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**Biology 1306/1406 – Modern Concepts in Bioscience II**  
Week of April 5, 2021

Hey everyone, I hope that everyone had a lovely Easter! Only one month left in this semester...y'all are rock stars and can do this!!

**Keywords: Nervous system, neurons, ecology, populations, potentials, animal nutrition, digestion, feeding**

Our Group Tutoring sessions will be every **Thursday from 7:00-8:00 PM**. You can reserve a spot at <https://baylor.edu/tutoring>. I hope to see you there!

This week in Biology 1306, we will be covering Campbell Chapters ch 41, 52, 53

**Animal Nutrition – Campbell chapter 41**

This chapter is unique to only a few BIO 1306 sections, but important to understand.

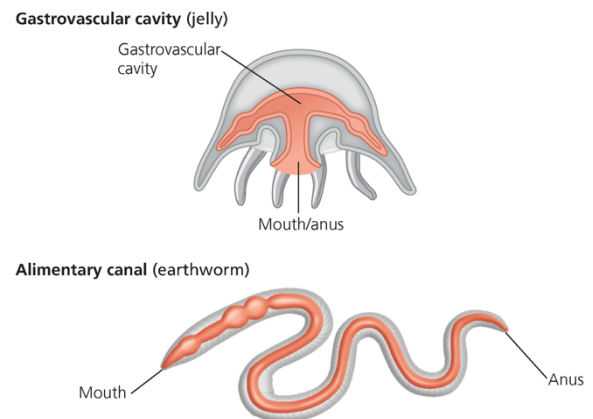
To begin, Animals gain their nutrients from what they eat. As such, they are characterized as **heterotrophs**. For animals, their diet must provide all of the chemical energy, organic building blocks and nutrients that are essential for life.

**Essential nutrients** must be “provided” in their final forms. This means that animals cannot synthesize these nutrients on their own and must get them from external sources. These include some amino acids, vitamins, minerals and fatty acids. If the intake of these nutrients is inadequate, **malnutrition** can result.

Animals can obtain food in different ways including **bulk feeding, filter feeding, substrate feeding and fluid feeding**. No matter how animals obtain their food, they will break it down similarly. One concept that is important to all animals that are digesting food is **compartmentalization**. Inside of the digestive system of animals, food is being broken down in different ways:

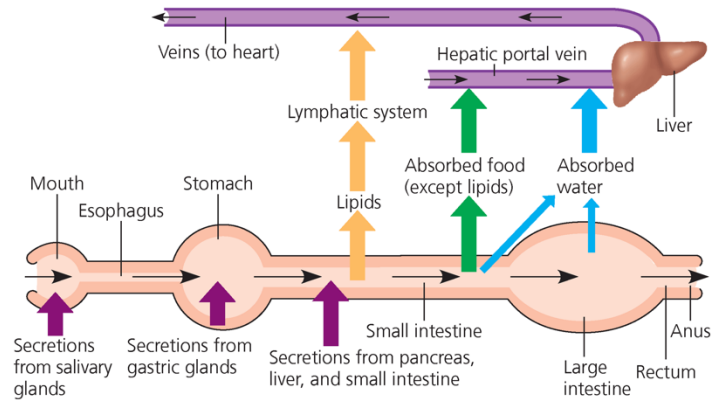
**Intracellular Digestion** involves food being brought into a cell by phagocytosis, an infolding of the cell membrane to create a membrane-sealed “bubble” around the food so that it can be brought to lysosomes where the food is broken down.

**Extracellular Digestion** is a little bit different. Extracellular digestion is much more common than intracellular digestion and involves enzymatic hydrolysis in some sort of **gastrovascular cavity** or **alimentary canal**.



In **mammals**, we see many organs which are specialized for specific stages of food processing. The Campbell Textbook gives a good summary of these stages which I have summarized below:

1. Food enters the digestive “system” through the **mouth**, and we see secretions from **salivary glands** that begin to break down aspects of the food.
2. Food then travels into the **Esophagus**.
3. From the Esophagus, food travels into the **Stomach** where secretions from **gastric glands** continue to break down the food.
4. From the stomach, the food travels to the **Small Intestine** and is met with secretions from the **pancreas and liver**. From here, lipids will travel to the **lymphatic system**, and all other substances which have been absorbed travel to the **hepatic portal vein**. This vein takes these substances to the **Liver** and then back to the **Heart**.
5. From the small intestine, unabsorbed food enters the **Large Intestine**. Here, water is absorbed into the blood and travels to the hepatic portal vein and back to the heart.
6. All other non-absorbed food travels from the large intestine into the **Rectum**.
7. In the rectum, no food is absorbed, and we see the contents of the rectum excreted from the body through the **Anus**.



