

# Lesson 1

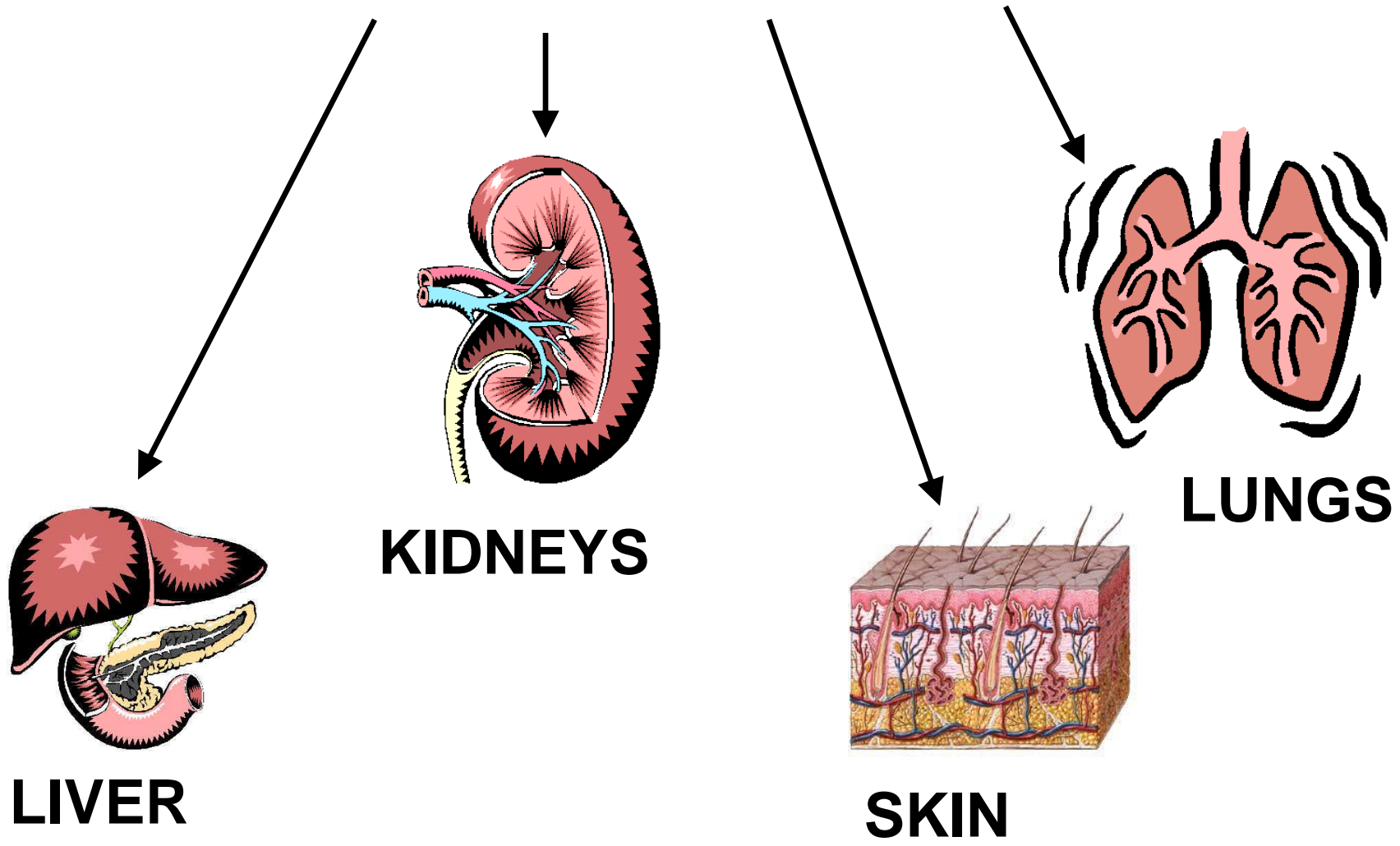
**Excretory Intro**

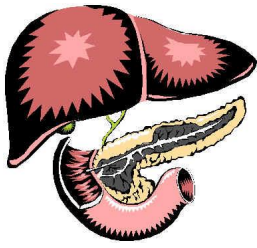
**Skin**

**Lungs**

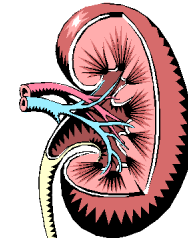
**Liver**

# The Human Excretory System

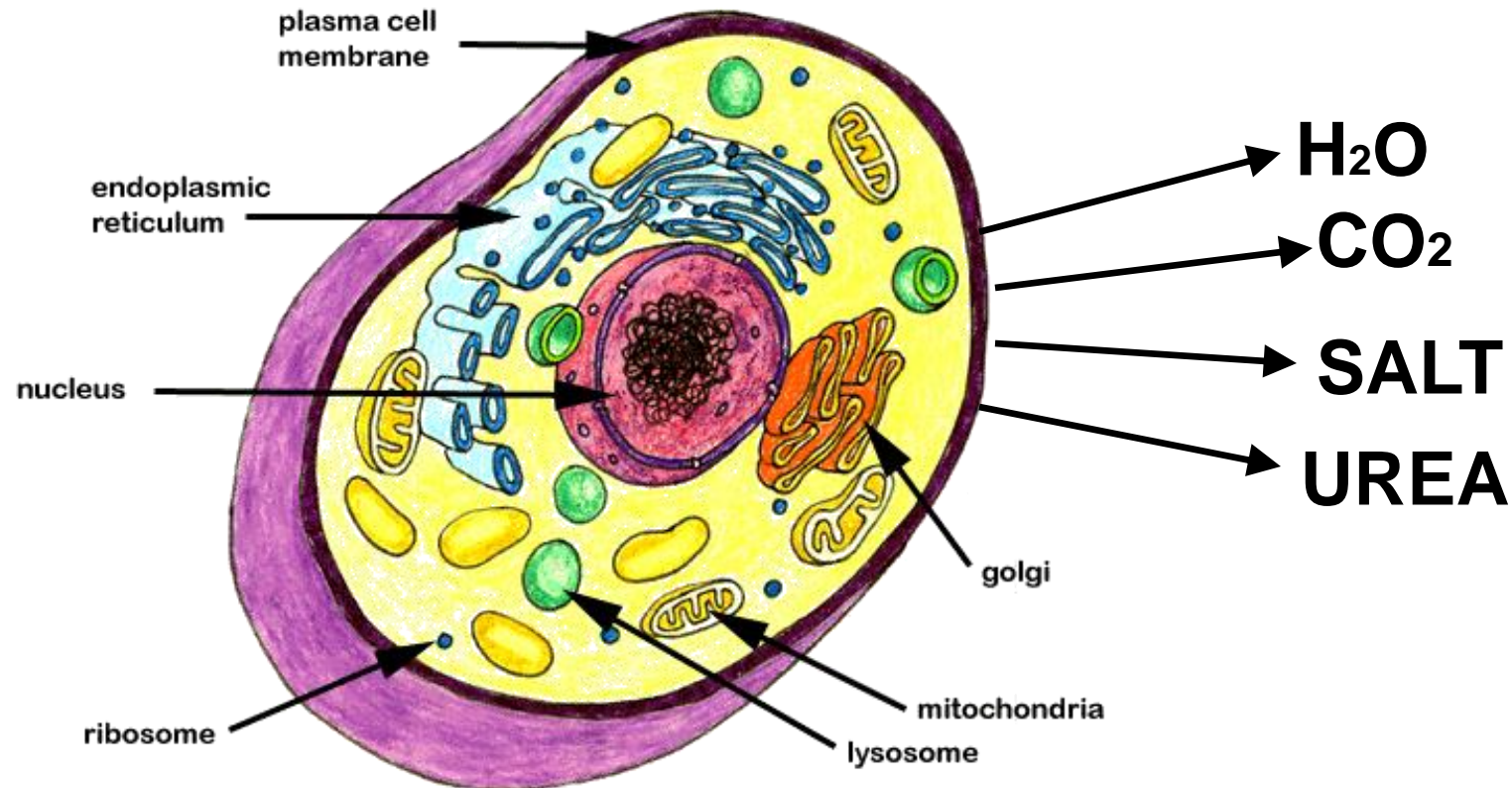




