädie (12,1%) betroffen, gefolgt von Gynäkologie und Geburtshilfe (7,7%), Innerer Medizin (6,6%) und den übrigen Fachdisziplinen (zusammen 23%). 23,1% der Verfahren entfielen auf die Zahnmedizin. Niedergelassene Ärzte waren zu 41,3%, Krankenhäuser zu 57,6% betroffen. Vorwürfe des Behandlungsfehlers (Überschneidungen möglich) wurden wegen fehlerhafter Durchführung der Therapie (59,6%), fehlerhafter Indikationsstellung (37,2%), falscher Diagnosestellung (27,7%) und/oder Organisationsverschuldens (17%) erhoben. Eine Verletzung der ärztlichen Aufklärungspflicht wurde in 34% der Klagebegründungen angegeben. Mit 70,2% endete die deutliche Mehrheit der Verfahren durch gerichtlichen Vergleich. 19,5% der Verfahren wurden durch Klagerücknahme, 8,5% durch Klageabweisung und 2,2% durch Verurteilung abgeschlossen.
Schlussfolgerungen. Die Urteilsanalyse kann durch die Darstellung von Fehlermöglichkeiten zur Fehlerprävention und somit zum medizinischen Qualitätsmanagement beitragen.

PG 11
Urteilsanalyse arzthaftungsrechtlicher Verfahren durch das Landgericht (LG) Marburg

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Einleitung. Ziel dieser retrospektiven Studie ist eine deskriptive und statistisch valide Auswertung von Gerichtsakten/Urteilen zu Arzthaftungssachen des LG Marburg.
Methoden. In die Analyse wurden alle von 2006 bis 2009 ergangenen 91 arzthaftungsrechtlichen Gerichtsurteile des LG Marburg einbezogen. Eine Auswertung erfolgte u. a. nach medizinischen Fachdisziplinen, Diagnosen, Therapien, betroffener Versorgungsebene, Pflichtverletzungsvorwurf durch die Klägerseite, Verfahrensausgang und Prozesskostenverteilung.
Ergebnisse. Am häufigsten waren Chirurgie (40,5%) und Orthopädie (10,1%) betroffen, gefolgt von Gynäkologie und Geburtshilfe (7,9%),

Innerer Medizin (7,9%) und den übrigen Fachdisziplinen(zusammen 21,2%). 12,4% der Verfahren entfielen auf die Zahnmedizin. Niedergelassene Ärzte waren zu 30,6%, Krankenhäuser zu 68,2% betroffen. Vorwürfe des Behandlungsfehlers (Überschneidungen möglich) wurden wegen fehlerhafter Durchführung der Therapie (56,1%), fehlerhafter Indikationsstellung (50,6%), falscher Diagnosestellung (34,8%) und/oder Organisationsverschuldens (12,3%) erhoben. Eine Verletzung der ärztlichen Aufklärungspflicht wurde in 40,4% der Klagebegründungen angegeben. Mit 64,4% endete die deutliche Mehrheit der Verfahren durch gerichtlichen Vergleich. 16,9% der Verfahren wurden durch Klagerücknahme, 14,6% durch Klageabweisung und 4,5% durch Verurteilung abgeschlossen.

Schlussfolgerungen. Die Urteilsanalyse kann durch die Darstellung von Fehlermöglichkeiten zur Fehlerprävention und somit zum medizinischen Qualitätsmanagement beitragen.

PG 12
Blasenfüllung als radiologisches Zeichen der Intoxikation

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Einleitung. Es war das Ziel dieser Studie zu überprüfen, ob das in der postmortalen Computertomographie (PMCT) errechnete Harnblasenvolumen mit dem bei der Autopsie gemessenen Harnblasenvolumen übereinstimmt und, ob der Füllungsgrad der Harnblase als radiologischer Hinweis auf eine Intoxikation verwendet werden kann.

Methoden. Bei allen Fällen, die seit Einführung der PMCT im August 2010 bis April 2011 an einer Intoxikation verstorben sind (Gruppe 1: n=37) wurde das Harnblasenvolumen in der PMCT berechnet und mit dem Harnblasenvolumen von 40 zufällig ausgewählten Fällen verglichen, deren toxikologische Untersuchung negativ ausgefallen war (Gruppe 2: n=40). Alle 77 berechneten Volumina wurden mit den autoptisch gemessenen Volumina verglichen. Anschließend wurde untersucht, ob ein signifikanter Zusammenhang zwischen errechnetem Harnblasenvolumen bzw. der Häufigkeit bestimmter Blasenvolumina und einer Intoxikation besteht.

