Biology 1306/1406 – Modern Concepts in Bioscience II

Hello and welcome to the weekly resources for BIO-1306/1406 - Biology 2

This week is Week 6 of class, and typically in this week of the semester, your professors are covering the topics below. If you do not see the topics your particular section of class is learning this week, please take a look at other weekly resources listed on our website for additional topics throughout the semester.

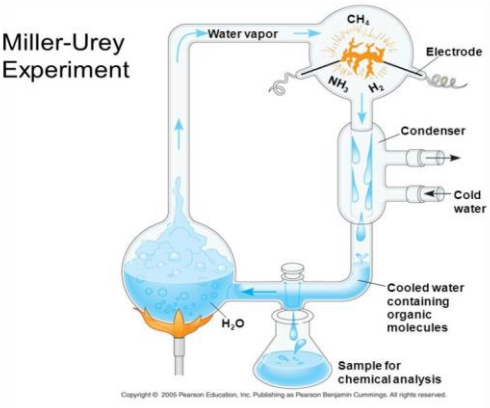
We also invite you **to look at the group tutoring chart on our website to see if this course has a group tutoring session offered this semester.**

If you have any questions about these study guides, group tutoring sessions, private 30 minute tutoring appointments, the Baylor Tutoring YouTube channel, or any tutoring services we offer, please visit our website www.baylor.edu/tutoring or call our drop in center during open business hours (M-Th 9am8pm on class days at 254-710-4135).

Topic of the Week:

This week in Biology 1306, we will be covering Early Life on Earth, Animal Form and Function, and Animal Diversity.
Campbell Chapters 25, 32 and 40.

Early Life on Earth: Campbell chapter 25

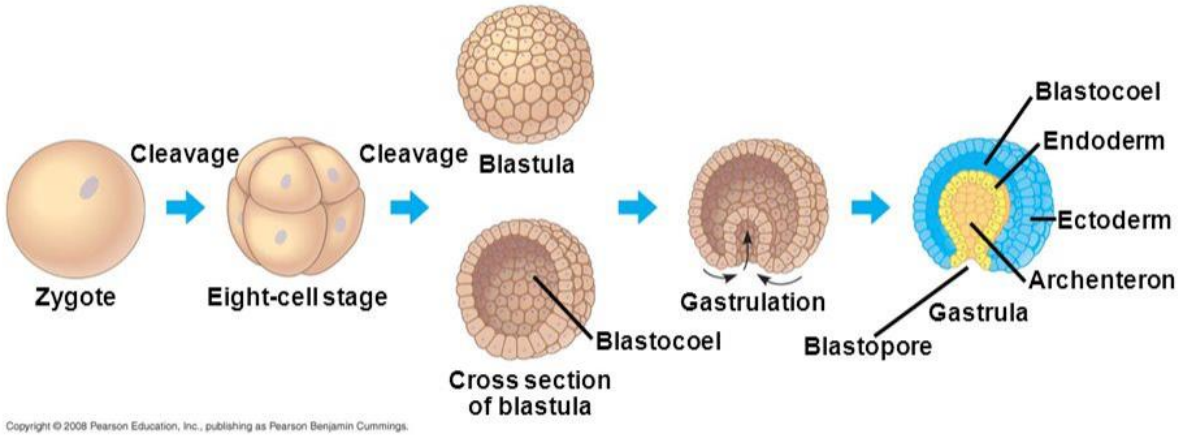


Chemical and physical processes, along with natural selection, made the origin of life possible on early Earth. In their experiment, **Miller and Urey** found that organic compounds, or biotic molecules, could be synthesized from abiotic factors. This led to the theory that life originated near Alkaline **Hydrothermal Ocean Vents**. The first organic macromolecules thought to be synthesized near these ocean vents are **RNA Polymers**. This is due to the fact that RNA Polymers will self-generate if monomers are present. These early molecules were packaged into **Protocells,** or droplets with membranes that maintain an internal chemistry different than that of the surroundings. From these protocells came single celled organisms and eventually multicellular organisms who later colonized land. Once on land, the rise and fall of dominant groups reflects **plate tectonics**, which can cause allopatric speciation, **mass extinctions**, like at the end of the **Permian** period, and adaptive radiation following a mass extinction where the survivors of the extinction adapt into important ecological niches.

