

Digestion Notes



Food →

energy and building blocks

- Describe the difference between a producer and a consumer
- Producer makes its own food
- Consumer get food from eating other living things

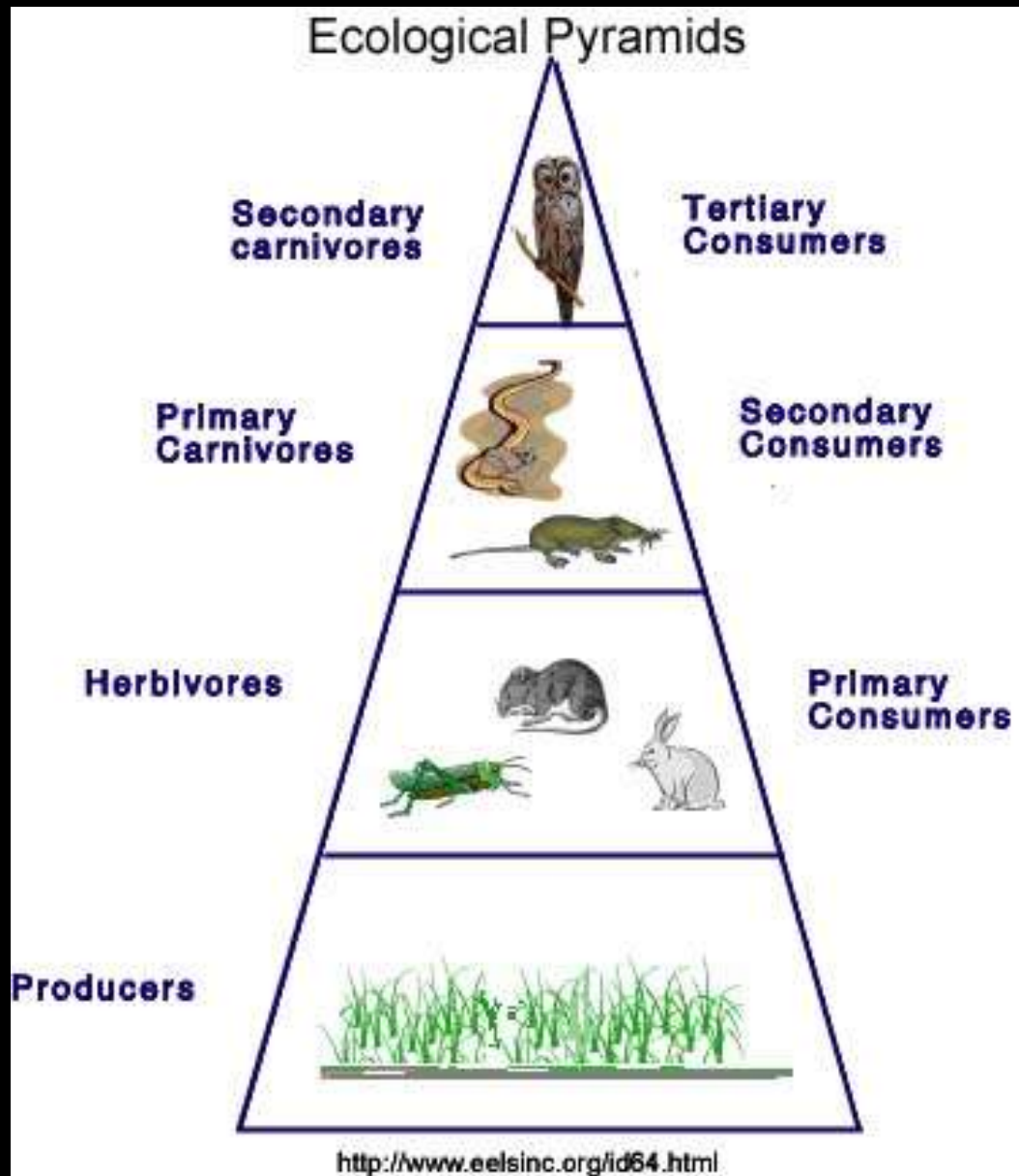
Autotrophs = producers

- Example =
- Plants
- Nutrients needed =
- N,P,K
- Energy source =
- Light
- Energy process to make food =

