Unit 3

Maintaining Dynamic Equilibrium

- Review
- Excretory system
- Excretory system disorders
- Challenge
- Conclusions

Oct 11-3:27 PM

Review

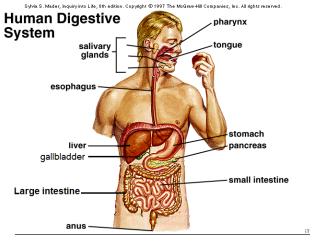


Table 5: Digestion Worksheet

Organ	Associated Glands	Chemical Digestion (Enzyme Action)	Mechanical Digestion	Other Secretions
Mouth	*salivary glands*	*salivary amylase breaks starch into maltose*	*teeth and tongue*	*sodium bicarbonate, mucin and water*
Stomach	*gastric glands and pyloric glands*	*pepsin breaks proteins into shorter polypeptides*	*peristalsis 3 times a minute*	*HCl kills bacteria, breaks down cellulose, lowers pH for pepsin* *water* *mucus protects stomach* *gastrin is a hormone that controls the release of gastric juice*
Small Intestine	*liver and gall bladder*	*none*	*peristalsis occurs regularly to mix food and enzymes and to push food against the intestinal wall for absorption*	*bile emulsifies lipids and neutralizes chyme* *sodium bicarbonate neutralizes chyme* *mucus lubricates food mass and protects the digestive tube from enzymes*
	pancreas	*proteases (trypsin and chymotrypsin) further break down polypeptides from the stomach into shorter polypeptides* *erepsins break down single polypeptides into amino acids* *lipase breaks down fats into fatty acids and glycerol* *pancreatic amylase breaks down starch into maltose*		
	intestinal glands	*peptidases break singular polypeptides into amino acids* *lipase breaks down fats into fatty acids and glycerol* *maltase breaks maltose into simple sugars, sucrase breaks* *sucrose into simple sugars and lactase breaks lactose into simple sugars*		
Large Intestine	*mucus glands*	*none*	*none, any muscular activity is for movement of food* *water is reabsorbed*	*mucus to lubricate passageway*

6th essential Nutrient is WATER!!

Question/Challenge

- Read pages 372-373.
- Distinguish between anorexia and bulimia.

Apr 22-5:23 PM

Excretion p.374

- The excretory system regulates the levels of water, salt and metabolic waste in the body.

- Many organs aid with excretion, including:

1. **Lungs** – Remove CO_2 made during metabolic reactions.
2. **Skin** – Removes metabolic heat.
3. **Liver** – Removes metabolic chemical waste.
4. **Kidneys** – Its primary function is excretion. It removes excess water, metabolic waste and ions.

Apr 30-10:24 AM

The Urinary System p.374

- Excretion is the primary function of this system.

- Blood plasma is filtered by this system and excess water, salt, and urea are removed.

- **Urea** – A metabolic waste created when cells recycle old proteins.

Apr 30-10:24 AM

The Urinary System

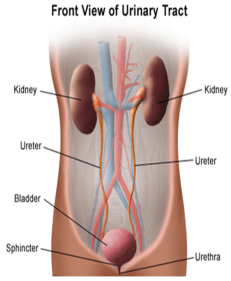
There are **four** main parts:

1. **Kidneys** – Two organs located in the back that actually filter blood.

2. **Ureter** - Tube that connects the kidney to the bladder.

3. **Urinary bladder**– Stores urine until it is excreted.
- Urine includes the excess water, salt and urea removed from the blood by the kidneys.

4. **Urethra**– Tube where urine leaves the body.



Apr 30-10:25 AM

The Kidney p.374-377

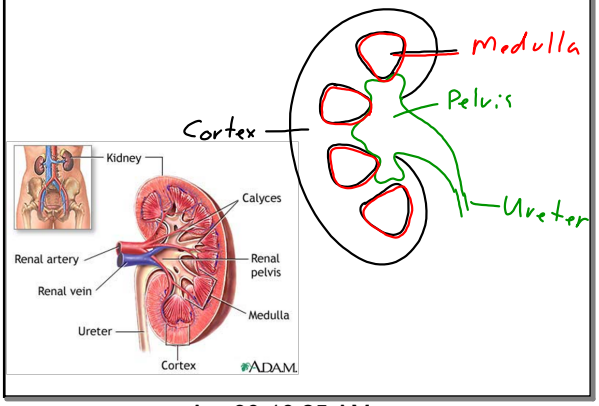
- Kidneys filter about 45 liters of blood a day, producing about 1.5 liters of urine.