# Function:

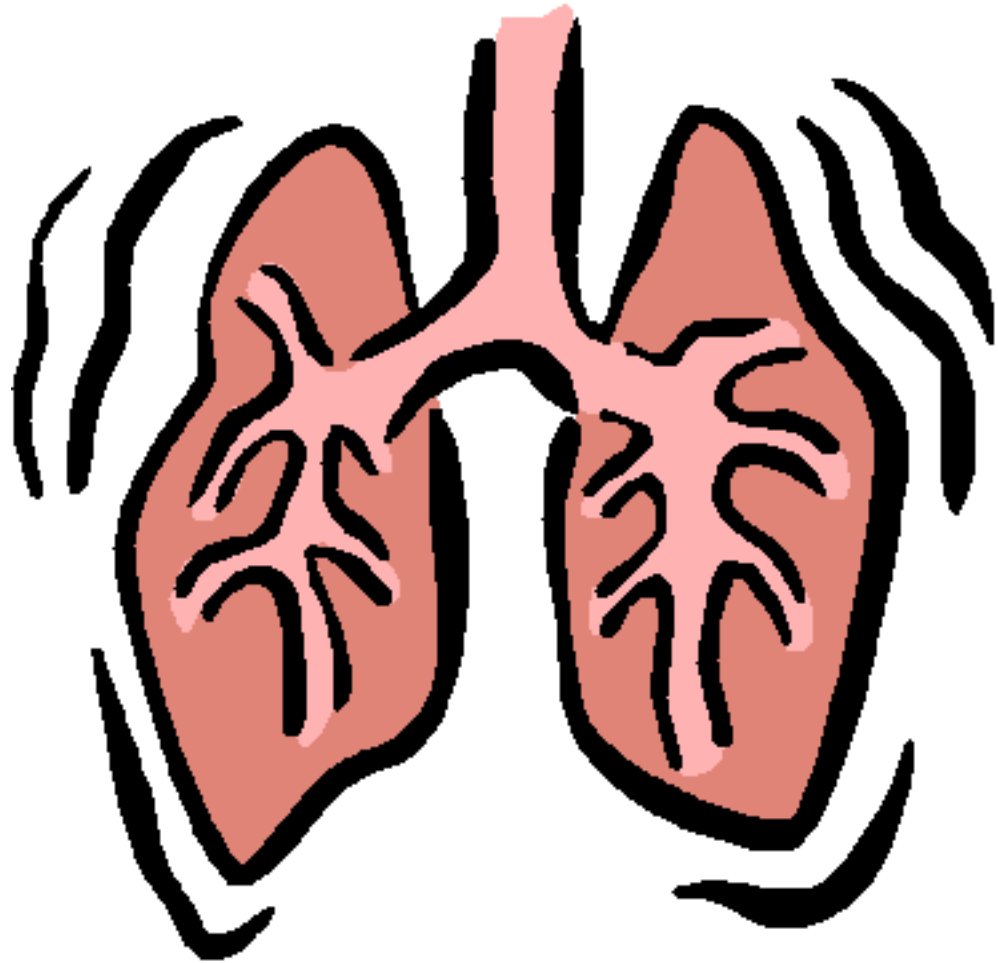


- The removal of cellular waste (metabolic waste) from the human body



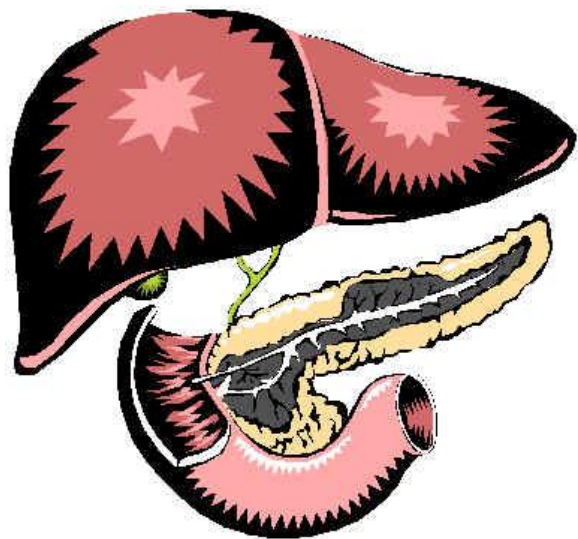
Metabolic Wastes Produced by Humans...	By-Product of these processes...
<b>Water (H<sub>2</sub>O)</b>	Dehydration Synthesis, Respiration
<b>Carbon Dioxide (CO<sub>2</sub>)</b>	Cellular Respiration
<b>Salts</b>	Acid and Base Reactions
<b>Urea (nitrogenous waste)</b>	Protein Metabolism, Deamination