Photosynthesis

- Light + CO₂ + water → sugar + O₂

Producers form base of all food chains



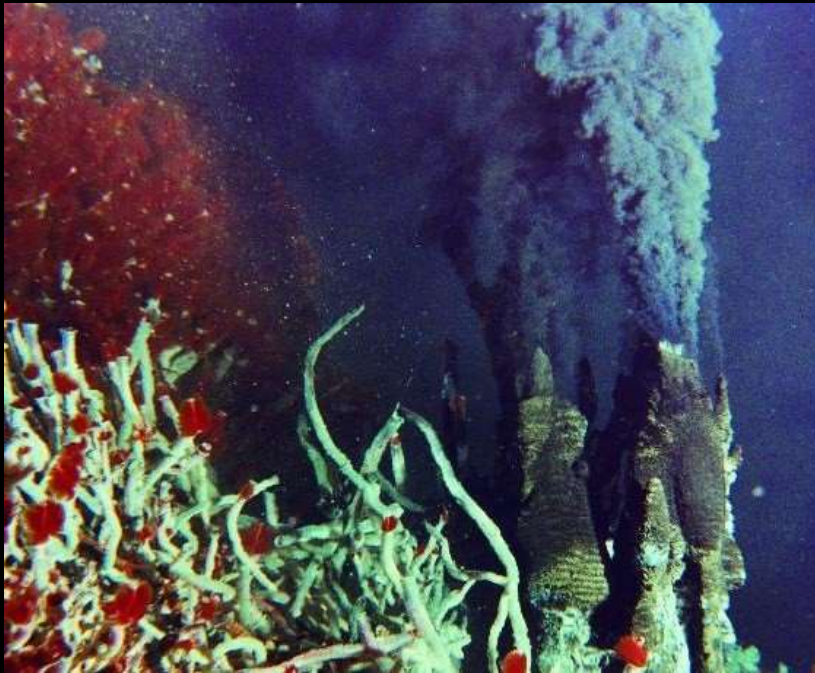
Review difference between
population and community

Describe the organisms found in
Hydrothermal vent communities in the
deep ocean far from sunlight

Make an inference

If these communities do not receive sunlight where do they get their energy from

Draw a Food Chain in the
Deep Ocean (label the
producers and consumers)



Heterotrophic Nutrition

Heterotrophs = consumers

Consumers = heterotrophs

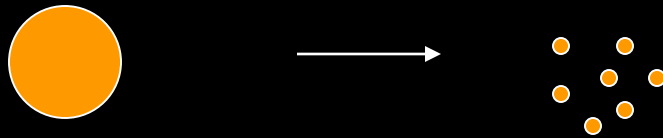
- Examples:
- Animals, decomposers
- Nutrients needed
- Carbohydrates, fats, proteins
- Where do they get their nutrients
- Eating other organisms
- What do they have to do before they can use nutrients from food
- Digest or break it down

How do organisms digest
food?

Frog Saliva CER activity

2 types of digestion

- Mechanical = physical (ex: chewing)
→ inc. surface area



- Chemical = requires enzymes and acids to break chemical bonds

Practice question in notes

Acid rain CER activity

Products of chemical digestion

Large Molecule	End Products
Complex sugars (ex: starch)	Simple sugars Ex: glucose
Proteins	Amino Acids

