

**EEB 4275 (Invertebrate Zoology)**  
**Fall, 2010**  
**Study Guide I**

What is an “invertebrate”? Do the “invertebrates” constitute a monophyletic group?

Differences between a prokaryote and a eukaryote; 2 prokaryotic Domains; 4 eukaryotic Domains. Know basic terms for regions inhabited by inverts i.e., littoral zone, etc.

**For each “invertebrate” phylum, in addition to the information outlined below, you should know the common name, distinguishing characteristics (synapomorphies if they exist), approximate range in size, and position within the general scheme of “invertebrate” organization with respect to the major subgroupings of invertebrates i.e. body cavity configuration (acoelomate vs. blastocoelomate vs. eucoelomate), bilateria vs. radiata, protostome vs. deuterostome; level of organization: cell, tissue, organ/organ system etc., general habitat (e.g. freeliving/parasitic; marine, etc.), solitary/colonial, etc. You should have some idea of diversity in each phylum, class, subclass, etc (if covered). You should know how each phylum generally handles locomotion, feeding (food acquisition, digestion, etc.), respiration, circulation, excretion, reproduction, development, sensory perception, and defense.**

**PROTISTS:** What are the “Protists”? What are their distinguishing features? Do they represent a monophyletic assemblage of taxa?

"Amoebozoans"- distinguishing feature/s; 2 phyla.

**Lobosea-** distinguishing characteristics; potential synapomorphy; naked versus testate; example genera.

"Rhizaria"- distinguishing feature/s; 2 phyla.

**Foraminifera-** distinguishing characteristics. Potential synapomorphy? What are reticulopodia? How are they associated with the test? What is the test? Age and fossils of?

**Radiolaria-** distinguishing feature/s; potential synapomorphy? 2 major Classes and their distinguishing characteristics; what are axopods? How are they associated with the test? What is the test?

-distinguish undulopodium vs flagellum vs cilium; cross section of free and basal region of undulopodium.

"Alveolates"- distinguishing feature/s- 1 phylum

**Ciliophora-** distinguishing characteristics; nuclei and potential synapomorphy? What is infraciliature? Variations in body form of ciliates illustrated using example genera; fission vs. conjugation; sessile vs errant taxa; what are trichocysts?

"Excavata"- distinguishing feature/s- 1 phylum

**Parabasalida-** distinguishing characteristics; potential synapomorphy? What is a hypermastigote? Where would you expect to find one? Do they possess infraciliature?

**Choanoflagellata-** habitats and distinguishing characteristics; collar and its function; potential close relatives.

**ANIMALIA (=Metazoans):** What is meant by the term “Metazoa”? Animalia? General features of animals (e.g., possession of collagen, develop from embryos, etc.). Are the animals monophyletic? distinguishing features; potential synapomorphies; major subdivisions (parazoans, radiatans, bilaterians) and their distinguishing features; phyla covered to date that belong to each “grade” including level of organization and complexity of each.

**Porifera-** distinguishing characteristics; potential synapomorphy? Level of organization; totipotency. Cell layers, cell types (amoebocytes, archaeocytes, collenocytes, choanocytes, pinacocytes, etc.) their functions, and positions in the body wall. Sponge body types (asconoid, syconoid, leuconoid) and their implications for sponge body size, be able to illustrate an example of each; direction of water flow through each sponge body type; parts of the body (osculum etc.); asexual reproduction- gemmules; sexual reproduction, parenchymula and amphiblastula larvae; 3 classes of sponges and their distinguishing characteristics, body type, spicule types, an example genus for each. What are the Symplasma? Distinguishing feature/s? Why have some considered it a separate phylum?

**Cnidaria-** distinguishing characteristics; potential synapomorphy? 2 tissue layers and their embryonic germ layer origins; cell types and their locations and functions in each tissue layer; 2 basic body forms (polyp vs. medusa) and how emphasized in different classes; 2 types of polymorphism (simultaneous vs. sequential) and an example of each; 4 classes and their distinguishing characteristics; gastrozooid vs gonozooid; life cycle of *Obelia*; colonial components of *Physalia*; life cycle of *Aurelia*; what is a rhopalium? Concept of a stomodeum; 2 subclassess of Anthozoans and their features.

**Ctenophora-** basic features; synapomorphies, orientation relative to cnidarian medusa and other features useful for separating the 2 phyla (e.g. larval stage, combs, colloblasts, etc.); number of tissue layers; kleptocnidae; colloblasts; comb plates; cydippid larva.

**Body form generalizations:** Distinguish diploblasty from triploblasty; know examples of phyla exhibiting each; types of symmetry (spherical, radial, biradial, asymmetrical etc.), examples of each; planes of section (frontal, cross, sagittal etc.); be able to illustrate the different configurations of the body cavity (acoelomate, blastocoelomate, eucoelomate) including the arrangement of the ectoderm, endoderm, and mesoderm and various body cavities in each; understand distinction between a colony and an individual. Tissue types and fates of 3 embryonic germ layers.