### Ecology and the Biosphere and Population Ecology – Campbell chapter 52, 53

Like many chapters in this course, 52 and 53 are very definition heavy. To start, we must be able to differentiate between different types of **ecology**:

**Organismal:** how an organism’s structure, physiology and behavior meet

**Population:** factors affecting population size and why it changes

**Community:** interactions between species (competition and predation) affect the community

**Ecosystem:** energy flow and chemical cycling between organisms and environment

**Landscape:** factors affecting and controlling the exchange of materials, energy and organisms

**Biome:** major life zones characterized by vegetation type in terrestrial biomes or physical environment in aquatic biomes

### Understand the differences between:

**Abiotic:** non-living factors

**Biotic:** living factors

**Microclimate:** fine, localized patterns ex. Shade under a canopy

**Macroclimate:** global, regional and landscape level patterns ex. Mountain sides

**Climograph:** plot of the annual mean temperature and precipitation in a particular region.  
DETERMINES WHAT TYPE OF BIOME WILL EXIST IN THAT AREA

**Thermocline:** abrupt temperature changes between warm upper layer of water and cooler deeper water

**Seasonal Turnover:** semiannual mixing of water due to climate change causes oxygen rich surface water to go to the bottom and nutrient rich water to the surface

**Disturbance:** an event (storm, fire, etc.) which changes a community, removing organisms from it and altering resource availability

**Climate:** the most significant influence on the distribution of organisms in the area; long term prevailing weather conditions in an area

**Climate change:** change in global climate lasting 3 decades or more

**Iteroparity-** organisms that reproduce a few offspring more than once ex. Dogs

**Semelparity-** organisms that reproduce once but have many offspring ex. Salmon

**Bodies of water and mountain ranges can affect regional climate conditions. Ocean currents** heat or cool overlying air masses that pass across land. The high specific heat of water helps moderate the climate. Similarly, **mountains** can influence the air flow over land. Warm air goes up the mountain, cools and rains. The **leeward side** doesn't get much moisture, so a desert is made on the other side of the mountain.

To learn more about major aquatic biomes, check out this video:

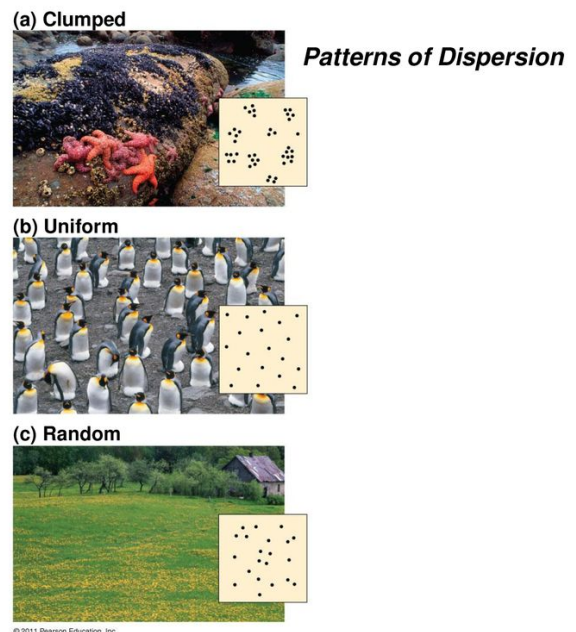
<https://www.youtube.com/watch?v=4fMemcd-VXw>

To learn more about terrestrial biomes, check out this video:

<https://www.youtube.com/watch?v=4kQSXIWsUtg>

There are three different types of dispersion we will discuss:

- **Dispersal** is the movement of individuals or gametes away from their areas of origin or centers of high population density. There can be a difference between where a species could live (**Potential Range**) and where it actually lives (**Actual Range**).
- **Density** is the number of individuals per area
- **Dispersion** is the pattern among spacing among individuals in that area.



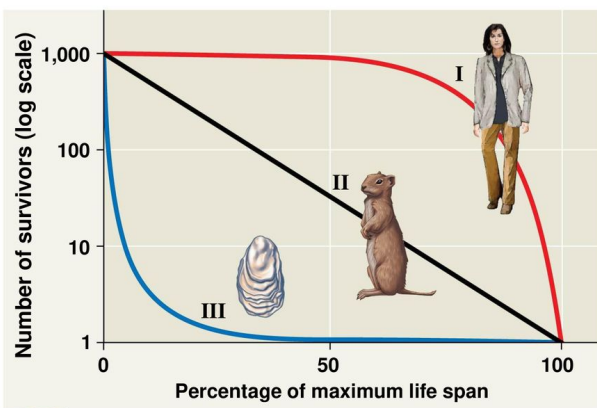
**Survivorship Curves-** describe the death patterns in types of communities.

**Type 1-** low death rates at the beginning and middle, then steep at the end ex. humans

**Type 2-** constant death rate over the lifespan

**Type 3-** high death rate in young, but flattens out for those who survive

Figure 40.16 Idealized survivorship curves: types I, II, and III



Population sizes can also be “selected” in different ways. Those that undergo **density dependent selection**, or selection for traits that maximize reproductive success in crowded environments are **R-selected Populations**. Those that undergo **density independent selection** are **K-selected Populations**.

Remember, there is always a tradeoff between reproduction and survival. There is competition. Among individuals in the population and the resources available that limit that population.

**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 a Microsoft Teams appointment.**

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