Digestive systems in animals

2 way digestive systems

- Food goes in and out same opening
- Ex: amoeba engulf / surround food



2 way

- Ex: Paramecium uses cilia to force food into an oral groove



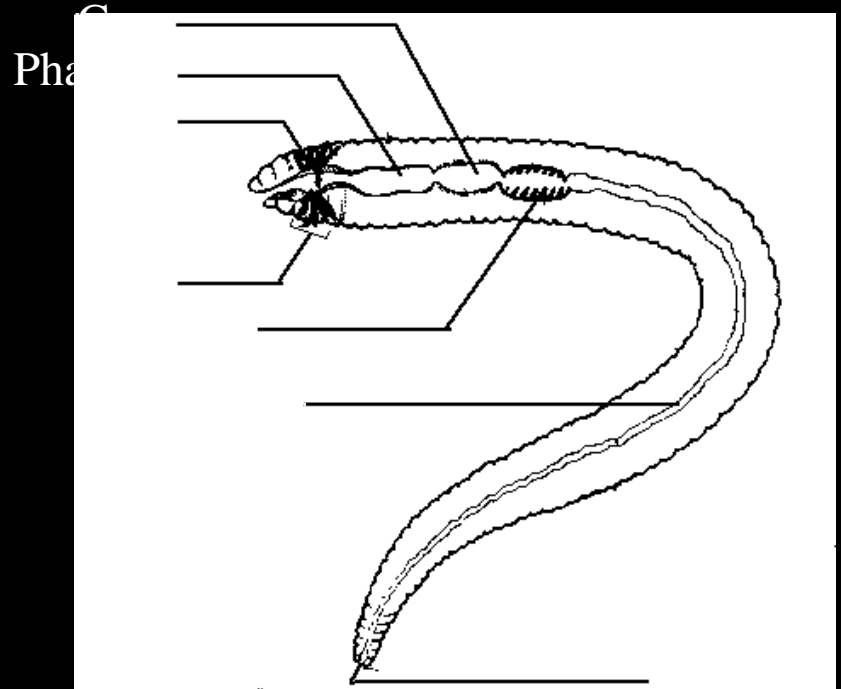
2 way

- Ex: Hydra tentacles pull food in & wastes go out same opening



One way digestive system

- Description
- Food moves in 1 direction
- Example 1 Earthworm



Example 2

- Humans have a 1 way digestive system

4 Steps Involved in Digestion

1. Ingestion = take in
2. Digestion = break down
 - (occurs in lysosomes, involves enzymes and acids)
3. Absorption = broken down food diffuses into cells
 - (Must be small enough to go across cell membrane)
4. Egestion = removal of unused parts

Figure 33–8: The Digestive Systems of Vertebrates

-  Esophagus
-  Stomach
-  Intestine
-  Liver
-  Gallbladder
-  Pancreas
-  Cloaca
-  Crop
-  Gizzard
-  Cecum
-  Rectum