- Kidneys are made up of about a million small units called **nephrons**

- Kidneys can be divided into 3 parts:

1. **Cortex** – Outer layer. Filtering occurs here.
2. **Medulla** – Inner layer. Reabsorption occurs here.
3. **Pelvis** – Wide space that empties into the ureter.

The Kidney



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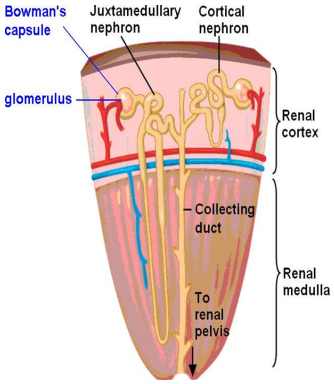
The Nephron

- Nephrons are the **functional unit** of the kidney.
- This is where blood plasma is actually **filtered**.
- They are made up blood vessels intertwined with a separate system of tubes that carry urine.



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The Nephron

- Each can be divided into four parts:
  1. **Glomerulus** – A small ball of blood vessels.

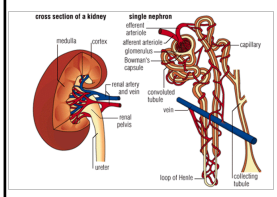
  - Blood cells remain in the vessels, while blood plasma is forced out tiny pores.

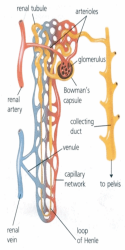
  2. **Bowman's capsule**– The plasma that is removed enters this bulge of a separate tube.

  3. **Loop of Henle** – The liquid that enters Bowman's capsule travels through this loop.

  - Blood vessels are intertwined with this loop.
  - As the liquid moves along, water, salt, and urea can enter or leave this tube at different points.
  E.g. If you are dehydrated, a lot of water will be reabsorbed, producing a concentrated urine.

  4. **Tubule**– After filtration and reabsorption, the urine travels from here to the pelvis of the kidney.





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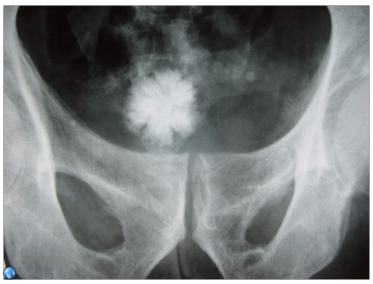
Kidney Disorders p.379-381

Kidney Stones

- These are solid crystals that form in the kidneys.
- Stones can form from many materials but often are made of calcium.
- Diets low in calcium and some genetic disorders can lead to kidney stones
- Most stones are small, but if they reach 2-3 mm they can block parts of the urinary system.
- Muscle spasms attempt to remove the blockage, and this results in abdominal pain.
- Stones can be diagnosed through x-rays or CT scans, or related symptoms.

Stones are treated with surgery, sound waves that break up the stones, changes in diet, and medications.



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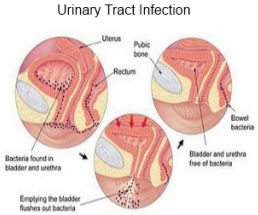
Kidney Disorders

2. **Kidney and bladder infections**

- These occur when the kidneys or bladder are infected by a bacteria or an allergen.
- The bacteria generally enter the kidney or bladder from the urethra.
- Symptoms include, frequent urination, pain during urination, pain in the sides or back and vomiting.
- Treatment includes increasing water intake, changing the diet, and antibiotics.



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Conclusions?

Apr 16-4:15 PM

Challenge!

How are the two basic gas exchange requirements met by the mammalian lung?

Apr 16-4:14 PM