General features of "acoelomates"; body cavity?; 4 phyla currently considered to be "acoelomates."

**Platyhelminthes-** distinguishing characteristics; potential synapomorphies; basic phylogenetic relationships; basic organ systems; central nervous system and cephalization (what is it?), musculature. Characteristics of the "turbellarians" (are the turbellarians monophyletic?); structure and function of a protonephridium; structure of the tegument of neodermatans and how it differs from the outer body layer of the "turbellarians"; 2 classes and 4 subclasses neodermatans and their basic and distinguishing features and general life-cycles; examples of larval types in each (e.g., Mueller's larva, sporocyst, redia, cercaria, oncomiracidium, hexacanth); general host associations of each subclass.

**Nemertea-** distinguishing characteristics; locomotion, understand the details of the proboscis and rhynchocoel; possession of circulatory system and respiratory pigments; complete digestive system, excretion; asexual reproduction, sexual reproduction (dioecy, etc.); pilidium larva. Why considered eucoelomates by some?

**Gastrotricha-** distinguishing characteristics; reproduction (including parthenogenesis- what is it?), monoecious; locomotion (ventral cilia and adhesive tubes); complete digestive system.

**Gnathostomulida-** distinguishing characteristics; feeding and pharyngeal jaw apparatus; monoecious.

General features of blastocoelomates; 9 Phyla currently considered to exhibit this body cavity type.

**Nematoda-** distinguishing characteristics; potential synapomorphy? Musculature and its arrangement especially in cross section, parts of a muscle cell; diversity of habitats; typical life-cycle; 2 classes and their distinguishing features; basic structure of reproductive system; excretory organs; configuration of outer body layers.

**Nematomorpha-** distinguishing characteristics; generalized life cycle; features distinguishing from nematodes? General host associations and habitats occupied (larvae vs. adults); sexual dimorphism.

**Rotifera-** distinguishing characteristics; body parts (e.g. corona and its trochal discs and cingulum; mastax and its trophi, etc.); configuration of outer body layers; diversity of feeding modes and associated modifications of feeding structures; 2 Classes and their general types features; how monogonontans and bdelloids differ wrt reproduction and life-cycles; role of mictic versus amictic eggs.

**Acanthocephala-** distinguishing characteristics; parts of the body; sister taxon? Syndermata (i.e. Rotifera + Acanthocephala)- features uniting and distinguishing these phyla; host associations.

**Entoprocta-** distinguishing characteristics; general morphology (colonial, sessile, with tentacles, etc.); tentacles and their functions; basic orientation of body; larval stages; configuration of gut (position of anus).

**Priapula-** habitat; body regions; larval stage; specialized excretory structures; configuration of outer body layers.

**Kinorhyncha-** distinguishing characteristics (zonites, scalids, etc); body regions; juvenile; habitat.

**Loricifera-** distinguishing characteristics; larval stage, etc; habitat; body regions.

**Cycliophora-** distinguishing characteristics; only known habitat; complexity of life cycle; postulated affinities; year of description of phylum.

Terms for which you should be prepared to provide a definition and an example:

Parazoa	polyp	Eubacteria
Protista	medusa	Archaea
undulopodium	amphiblastula larva	eukaryote
radiatan	planula larva	test
bilaterian	gonozooid	protonephridium
flame cell	gasterozooid	nephridiopore
monoecious	nematocyst	blastopore
acoelomate	cnidocyte	blastocoel
blastocoelomate	parenchyma	blastomere
eucoelomate	epidermis	gastrula
redia	gastrodermis	archenteron
eulittoral	mesoglea	syncytium
flagellum	gastrovascular cavity	cercaria
blastocoelomate	gorgonin	kinetosome
foraminiferan	scyphistoma	prokaryote
Animalia	strobila	transverse fission
pinacoderm	ephyra	epithelio-muscular cell
lobopodium	velum	nutritive-muscular cell
filopodium	cydippid larva	cnida
reticulopodium	ectoderm	sporocyst
axopodium	endoderm	hexacanth
rhopalium	mesoderm	cercaria
triploblastic	mesenchyme	benthic
diploblastic	blastocoel	pelagic
cytostome	oncomiracidium	interstitial
macronucleus	Metazoa	meiofauna
micronucleus	rhynchocoel	epifauna
mictic female	scalid	infauna
amictic female	Mueller's larva	plankton
infraciliature	neodermis	nekton
alveolus	pilidium larva	supralittoral
trichocyst	parthenogenesis	sublittoral
pinacocyte	gemmae	
choanocyte	dioecious	
porocyte	mastax	
amoebocyte	lemnisci	
archeocytes	spongocoel	
collenocytes	stylet	
sclerocytes	scolex	
spongin	trophi	
mesohyle	oncomiracidium	
osculum	haptor	
spicule	cercomer	
megasclere	trochus	
microsclere	corona	
asconoid	lorica	
syconoid	cingulum	
leuconoid	parthenogenesis	