Shark



Salamander



Lizard



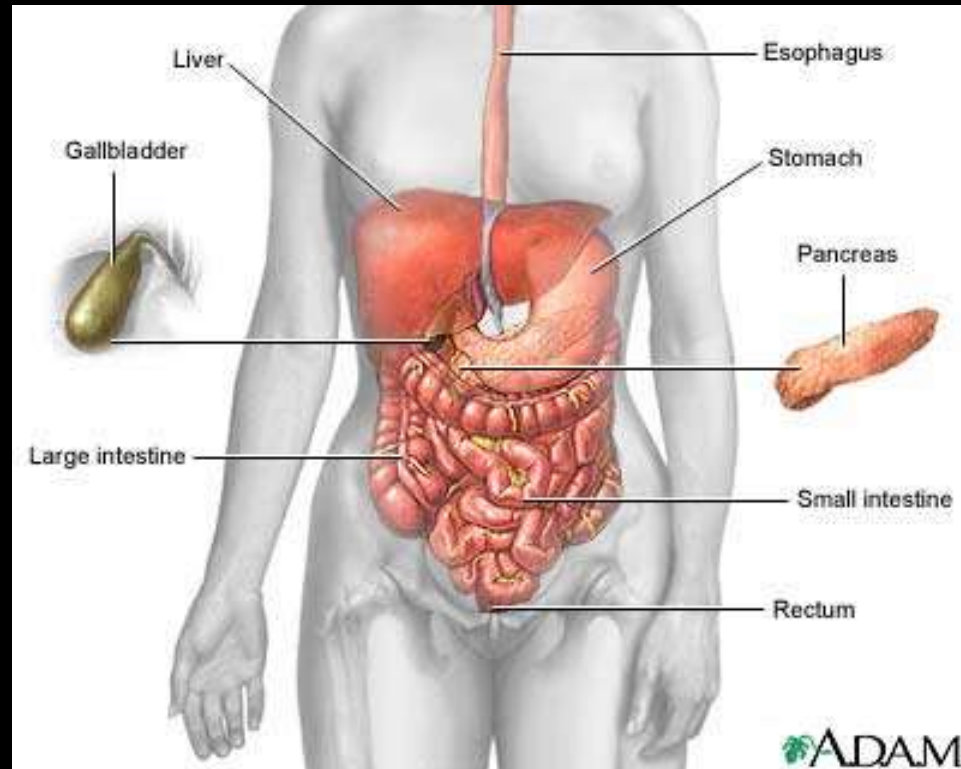
Pigeon



Cow



Human Digestive System

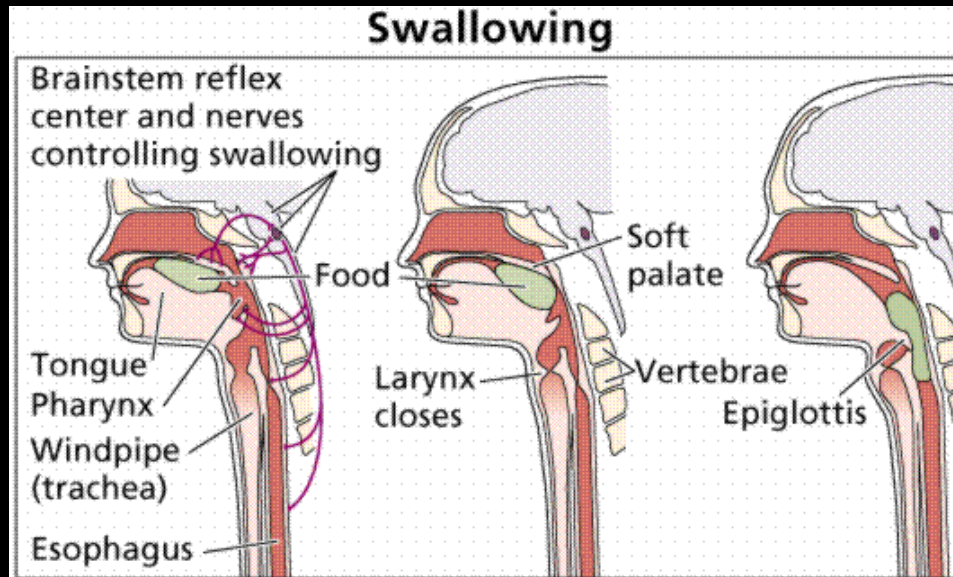


Step 1: Ingestion

- Mouth → esophagus
- Muscles of esophagus force food down

Swallowing

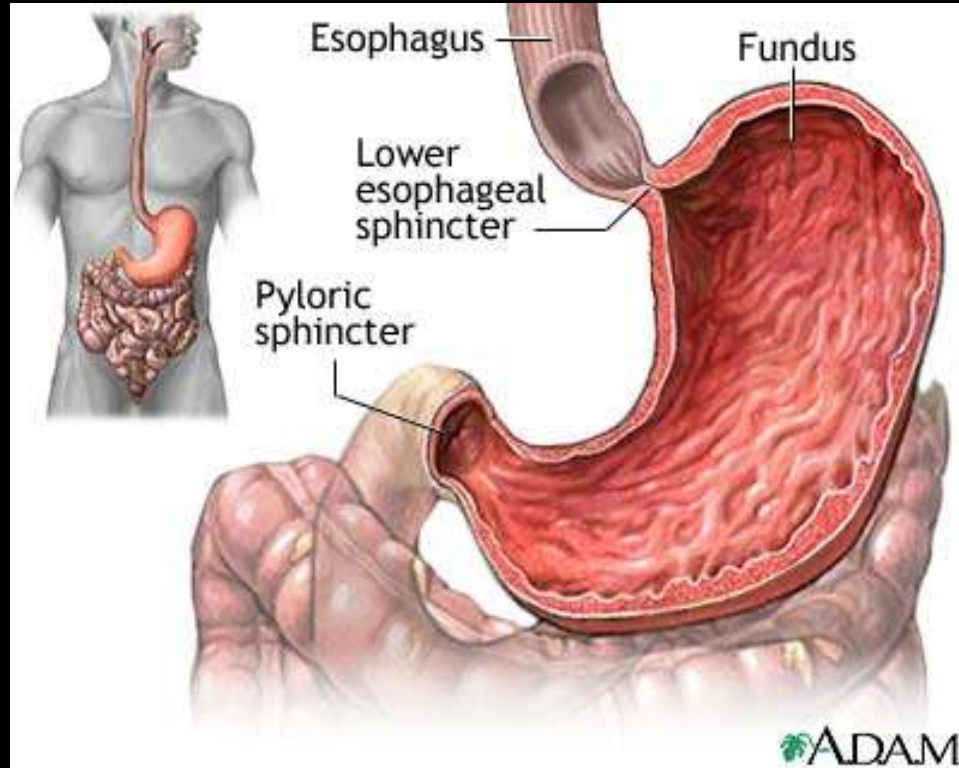
- Epiglottis → covers trachea when swallowing



