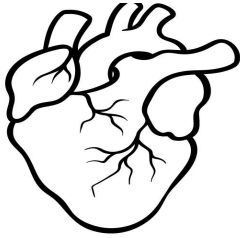


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Week 1 Topics; Intro, Discovery and Cells, Integumentary

Main Course Topics

- Anatomy
 - Focus on **structure** of the body and/or understand the internal workings of it
- Physiology
 - Focus on the **function** of bodily parts and/or the organs



Anatomy says: The heart is connected to many blood vessels

Physiology says: The heart pumps blood through the blood vessels so blood goes where it is needed

- Disease
 - What is causing **issues**/what is **impacting** normal body structure/function?
 - How can normal body structure/function be recovered?
- Health
 - Can be seen as the state the body is disease free or body has a high level of bodily function

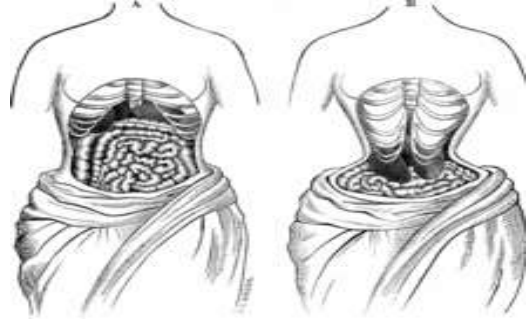
Biology in everyday life

- Impact on consumption
 - Knowing about biology helps understand what you body needs or doesn't need
 - Could influence what you may consume/do in order to maintain bodily function



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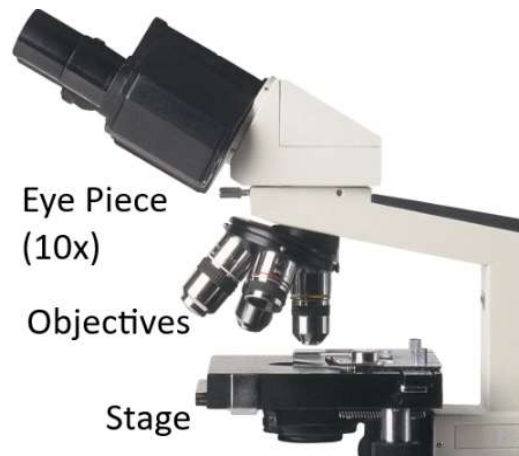
- Cultural impact
 - Understand how a culture's norms/traits/ideas can impact body structure/function
 - Example: USA and eating contests or Britain during Victorian era and tightlacing



- Citizen impact
 - How does the government prioritize good human biology?
 - Is there a focus on health?

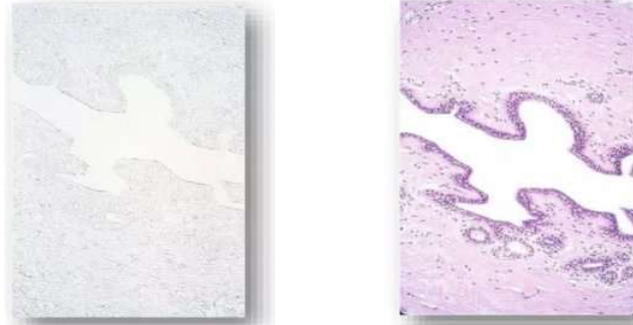
Science Discovery

- 3 key aspects of science discovery
 - Exploration: investigation and observing something new
 - Description: find details about it or explain what it is
 - Explanation: how or why it works, complicated or easy?
- The Microscope, science's biggest friend
 - Dating back to the 1600s, helped people understand materials/substances at a microscopic level
 - Early models were capable of 10x magnification
 - Present day capable of 1500x
- Magnification explained
 - To achieve varying levels of magnification both a base eyepiece (10x) is used along with an objective (varying magnification value)



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- Stains
 - In order to better see cells/components/structures of a sample, stains (dyes) are used to enhance visual clarity
 - Primarily helpful to see structures or, if using samples that are alive, observe if they grow or shrink under some conditions



Cells and Tissues

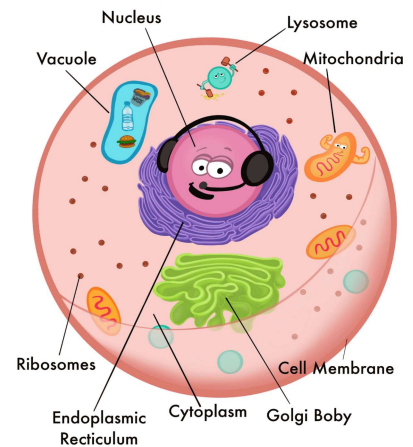
- Tissues are merely a lot of cells that form one unit (one substance or material)
- There are 4 main types of Tissues
 - 1) Epithelial Tissues: on top of
 - Used a lot throughout the body
 - Ex: outer layer of skin (epidermis), lining for gastrointestinal tract
 - 2) Connective Tissues: connecting things
 - Used by lots of organs
 - High function: helps move nutrients or store fat, helps repair other tissues
 - Ex: blood is a special type of connective tissue
 - 3) Muscle Tissues: strength or movement
 - Provide the capability for movement (both for skeleton and organs)
 - Fibers found in muscle tissues allow for tissues to expand or contract easier

