BIO 221
Invertebrate Zoology I
Spring 2010

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http://www4.nau.edu/isopod

Lecture 9

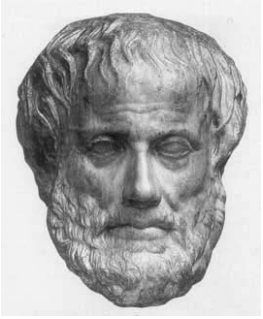
Phylum Cnidaria:
Hydroids, jellyfish, anemones, corals.

Historical Remarks

Aristotle
(384-322 BC)

a. Classified different groups according to body type.

b. Identified the "radiate animals" as distinct from the "bilateral animals.



Historical Remarks

Jean-Baptiste Lamarck
(1744-1829)

a. Coined term ***Radiata.***

b. Based on radial symmetry (following Aristotle).

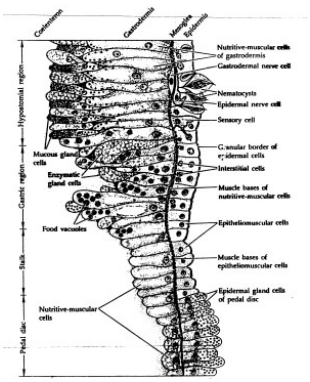
c. However, we will see that body symmetry can be somewhat misleading.

Historical Remarks

Coelenterata

3. More recent, but no longer used, although Conway Morris suggests that this term is still meaningful.

Phylum Cnidaria



Box One
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Cnidarian Morphology

a.Body wall characteristic of Cnidaria:

1. Diploblastic

1. two cell layers - *epidermis*, *gasterodermis*

a. epidermis - columnar cells

2. thin layer of mesolamella (mesoglea if cellular)

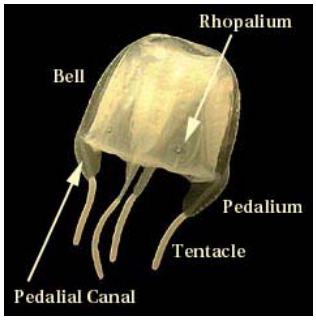
Cnidarian Morphology

c. Mesoglea - inner gel-like material.

1. Provides support, transport.

d. No distinct internal organs; a nerve net; no coelom

Cnidarian Morphology



b. Sensory, muscular structures associated with food capture, contraction, extension.

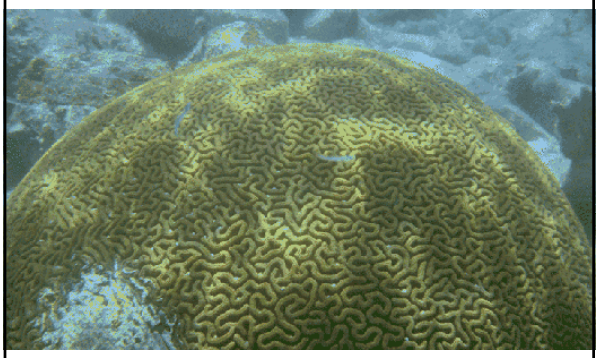
c. *gasterodermis* - inner digestive cells

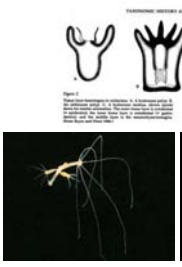
1. mucous, digestive, absorbtive cells

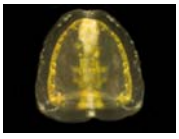
2. some contain *zoochlorellae* - photosynthetic algae.

Cnidarian Rhopalium

Cnidarian Morphology







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Cnidarian Morphology

b . Tentaculate with radial symmetry around mouth.

1. Note that radial symmetry *persists in different life stages.*

2. May be modified as biradial, quadriradial or septiradial symmetry.

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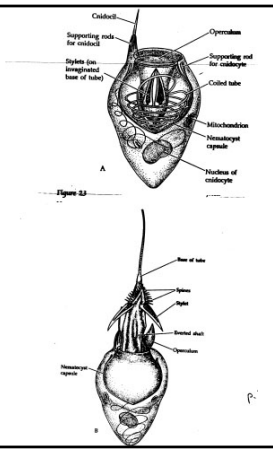
Cnidocytes

1. Cnidocytes - eversible cells, primarily on tentacles.

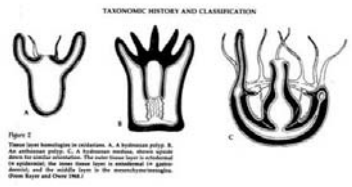
a. Trigger, nerves, cause discharge from tactile, coordinated or chemical stimulus.