Ergebnisse. Es besteht eine sehr hohe Korrelation zwischen dem berechneten und dem gemessenen Harnblasenvolumen (Korrelationskoeffizient 0,97; p<0,001). Das durchschnittliche berechnete Harnblasenvolumen betrug 259,7 ml in Gruppe 1 und 86,4 ml in Gruppe 2. Es besteht eine hohe Korrelation zwischen errechnetem Harnblasenvolumen und einer Intoxikation. Harnblasenvolumina von ≥330 ml traten ausschließlich in Gruppe 1 auf (12/37). Harnblasenvolumina von ≤50 ml waren signifikant seltener in Gruppe 1 (12/37) als in Gruppe 2 (21/40).

Schlussfolgerungen. Es besteht eine gute Übereinstimmung zwischen radiologisch berechnetem und autoptisch gemessenem Harnblasenvolumen. Ein Volumen von mehr als 330,0 ml kann gemäß unseren Resultaten als radiologisches Zeichen der Intoxikation gewertet werden.

PG 13
Die Anwendung der 3D-Scanning-Technologie in Verbindung mit der 3D-Animation bei der Rekonstruktion am Tatort und des Tatablaufs

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In der vorliegenden Arbeit werden praktische Möglichkeiten für die Abbildung eines virtuellen Tatortmodells vorgestellt, das den Tatablauf und das Verhalten aller Beteiligten umfasst und damit ein wesentliches Instrument der gerichtsmedizinischen und kriminalistischen Analyse darstellt. Solch ein Modell wird hauptsächlich auf der Basis der 3D-Scanning-Technologie gebildet und umfasst sowohl die Geometrie als auch die Lage aller Gegenstände, die Einfluss auf den Ablauf der Tat haben könnten, und schließt auch die Hautoberfläche und die ausgewählten anatomischen Details von inneren Organen der beteiligten Personen ein. Entsprechend des Bedarfs der geführten Analyse ist auch eine interaktive Modifizierung des Verhaltens aller an der Tat Beteiligten möglich. Die Gegenüberstellung verschiedener Versionen der Tat erleichtert die Verifikation der aus diversen Quellen gewonnenen Daten und Aussagen. Das Ausgangsmaterial bildete die Registrierung der tatsächlichen Tatorte sowie ihre Modelle, die von den Autoren für die vorliegende Arbeit erstellt wurden. Es wurden die Brauchbarkeit und die Effizienz der 3D-Scanning-Methoden nachgewiesen als einer nichtinvasiven Technik für die Bestandsaufnahme des Tatortes sowie für das Sammeln von Daten in der Makro- und Mikroskala. Die Ergebnisse der geführten Untersuchungen bestätigen den hohen Beweiswert der Informationen, die durch die hier beschriebenen Techniken gewonnen werden konnten, um der objektiven Wahrheit näher zu kommen. Nach Meinung der Autoren sind die 3D-Scanning-Technologien verbunden mit der 3D-Modellierungstechnik sowie den Instrumenten der 3D-Animation die besten Mittel zum Erreichen dieses Ziels.

PG 14
Untersuchung des expliziten Geschwindigkeitseinflusses bei stumpfer Gewalt

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Einleitung. Wie im letztjährigen Vortrag gezeigt, ist die Verletzung bei stumpfer Gewalt gegen einen Polyurethanschädel nicht nur rein von der Energie abhängig, sondern wird beeinflusst von der Geschwindigkeit-Masse-Zusammensetzung der Energie. Der Einfluss wurde jedoch bis dahin nur auf einem einzelnen Energieniveau nachgewiesen. Diese Betrachtungen werden nun ausgeweitet auf weitere Niveaus, um dort den Einfluss der Geschwindigkeit zu bestätigen und allenfalls Gesetzmäßigkeiten zu finden.

Methoden. In einem Fallturm wird ein Prüfkörper, dessen Höhe und Masse verändert werden kann, auf Polyurethanschädel fallen gelassen. Bei unterschiedlichen Energien werden mehrere Versuche bei verschiedenen Geschwindigkeiten durchgeführt und die entstandenen Verletzungen analysiert.

Ergebnisse. Wie erwartet zeigt sich ein direkter Einfluss der Geschwindigkeit auf die Schwere der Verletzung. Da der Versuch auf unterschiedlichen Energieniveaus durchgeführt wurde, konnte eine Aussage über das Verhalten des Geschwindigkeitseinflusses besagter Niveaus getroffen werden.