# The Lungs

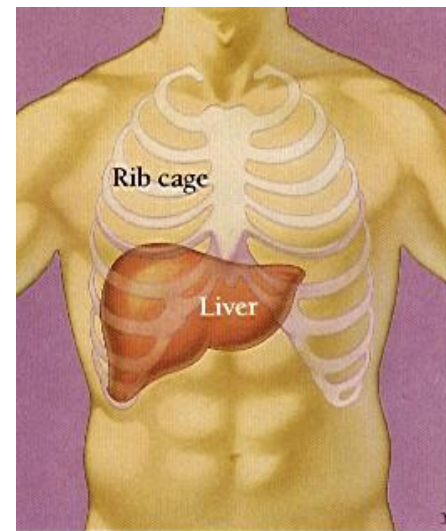


- **CO<sub>2</sub> & H<sub>2</sub>O are excreted during exhalation**

# The Liver



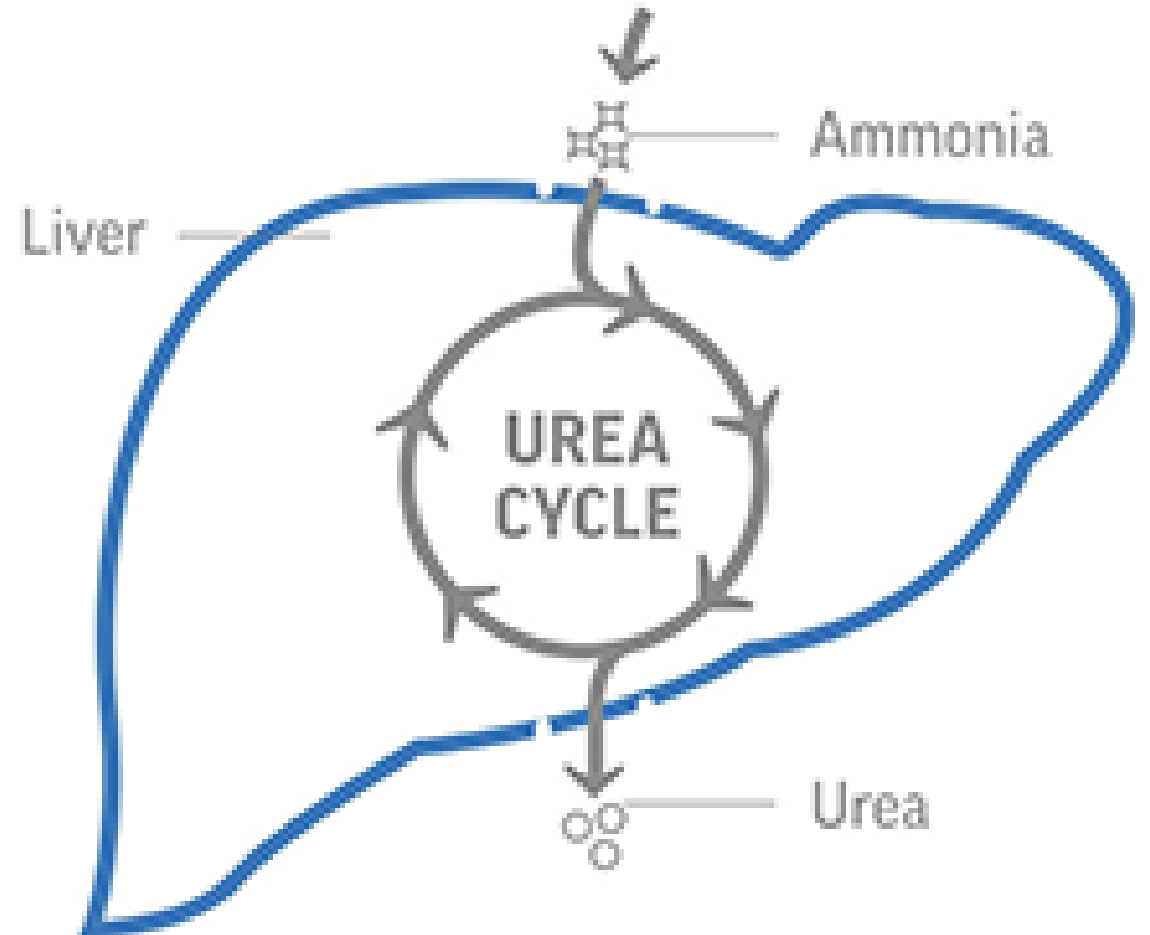
Has many functions!