Step 2: Digestion

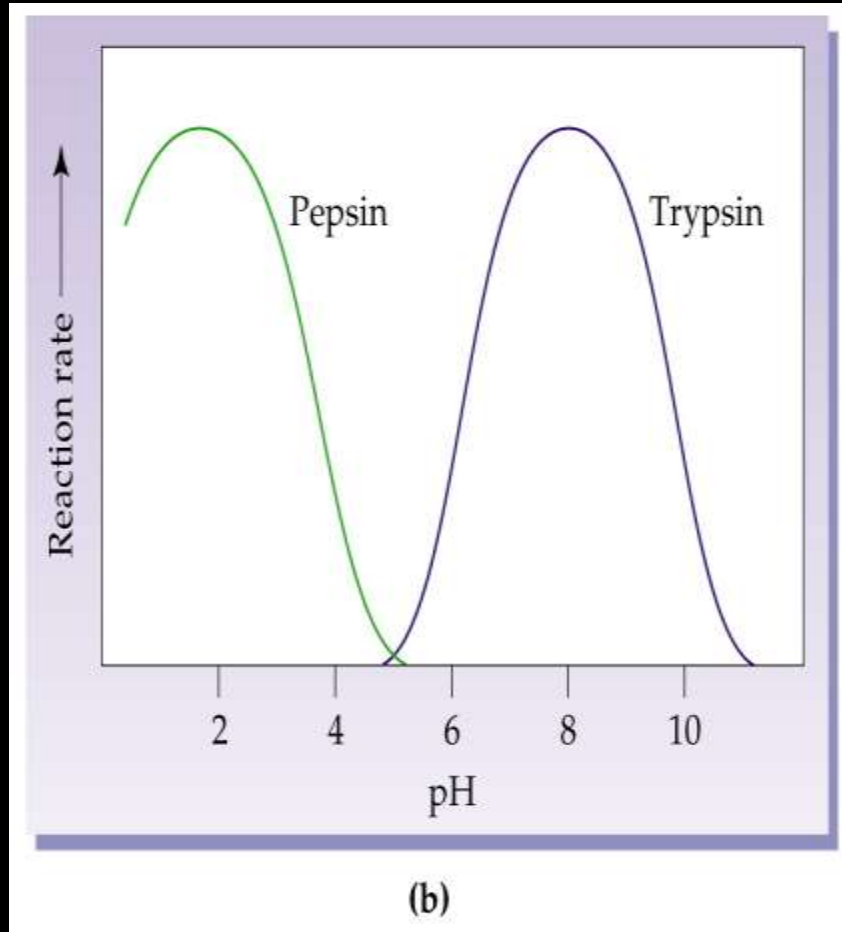
- Begins in Mouth
 - Chewing = mechanical digestion
 - Salivary glands → enzymes that digest starch

Stomach



Stomach digests proteins

- Stomach = produces acids and enzymes → chemical digestion of food
- Acids = low pH



- Which enzyme in the graph above would most likely be found in the stomach?