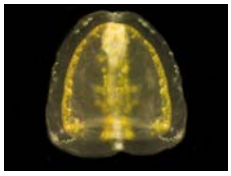
b. Operculum pops off, inner nematocyst explodes out.

c. Barbed or with toxin, paralyzes, immobilizes prey.



Cubozoan Cnidae





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Cnidarian Morphology

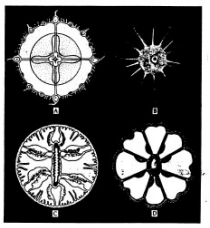
Gastrovascular Cavity (GVC)

a. Central cavity for digestion, transport of materials.

b. Relatively thin tissues permits efficient nutrition, waste removal.

TAXONOMIC HISTORY AND CLASSIFICATION

CHAPTER EIGHT / PHYLUM CNIDARIA



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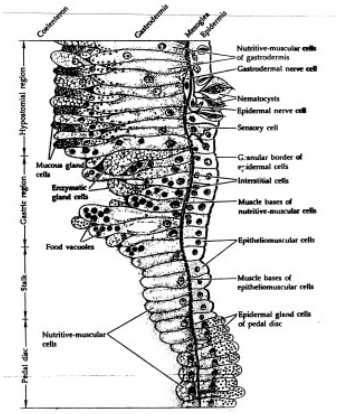

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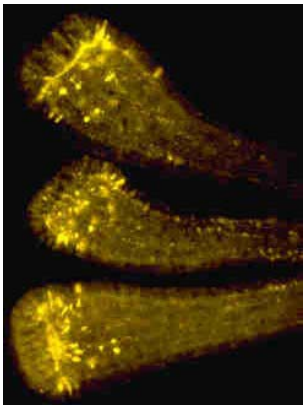

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Metagenesis

Polymorphic body forms associated with life cycle.

Polyps

1. Polyp - sessile form, often vegetative.

Polyps

1. largely sessile - some can creep, somersault, etc.
2. Have a *longitudinal* axis
   a. Oral end
   b. Aboral end
   c. Tentacles surrounding the mouth

Medusa

Medusa means "sovereign female wisdom."

In Sanskrit it's *Medha*, Greek *Metis*.

Medusa

Was one of the Gorgons; sisters that caused men to turn to stone.

Perseus slew Medusa and used her head as a weapon.

Medusae

Medusa - motile form, often sexual.

1. specialized for swimming - some are more or less attached.

Medusae

2. have a shorter longitudinal axis

a. mouth often with oral arms.

3. body wall also diploblastic

a. highly thickened *meosglea* - forms bell.

Medusae

4. GVC is divided into radial canals.

5. Tentacles oriented around the bell

6. sensory, muscular system associated with swimming.

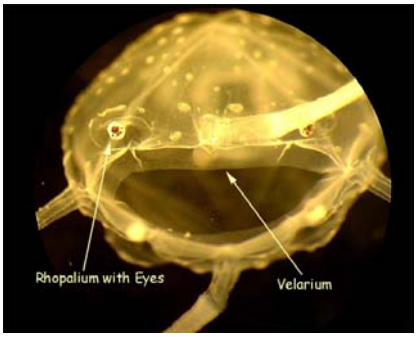
Medusae

a. Contraction around bell margin

1. *velum* - structure associated with rapid swimming

2. present or absent in different groups.

Cubozoan Velarium



Medusae

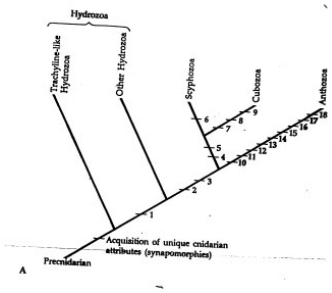
b. Rhopalia

a. statocysts - maintain balance in water

b. ocelli - light sensitive organs

Cnidarian Rhopalium

A Cnidarian Phylogeny



1. Four main classes (even though most sources consider 3)
   a. stem group - possess basic structural organization of other more advanced metazoa
   b. have radiated into many habitats - yet body plan has been retained.