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- 4) Nervous Tissues: body communication
 - Act as the telecommunication network so the body can do activities
 - Commonly found in the brain and spinal cord

Cell Structures

- There are 6 main organelles in the cell that have function
 - Organelles are similar to what organs are for the body
 - 1) Nucleus
 - The **brain** of the cell
 - Contains the cell's genetic information
 - For larger cells, there might be many **nuclei**
 - 2) Mitochondrion
 - The **powerhouse** of the cell
 - Provides chemical energy for the cell
 - Adenosine Triphosphate (ATP)
 - 3) Endoplasmic Reticulum
 - The **resource producer** of the cell
 - Smooth version (SER) produces lipids (fats)
 - Rough version (RER) produces proteins
 - 4) Golgi Complex
 - The **packager** of the cell
 - Uses the lipids and proteins made by the ER's and prepares them to be of use by the cell
 - 5) Lysosome
 - The **compost** of the cell
 - Breaks down bacteria, old cell components and other unneeded material in the cell with its digestive enzymes
 - 6) Vesicle
 - The **resource mover** of the cell
 - Sac that allows for things to move around in a cell, not to be confused with membrane that separates outside the cell and inside it



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Plasma membrane (Cell membrane)

- Barrier between the outside and inside of a cell
- Made up of two phospholipid layers, the layers themselves are made of many phospholipid molecules
- Substances may diffuse through the membrane via two ways
 - Simple diffusion
 - Protein assistance

Cell examination and life stages

- Few basic steps to examine a sample
 - 1) Take sample with a tool
 - 2) Place sample (smear it) on a slide
 - 3) Add a stain on the slide (add a dye)
 - 4) Place slide on the microscope stage
- From a sample, there are a few basic structures/forms we see most



Large with lots of space
Suitable for future cell
growth, ex: fertilized egg



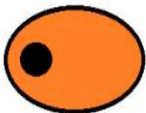
Moderate size but cell primarily has larger
surface area
Lack of a nucleus allows easier movement
ex: blood



Thin but long, most of cell
information is in one place
ex: sperm



Long cell chain, connection method
allows for expansion or contraction
ex: muscle cell



Large with lots of space, but
not free space, space taken up
by important substance
ex: fat cell



Branch like appearance,
connects with other branch like
structures for communication
ex: neurons

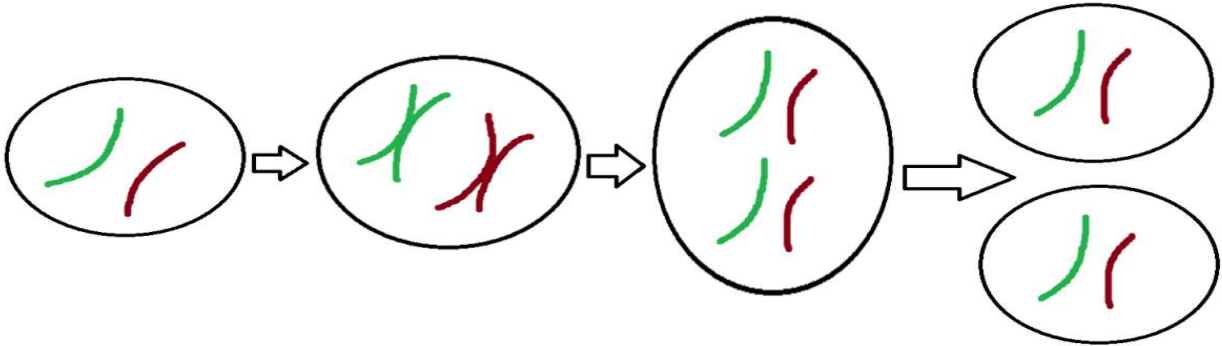


End where nucleus is located is more fortified
whereas ribbed end is more susceptible
Cell structure allows for deteriorative actions to
impact cell, but not compromise the cell entirely
ex: intestine lining cell

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Cellular life stages

- Mitosis
 - Single cell duplicates chromosomes
 - Chromosomes regroup in pairs and then split off from main cell to form 2 separate daughter cells



- Hypertrophy
 - As growth happens, size increases
 - Cell must then grow in size to accommodate
- Differentiation
 - As a cell matures, depending on what function it must serve, the cell must undergo change
 - Cell will undergo a change in structure so it can have a different function than before
- Apoptosis
 - A cell is programmed to die after a certain time, this is to not have an excess of unnecessary cells in a given organism/material/substance
 - This is different than Necrosis, which is sudden unexpected cell death due to some factor