- Stomach muscle → mechanical digestion
 - Grinds, churns and mixes foods
 - Muscles are made of
- Protein
- What keeps the acids from breaking down the stomach

What keeps the stomach acid from digesting itself

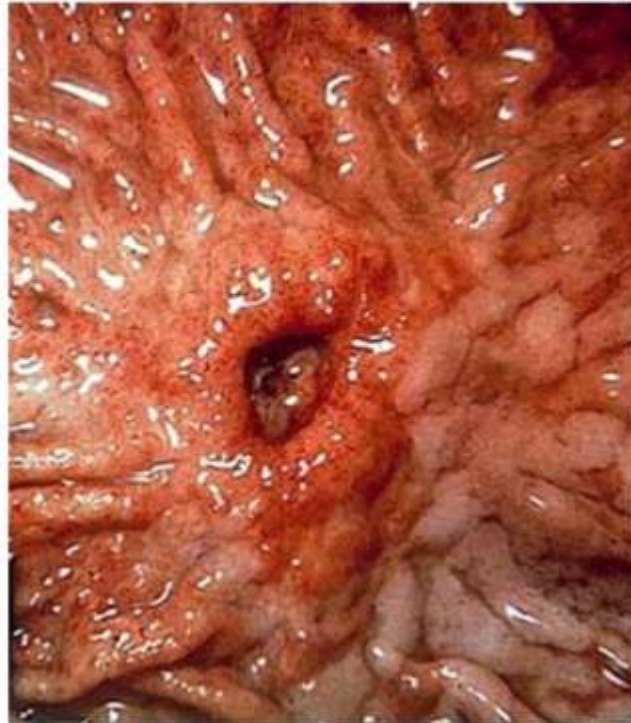


Normal Stomach Lining

- Thick layer of mucus

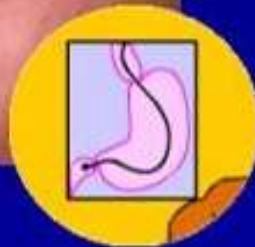
What happens if the mucus layer gets destroyed

ulcer in stomach lining



Ulcer

Duodenal Ulcer (DU)



Gastric Ulcer (GU)



http://www.helico.com/images/du_gu_1.jpg

Caused by stress, alcohol,
hi salt diet, smoking, too much aspirin, bacteria...

Digestion continues in Small Intestines

- Small intestines → lots of enzymes → Chemical digestion of fats, proteins and carbohydrates
- Bile (made by the liver) helps breakdown fats and neutralize stomach acid

Other organs produce digestive juices for the small intestines

- Liver → makes bile
- Gall Bladder → stores bile
- Pancreas → digestive enzymes

End products of digestion

Type of food	Product of digestion
Complex sugar	
Proteins	
Fats	

Step 3: Absorption occurs in small intestines

- End products of digestion diffuse into
blood

Define Diffusion

- Small molecules move from areas of high concentration to low
- Example:
- Nutrients move from intestines into the blood

Why are the small intestines so long?

- increased surface area →
- increased absorption of nutrients into blood

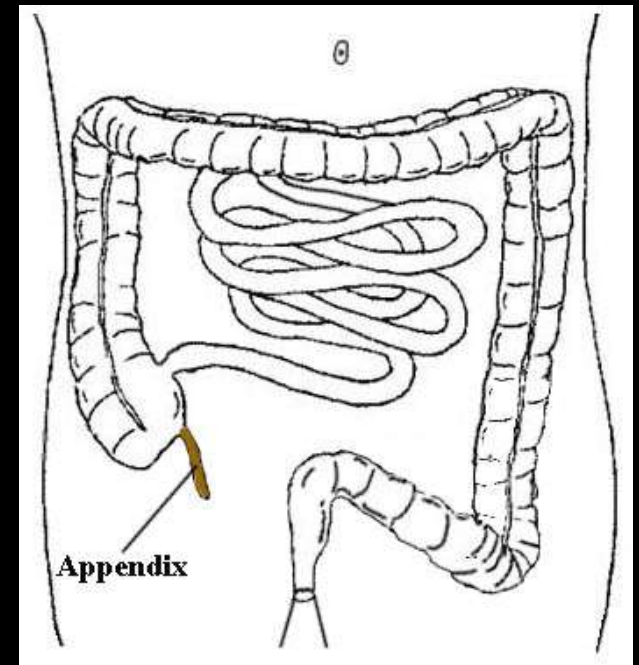


Step 4: Egestion

- Large intestines =
- Remove undigested food and
- Re-absorb water

Appendix

- No known function
- Hypothesis: might be important if your good bacteria are destroyed