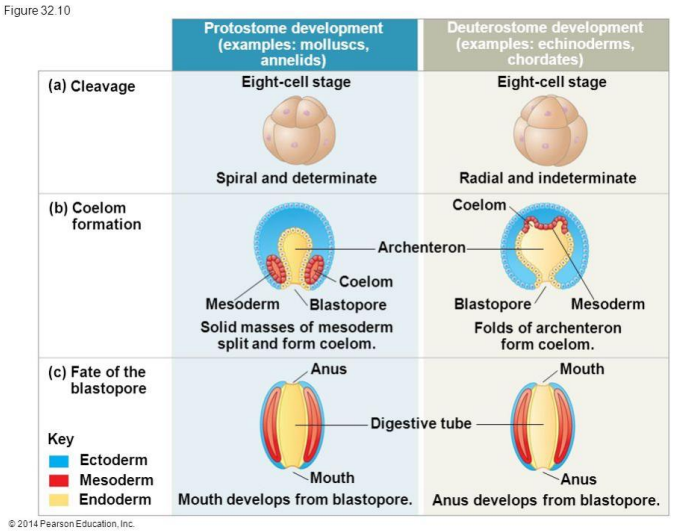
An Overview of Animal Diversity - Campbell Ch. 32

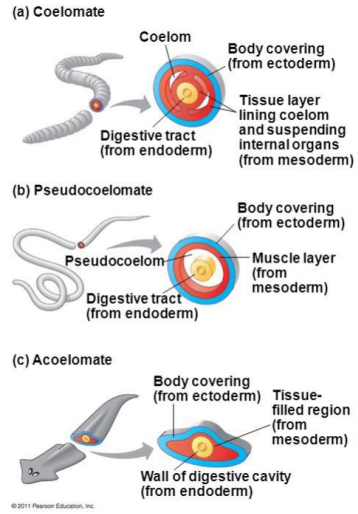
Animals are multicellular, heterotrophic eukaryotes with tissues that develop from **embryonic layers**. The stages of **embryonic development** are shared among all animals and proceeds through many cleavages, or successions of mitotic cell division without cell growth, meaning

that cells divide into two cells over and over again.



Animals can also be characterized by their **body plans**. Sponges have **no symmetry**, meaning that anyway they are divided, the two pieces are not identical. **Radial Symmetry** can be seen in cnidarians, where the top and bottom of the organism are identical. **Bilateral symmetry** can be divided down the middle, and into top and bottom and is associated with **cephalization**, or the isolating of nerve tissue into a head.





Following Gastrulation, **germ layers** are created. The **ectoderm** is the outer covering of the embryo and gives rise to the outer covering of the animal and the Central Nervous System. The **endoderm** is the inner most germ layer and gives rise to the digestive tract. The **mesoderm** lies between the ectoderm and the endoderm in all bilaterally symmetric animals and gives rise to most other tissues. Animals can have only endoderm and ectoderm, and are **diploblastic**, or in the case of all bilaterally symmetric animals, can have all three and be **triploblastic**. Below is a diagram of the body cavities of triploblastic animals. Similarly, these triploblastic animals either develop as **Protostomes** or **Deuterostomes**, depending on the fate of the blastopore, and the location of Mesoderm (see above).

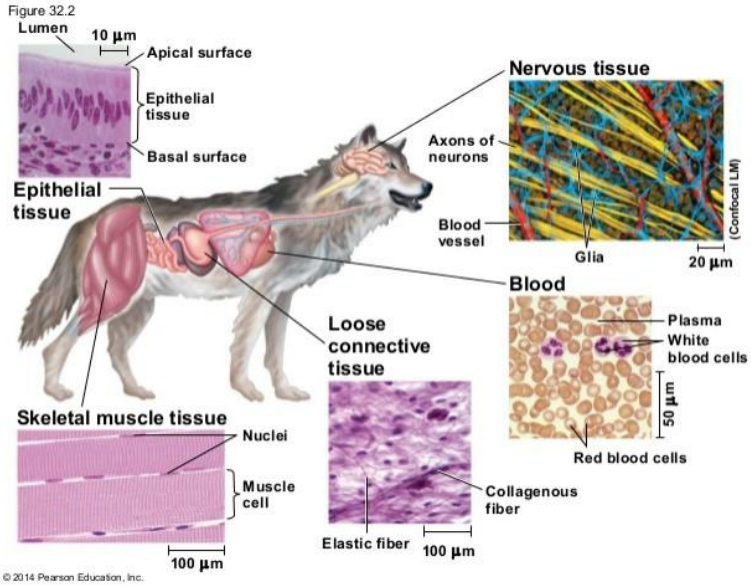
Basic Principles of Animal Form and Function: Campbell chapter 40

This chapter is very definition heavy. One thing that is important to remember as we learn different types of cells is the order of different levels of body plan organization. In order of increasing complexity, they are **cells, tissues, organs, organ systems and bodies.** By increasing complexity, organisms are able to maximize their **Surface Area to Volume** ratios. This is important because it enables organisms to exchange nutrients, water and other materials with their environment.

