The Excretory System

Excretion:

* \_\_\_\_\_\_\_\_\_\_\_\_\_ that is produced by your body needs to be removed because it is toxic to the body,
* This is the job of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Excretion is the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the body.
* Examples:
  + CO2 from \_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from kidneys
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from liver
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the skin
* Waste is produced through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (cells produce energy from nutrients and create waste
* The waste that the body produces is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. If the metabolic waste is not removed, it would be a serious health risk.

Excretory Organs and the waste product they remove:

**Intestines:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Liver:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Skin:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lungs:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Kidneys: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The Kidney:**

Kidneys: major excretory organ of the body

Located at the level of the last set of ribs

Dark-red and bean shaped

Smaller than a closed fist

* Kidney Excretion:

Each kidney has about one million \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ They create about 1.5 liters of urine a day.

* + Nephrons\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Process \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the RENAL ARTERY.
* Functions of the Kidneys:

1. Get rid of Wastes such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Gets rid of excess sugars and salts.
3. Gets rid of excess \_\_\_\_\_\_\_\_\_.

\*\*\*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\*\*\*

**Ureters:**

Function: tubes which remove waste from the blood and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

From the \_\_\_\_\_\_\_\_\_\_\_\_\_\_, urine enters two canals called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which connect each Kidney to the bladder. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Bladder:**

* + Expandable sac made of muscular tissue
  + Located behind the pubic bone.
  + Function is to store urine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Sphincter: (circular muscle) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which contracts to prevent urine from leaking into urethra.

**Urethra:**

* Tube which begins at the bladder and ends outside the body.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* In men, the urethra is a conduit for both reproduction and excretion.

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**How Excretory System workks:**

**Kidneys receive blood from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which connect to the renal capillaries around the nephrons. The nephrons filter the blood and remove the waste and excess substances \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The purified blood will then be returned to the heart via the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This will keep the composition stable.**

Components of Urine:

* Urinary system filters blood by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Urine is usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The quantity of urine depends on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_% of urine is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_% is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (chemicals dissolved in water e.g. urea, uric acid, salts, etc.)
* Urine can also contain glucose or protein which could indicate a health problem such as diabetes.

Urine should be:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in colour depending on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the body. Unusual colours can indicate different problems.
* Usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (except after certain foods e.g. asparagus)
* Clear. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (cloudy) urine can be due to infections or crystals
* Neutral. A pH of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a day
* Have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of 1.003 to 1.035 g/ml

**Homeostasis** is the body’s ability to maintain *equilibrium* (balance) in the blood by stabilizing various substances such as mineral salt concentration, pH and the proportion of water in the body. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ play an important role in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by filtering blood and removing certain substances from the circulatory system.

Changes in blood composition and the volume of internal fluids are monitored by a gland at the base of the brain called the **pituitary gland** which sends signals to the kidneys when the balance is disturbed

They control how much water or minerals salts must be removed, depending on the body’s requirements.

Maintaining Equilibrium in the Bloodstream

The quantity of urine produced and its composition depend on many factors, such as:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Some medications cause water retention (accumulation of water in the body))

* Diuretics such as coffee and alcohol increase the production/elimination of urine.

The Skin: Heat regulation:

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (increase in diameter) blood vessels \_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to surface and excrete \_\_\_\_\_\_\_\_\_\_\_\_\_ (e.g. flushed face when hot)

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (decrease in diameter)vessels \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and conserve \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (e.g. bluish lips when cold)
  + Sweat glands help maintain the equilibrium of the bloodstream by excreting water, wastes and mineral salts.
  + It has the same composition as urine (urea) but much more diluted (more water).
  + During physical activity, perspiration increases so less water is removed from the blood by the kidneys.

The Lungs:

* Lungs also help maintaining equilibrium in the bloodstream by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, allows the blood pH to remain stable at a pH of 7.4
* Carbon dioxide lowers the pH of the blood. During physical activity the levels of carbon dioxide increase, the pH drops, so the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to eliminate more carbon dioxide to return to normal pH.
* If breathing is not sufficient to eliminate carbon dioxide, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Liver:

* Liver Excretion: converts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (from the breakdown of amino acids found in proteins) to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is excreted in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

When your Kidneys stop working:

* Kidney failure can happen due to an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Kidneys are no longer able to filter blood and waste begins to accumulate in body. Blood has to be filtered by a machine instead (4 hours every day!!!)
* This is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(system acts as an artificial kidney till a transplant can happen)

Urinary Tract Infections:

* Urinary infections are caused by the presence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Most common is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Affects mainly women because **urethra is shorter and bacteria can reach the bladder more easily!**
* Kidney infections are much more serious and can be caused by an untreated cystitis which gives bacteria in bladder time to reach kidneys. Easily treated with antibiotics.

**Cystic Fibrosis:** Symptoms include thick mucus in respiratory tracts. High concentration of mineral salts in sweat. Can be diagnosed by analyzing composition of sweat. Salty taste of a child’s skin is often the first sign of cystic fibrosis

**Kidney Stones**: Renal calculi. Due to accumulation of particles in the urinary system. Made up of mineral salts or urea crystals. Cause pain and require medical attention.

**Conditions Detectable by a Urine Test:**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- the protein albumin, in urine can occur if the kidneys or blood vessels are damaged. This can be caused by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- glucose in urine can be caused when the body does not produce enough \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is excreted
* Hyperuricosuria- too much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in urine would produce a pH \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This could be a sign of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Transplanting Kidneys:**

Kidneys filter about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. One healthy kidney can carry out all the necessary filtration. This is why a person can donate a kidney and remain healthy.