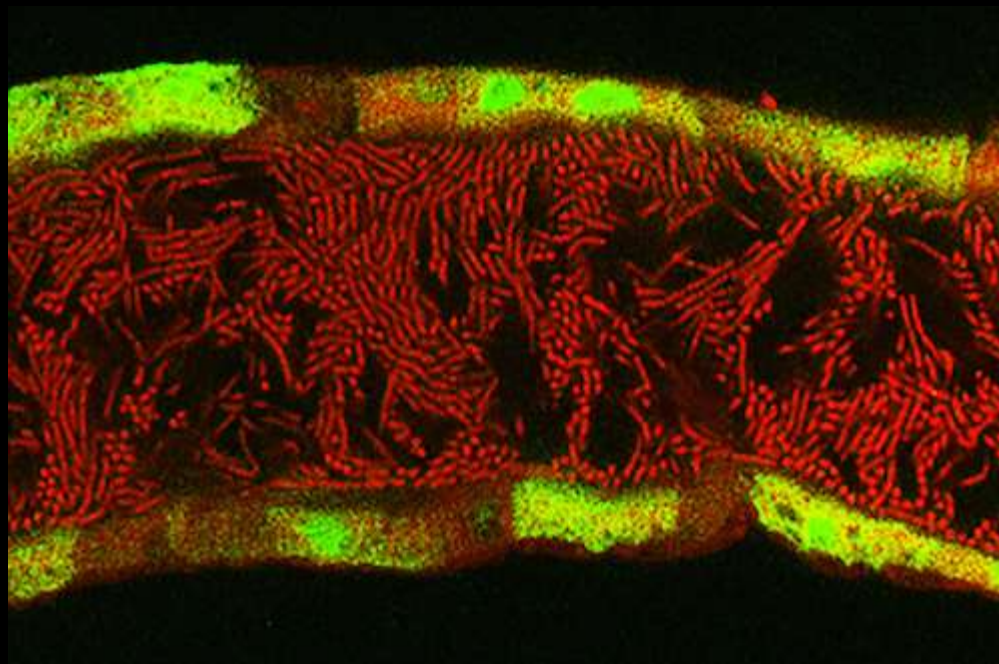
Symbiotic relationships

- Mutualism = both benefit
- Parasitism = one harmed one helped (dog and flea)
- Commensalism = one helped one unaffected (moss on a tree)

Mutualistic bacteria live in large intestines

- Lots of bacteria in feces
- Help digest food
- Produce vitamins (ex: e. coli → vit. K, others → B12)

Drosophila intestine with
lactobacilli bacteria in red.



Watch: Digestive Health
Assignment Discovery video
and notes

Failure to maintain homeostasis

- Nausea = often caused by pathogens
 - If severe can lead to dehydration treat with fluids
- Gas = caused by bacteria in intestines
 - Treat by changing diet (ex: fewer sugars)
- Diarrhea = not enough water is reabsorbed by _____ (foodborne pathogens and antibiotics)
 - Severe → _____ treat with fluids
 - Fiber slows food down → better absorption

More failure to maintain homeostasis

- Constipation = too much water reabsorbed by _____ (caused by dehydration)
 - Treat with laxatives, fluids, and fruits
- Heartburn = stomach acid moves into esophagus (overeating, smoking, drinking)
 - Treat with antacids
- GER = extreme heartburn (weak sphincter valve)
 - Treat with surgery
- Ulcers = hole in mucus lining (from

More failure to maintain homeostasis

- Lactose intolerance = missing enzyme _____ that breaks down lactose (sugar in milk)
 - Give them enzymes
- Colon cancer = uncontrolled cell division
 - Colonoscopy = technique to diagnose
- Pancreatitis = inflammation of pancreas (usually caused by alcohol)
 - Treat with anti-inflammatory drugs
- Gall Stones = cholesterol deposits in gall bladder
 - Surgery
- Appendicitis = inflammation of appendix