

Animalia I: The Invertebrates

I. Introduction

A. Taxonomy

Domain: Eukarya

Kingdom: Animalia

B. General characteristics

Multicellular

Heterotrophic

Distinct tissues/organs

Require oxygen

Sexual reproduction

C. Animal diversity and organization schemes

30 phyla

Classification basis:

Tissues

Symmetry

Embryonic tissue development

Molting

Body cavities

D. Symmetry

Asymmetry

Radial symmetry

Bilateral symmetry

E. Cavities

Aceolomate

Pseudoceolomate

Coelomate

F. Embryonic development

Protostomes

Deuterostomes

II. Simplest Animals

A. Phylum Porifera

Examples: sponges

Asymmetric

No tissues or organs

Spicules

Collar cells

III. Animals with tissues

A. Phylum Cnidaria & Phylum Ctenophora

Examples: jellyfish, sea anemones, coral (all Cnidaria); comb jellies (Ctenophora)

Tissues, no organs

Body plans – radial symmetry

Medusa vs. polyp

Life cycle of *Obelia*

Nematocysts

IV. Animals with a 3-layer embryo and are protostomes

A. Lophotrochozoans

1. Phylum Platyhelminthes

Flatworms – often parasitic, hermaphroditic, acoelomate

Examples: planarians, flukes, tapeworms

Planarian organs and systems

Tape worm life cycle and structure

2. Phylum Annelida

Segmented worms, coelomate

Examples: earthworms, leeches

Class Hirudinea – leeches

Class Oligochaeta – earthworms

Setae

Class Polychaeta – polychaete worms

Tube worms

3. Phylum Mollusca

Examples: clam, octopus, snail

General body plan: coelomate

Class Gastropoda – snails, slugs, nudibranchs

Class Polyplacophora – chitons

Class Bivalva – clams, oysters

Class Cephalopoda – octopus, squid, nautilus

4. Phylum Rotifera

Pseudocoelomate

Body plan

B. Ecdysozoans

1. Phylum Nematoda

Roundworms

Trichinella

Wuchereria bancrofti

2. Phylum Tardigrada

Water bears

Coelomate

Hardy microscopic creatures

3. Phylum Arthropoda

Characteristics

Jointed appendages

Segmented body plan

Specialized mouthparts

BIO 102 General Biology
Lecture Outline

Chelicerae

Mandibles

Exoskeleton

Sensory structures

Molt

Subphyla – Chelicerata, Crustacea, Uniramia

Class Arachnida

Spiders, scorpions, mites, ticks

2 segments: cephalothorax and abdomen

Mouthparts: fangs/pincers

Pedipalps

4 pairs of legs

No antennae

Class Crustacea

Crabs, lobsters, crayfish, pill bugs

2 segments: cephalothorax and abdomen

2 pairs of antennae

Mouthparts: mandibles

Class Chilopoda

Centipedes

1 pair of legs per segment

Class Diplopoda

Millipedes

2 pairs of legs per segment

Class Insecta

3 segments: head, thorax, abdomen

1 pair of antennae

3 pairs of legs

May have wings

Metamorphosis

Mouthparts of insects

V. Animals with a 3-layer embryo and are deuterostomes

A. Phylum Echinodermata

Spiny skin

Sea stars, sea urchins, sand dollars

5 part body plan – radial symmetry in the adult (bilateral symmetry in larvae)

Water vascular system