

## The Excretory System

How Our Body Eliminates Cellular Wastes

**Excretory System** – removes excess water, H<sub>2</sub>O, urea, carbon dioxide, CO<sub>2</sub>, and other wastes from our blood.

- \* Kidneys – filter out excess water and urea
- \* Lungs – filter out carbon dioxide, CO<sub>2</sub>, from the blood.
- \* Skin – excretes water, as sweat, which contains some trace chemical wastes, including urea.

## I. The Kidneys

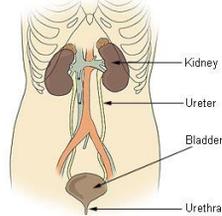
- \* Every drop of blood in your body is filtered by your kidneys more than 300 times per day!
- \* Kidneys eliminate urea, minerals and excess water.
- \* Kidneys regulate the amount of water we need to maintain in our bodies.

**Ureters** – tubes that take urine from the kidney to the urinary bladder.

**Urinary Bladder** – a sack that stores urine.

**Urethra** – small tube that leads urine out of the body.

## Components of the Urinary System



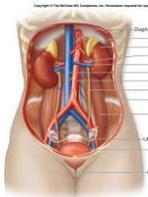
## II. Signs of Disease

Doctors analyze urine for disease;

- \* Normal urine contains water, urea and trace minerals.
- \* Sugar in urine indicates Diabetes
- \* Protein in urine indicates the kidneys are not working and the person, or animal, is very sick.

## The Human Excretory System

The function of the excretory system is to **excrete** (get rid) of **wastes** that are not helpful to the body.



## Excretion

- The removal of metabolic waste from the body.
  - Includes carbon dioxide, water, salt, and urea.
- Waste diffuses from cells into blood and then out of the body through different organs.

## Waste

- Wastes that are removed include **carbon dioxide, water, salt, urea and uric acid**.
- All excreted wastes travel at some time in the **blood**.



Structures of the Excretory System

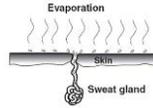
1. Skin
2. Lungs
3. Liver
4. Large intestine
5. Urinary System

Think – Pair – Share:  
Can you guess how these structures are a part of the excretory system?



Skin

Wastes such as excess water, salt, urea and uric acid are removed from the body in sweat.



Sweat Glands

- Excrete waste, water, salts, and small amounts of urea.
- This waste diffuses between capillaries and sweat glands.
- The mixture of waste and water is perspiration.
- Regulates body temperature (homeostasis).

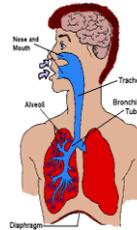
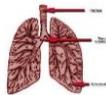
Lungs

Excess carbon dioxide waste is removed from the body when we exhale.



Lungs

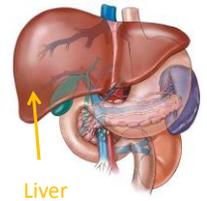
- Remove the waste products of cellular respiration  
– Carbon Dioxide and water



Liver

The liver is a part of what other system?

The digestive system

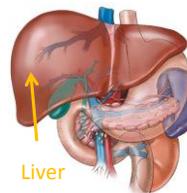


The liver has many functions, including (but not limited to):

1. to produce substances that break down fats
2. produce urea (the main substance of urine)
3. make certain amino acids (the building blocks of proteins)
4. filter harmful substances from the blood (such as alcohol)
5. The liver is also responsible for producing cholesterol. It produces about 80% of the cholesterol in your body.

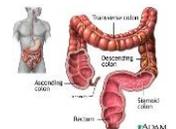
The Liver and Waste

- The liver produces urea and uric acid as a by-product of the breakdown of proteins
- Urea and uric acid are sent to the kidneys to be processed



Large Intestine

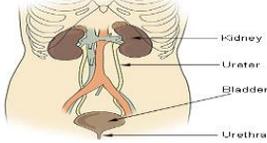
- The large intestine removes solid, undigested food from the body after it passes through the digestive system.
- Waste is stored in rectum until it is excreted from the body as solid waste.



## Urinary System

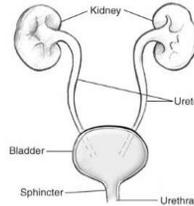
- The body system that filters and excretes waste out of the body.

### Components of the Urinary System



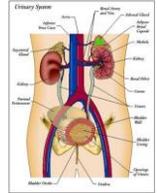
## Urinary System

- Organs**
  - Kidneys
  - Ureters
  - Urinary bladder
  - Urethra



The urinary system

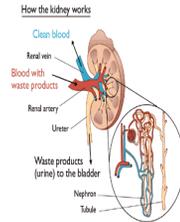
- The **kidneys filter the blood to form urine**, which is excess water, salt, urea and uric acid.



## Urinary System

### Kidney's

- Main function is filtration.
- Removes urea from blood.
- Nephron is the functional unit of the kidney.
- Urine is created here.



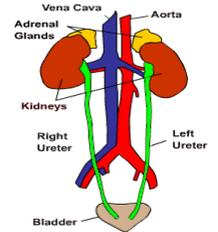
The Kidneys and Homeostasis

- How do the kidneys help maintain homeostasis?
  - The kidneys respond directly to the composition of the blood. They are also influenced by the endocrine system. Disruption of proper kidney function can lead to serious health problems.

## Urinary System

### Ureters

- The large tubes connected to the kidneys and the urinary bladder.

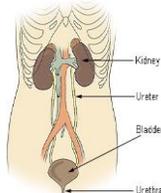


## Urinary System

### Components of the Urinary System

### Urinary Bladder

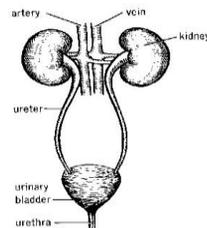
- A muscular organ that temporarily stores urine.



## Urinary System

### Urethra

- A tube that expels urine out of the body.



## Urinary System

### Diseases of the urinary system

#### Gout

- Causes symptoms similar to arthritis.
- Is caused by deposits of uric acid in the joints.
- Patients may suffer from severe pain and stiff joints.





## Urine Testing

The presence of protein or glucose in urine can be indicators of diseases such as dangerous high blood pressure or diabetes.

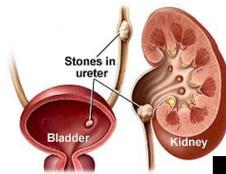
Drugs generally remain in the filtrate and are eliminated in urine. This is why the effects of many drugs wear off over time and why urine tests are often used to detect the use of illegal drugs.

## Kidney Disorders—Kidney Stones

Substances such as calcium, magnesium, or uric acid salts in the urine can crystallize and form kidney stones.

When kidney stones block a ureter, they cause pain.

Kidney stones are often treated using ultrasound waves, which pulverize the stones into smaller fragments that are eliminated in the urine.



## Kidney Disorders—Kidney Damage

- Excessive blood pressure damages the filtering mechanism, and high blood sugar causes the kidneys to filter more blood than normal.
- Over time, the tubules weaken, and the kidneys may fail to keep up with the demands placed upon them.
- When kidneys can no longer cleanse the blood and maintain homeostasis, a person is said to be in kidney failure.
- A patient with kidney failure must receive dialysis or undergo a kidney transplant.
- During dialysis, a machine performs the role of the kidneys. The patient's blood is pumped through the machine, cleansed, and pumped back into the body.