

PowerLecture:

Chapter 25

Part I

Animal Evolution – The Invertebrates

Section 25.0: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Impacts, Issues: **Old Genes, New Drugs**

- More than 500 predatory mollusks live in the sea

- Use conotoxins to paralyze their prey

- Conotoxins interest biologists as potential sources for new drugs

Impacts, Issues: **Old Genes, New Drugs**

- *C. geographicus* secretes a toxin that one day might help epileptics

- The gene that codes for the enzyme gamma-glutamyl carboxylase (GGC) catalyzes a step in the conotoxin synthesis pathway

Impacts, Issues: **Old Genes, New Drugs**

- GGC is present in insects and humans, but functions in blood clotting in our bodies

- GGC gene must have been around for at least the past 500 million years in a common ancestor

Impacts, Issues Video

Section 25.1: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Characteristics of Animals

- Multicelled heterotrophic eukaryotes
- Require oxygen for aerobic respiration
- Reproduce sexually, and perhaps asexually
- Motile at some stage
- Develop from embryos

Major Animal Phyla

Animal Tissues

- Ectoderm

- Endoderm

➤ Epithelium

Frog Development

Early frog development

Animal Origins

➤ Originated during the Precambrian (1.2 billion - 670 million years ago)

➤ From what? Two hypotheses:

- Multinucleated ciliate became compartmentalized
- Cells in a colonial flagellate became specialized

Section 25.2: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Symmetry

Types of body symmetry

The Gut

➤ Region where food is digested and then absorbed

➤ Saclike gut

- One opening for taking in food and expelling waste

➤ Complete digestive system

- Opening at both ends; mouth and anus

Body Cavities - Acoelomate

Body Cavities - Pseudocoel

Body Cavities - Coelom

Body Cavities - Coelom

Types of body cavities

Segmentation

➤ Repeating series of body units

➤ Units may or may not be similar to one another

➤ Earthworms - segments appear similar

➤ Insects - segments may be fused and/or have specialized functions

Section 25.3: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Phylum Placozoa

➤ One living species, *Tricoplax adherens*

➤ Simplest known animal

➤ Two-layer body,

3 mm across

Sponges - Phylum Porifera

- No symmetry
- No tissues
- No organs
- Reproduce sexually
- Microscopic swimming larval stage

Sponge Structure

Sponge Structure

Body plan of a sponge

Section 25.4: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Phylum Cnidaria

- Only animals that produce nematocysts
- Nerve net
- Hydrostatic skeleton
- Saclike gut

Cnidarian Diversity

- Scyphozoans
 - Jellyfish
- Anthozoans
 - Sea anemones
 - Corals
- Hydrozoans

Two Main Body Plans

Cnidarian Diversity

Cnidarian body plans

Nematocyst

Nematocyst action

Obelia Life Cycle (Hydrozoan)

Obelia Life Cycle (Hydrozoan)

Cnidarian life cycle

Section 25.5: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Flatworms:

Phylum Platyhelminthes

- Acoelomate, bilateral, cephalized animals
- All have simple or complex organ systems
- Most are hermaphrodites

Three Classes

- Turbellarians (Turbellaria)
- Flukes (Trematoda)
- Tapeworms (Cestoda)

Blood Fluke

Blood fluke life-cycle

Tapeworm

Tapeworm life cycle

Planarian Organ Systems

Planarian Organ Systems

Planarian organ systems

Section 25.6: Weblinks and InfoTrac

See the latest Weblinks and InfoTrac articles for this chapter online

Annelids: Phylum Annelida

Segmented, coelomate worms

- Class Polychaeta
- Class Oligochaeta
- Class Hirudinea

Polychaetes

- Most are marine
- Bristles extend from paired, fleshy parapods on each segment
- Head end is specialized

Marine Polychaetes

Marine polychaetes

Leeches - Class Hirudinea

- Predators and parasites
- Less obvious body segmentation
- Most have sharp jaws

Leeches

Feeding leech

Earthworm - An Oligochaete

No parapodia, few bristles per segment

Earthworm Nephridium

Earthworm Circulatory System

Earthworm Digestive System

Earthworm Nervous System

Earthworm

Earthworm body plan

Section 25.7: Weblinks and InfoTrac

See the [latest Weblinks](#) and [InfoTrac articles](#) for this chapter online

Rotifers

Rotifers

Rotifers

Two Coelomate Lineages

Protostomes

➤ Mollusks

➤ Annelids

➤ Arthropods

Cleavage Patterns

First Opening in Embryo