Schlussfolgerungen. Bei der Angabe der Energie für die Entstehung einer Verletzung durch stumpfe Gewalt ist also Vorsicht geboten, denn sie ist nicht der einzige Einflussfaktor. In einem weiteren Schritt wird

untersucht, wie sich bei konstant gehaltener Zerstörung Energie und Geschwindigkeit zueinander verhalten.

PG 15
„Speziesdifferenzierung" an Herzplastinaten

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Einleitung. Histologische Untersuchungen sind eine anerkannte Methode zur Speziesdifferenzierung an Gewebeproben. Wenn es jedoch um eine Artzuordnung von Plastinaten geht, erscheint eine Anwendung der klassischen Histologie nicht aussichtsreich, denn bei der Plastination wird das in den Zellen vorhandene Wasser durch Polymere ersetzt. So ist eine Anfertigung von Schnitten mit klassischen Mikrotomen bzw. Hartschnittmikrotomen durch die fehlende äußere Stabilisierung durch Parafin oder Kunststoff kaum möglich.
Methoden. Die Stabilisierung der Strukturen ist durch eine Einbettung in Technovit 9100 ® neu (Kaltpolimerisation) bzw. in Epoxidharz möglich. Alternativ wäre an eine „Entplastinierung" zur Vorbereitung der histologischen Aufarbeitung zu denken. Im Ergebnis unserer Versuche mussten wir feststellen, dass eine Entplastinierung ohne weiteres möglich ist, jedoch bei anschließender Einbettung in Paraffin das Material zerbröselt und eine Anfärbung nicht möglich ist. Nach Technoviteinbettung und Anfertigen von Dünnschliffen ist eine histologische Auswertung der Proben sowohl mit HE-, GIEMSA und Goldner-Färbung möglich.
Ergebnisse. In unserem konkreten Fall war dann ein Nachweis der Mehrkernigkeit der Zellen und charakteristische Vernetzung der Herzmuskelzellen dank der Kombination neuer Methoden der Materialverarbeitung mit klassischen morphologischen Kenntnissen möglich. Dies erlaubte ein Zuordnung des untersuchten Platinates zur Spezies Schwein. Unsere Befunde wurden durch mt-DNA Untersuchung bestätigt.
Schlussfolgerungen. Die Kombination moderner Werkstoffkunde mit klassischen Methoden der Histologie ermöglicht eine Speziezuordnung von Herzplastinaten.

PG 16
Automatisierte Analyse von Datensätzen zur Qualitätssicherung in der forensischen Routinearbeit

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Einleitung. Während der Handhabung und Bearbeitung von Probenmaterial in der forensischen Routinearbeit können durch verschiedenste Faktoren Kontaminationen auftreten.
Methoden. Um Kontaminationen durch Mitarbeiter des Instituts unmittelbar zu erkennen, wurde in Anlehnung und Ergänzung an unsere Datenbank (ForensicDatabase©) eine Schnittstelle zur Software Genemapper v3.2 (Applied Biosystems) entwickelt.
Ergebnisse. Diese ermöglicht die automatisierte Auswertung gängiger STR-Kits und besitzt gleichzeitig eine Exportfunktion in die ForensicDatabase© Datenbank, so dass Untersuchungsergebnisse nach der Bearbeitung abgespeichert und archiviert werden können. Somit ist es möglich, aufbereitete Datensätze direkt mit den in der Datenbank hinterlegten Mitarbeiterprofilen zu vergleichen, um etwaige Kontamination umgehend zu erkennen. Zusätzlich kann diese Funktion auch für die computergestützte Auswertung von Massenscreenings genutzt werden. Die anschließende Analyse der STR-Profile zur Ermittlung der Identitätswahrscheinlichkeit kann aus den bestehenden Datensätzen mit einem STR-Rechner durchgeführt werden. Dieser enthält unter anderem alle neuen Datenbanksysteme der aktuellen Untersuchungs-Kits und bietet die Möglichkeit der Nutzung verschiedener Frequenzdaten. Es besteht die Möglichkeit einer individuellen Anpassung, so dass sowohl bereits bestehende Allelfrequenzen genutzt als auch eigene Daten ergänzt werden können.
Schlussfolgerungen. Die Möglichkeiten der Anwendung sollen hier anhand von einigen Beispielen gezeigt werden.

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