Within these complex organisms are different tissues:

Epithelial Tissue- lines organs, covers the body and is held together by tight junctions

- Polarized: when something is found on one side and not the other, meaning that there is an apical and basal side
- Functions as a barrier
- Avascular (no blood vessels)
- Stratified squamous, cuboidal, simple columnar, simple squamous, pseudostratified



Connective tissue- lies underneath epithelial tissue, has blood vessels (vascular)

- Blood, cartilage, adipose (fat), bone, fibrous (tendons and ligaments), and loose (found in skin)
- Collagenous fibers: provide strength and flexibility
- Reticular fibers: join connective tissue to adjacent tissue
- Elastic Fibers: make tissue elastic

Muscle Tissue- all muscles cells consist of filaments containing the proteins **actin** and **myosin** which enable the muscles to contract

- Skeletal muscle, smooth muscle, and cardiac muscle

Nervous Tissue- makes up the Central Nervous System and the Peripheral Nervous System

- Neurons and Glia (the support cells which make up myelin)

Animals must also balance heat gain and heat loss. Different animals do this in different ways, but for the purposes of this class, we will focus on specific terms including:

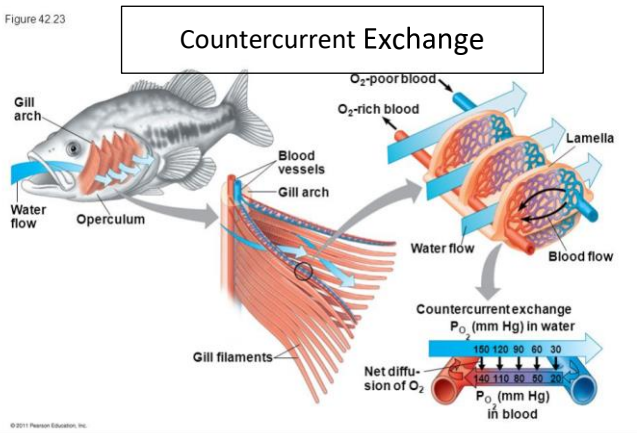
Poikilotherm: organism which has a varying body temperature
Homeotherm: organism which has a constant body temperature
Exotherm: organism which gains their heat from external sources
Endotherm: organism which is warmed by heat generated through metabolism

All endotherms are homeothermic, but some exotherms can be as well, depending on their external environments.

Insulation: prohibits heat loss, ex. Blubber or fur

Circulatory Adaptations: changing the width of blood vessels to conserve heat through Vasoconstriction and Vasodilation

Countercurrent Exchange: arterial and venous blood flow close to each other in two different directions, allowing for thermoregulation, gas exchange, and fluid exchange.



CHECK YOUR LEARNING

1. What is the difference between Batesian and Mullerian Mimicry?
2. What was discovered/proven in the Miller and Urey Experiment?
3. What is a poikilotherm and how does that relate to a homeotherm?

THINGS YOU MAY STRUGGLE WITH

1. Vocabulary! These chapters are all about memorization. Make sure that you can differentiate between the similar concepts presented by your professor.
2. The Miller and Urey Experiment. Check out this video to learn more: Check out this video starting at 5:29 https://www.youtube.com/watch?v=NNijmxsKGbc&t=318s
3. The differences between Protostomes and Deuterostomes. These are crucial to understand. Check out our youtube page for more information! Go to Youtube, search Baylor Tutoring Center and go to the Bio 2 folder.

Study Tips:

*** Review all vocabulary in each chapter and make sure you understand what the terms mean***

That's all folks.

If you have any questions, feel free to reach out to the tutoring center or use the link at the top of the resource to make an appointment.

Answers:

1. Mullerian Mimicry is when harmful species mimic each other. Batesian mimicry is when a harmless species mimics a harmful species.
2. The abiotic synthesis of organic molecules.
3. Poikilotherms have varying body temperatures and Homeotherms have constant body temperatures. THIS DOES NOT NECESSARILY CORRELATE WITH WHETHER THE ORGANISM IS AN ENDOTHERM OR ECTOTHERM.