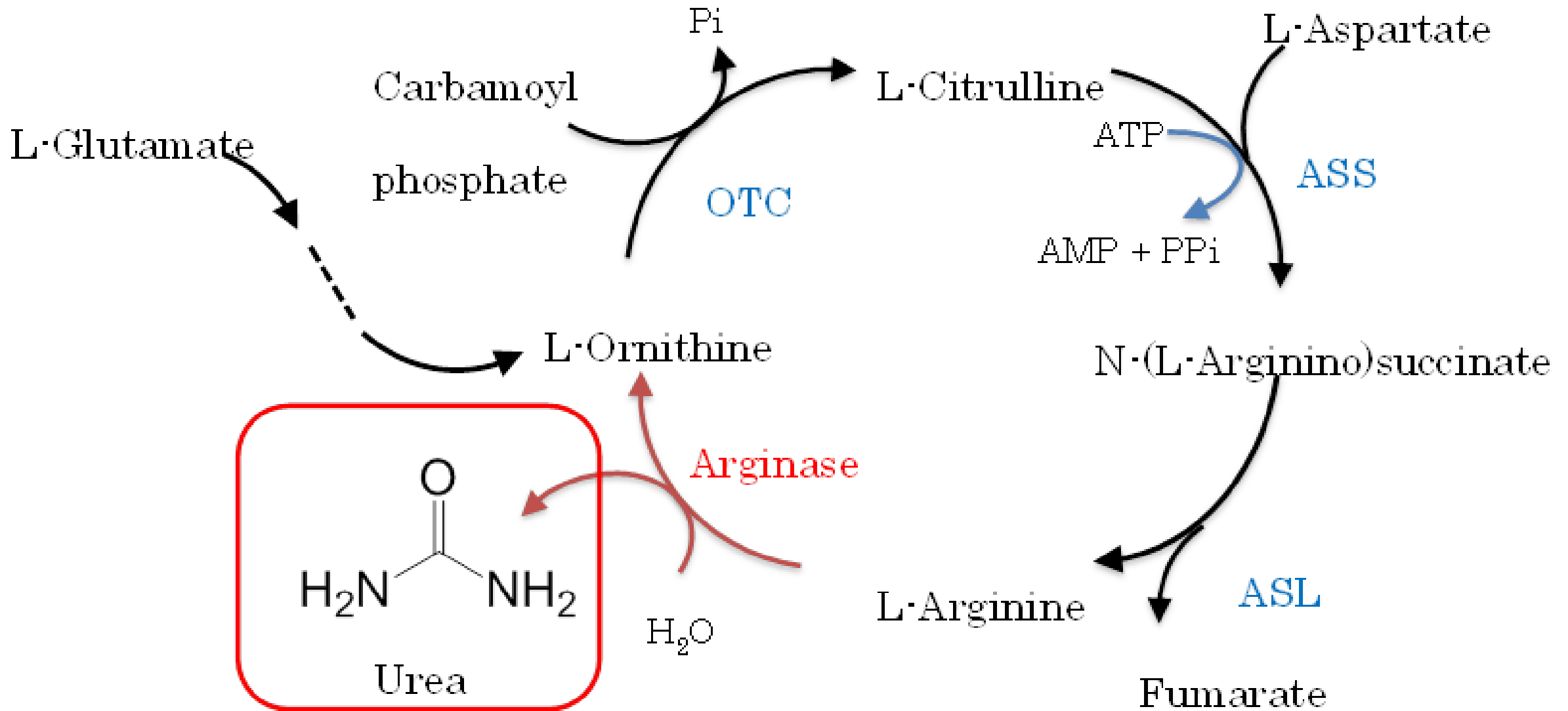
# Liver - Excretory System

Function: Breaks down proteins (deamination)

- produces a nitrogenous waste called urea
- urea enters the blood stream to be removed by the kidneys



# The Urea Cycle

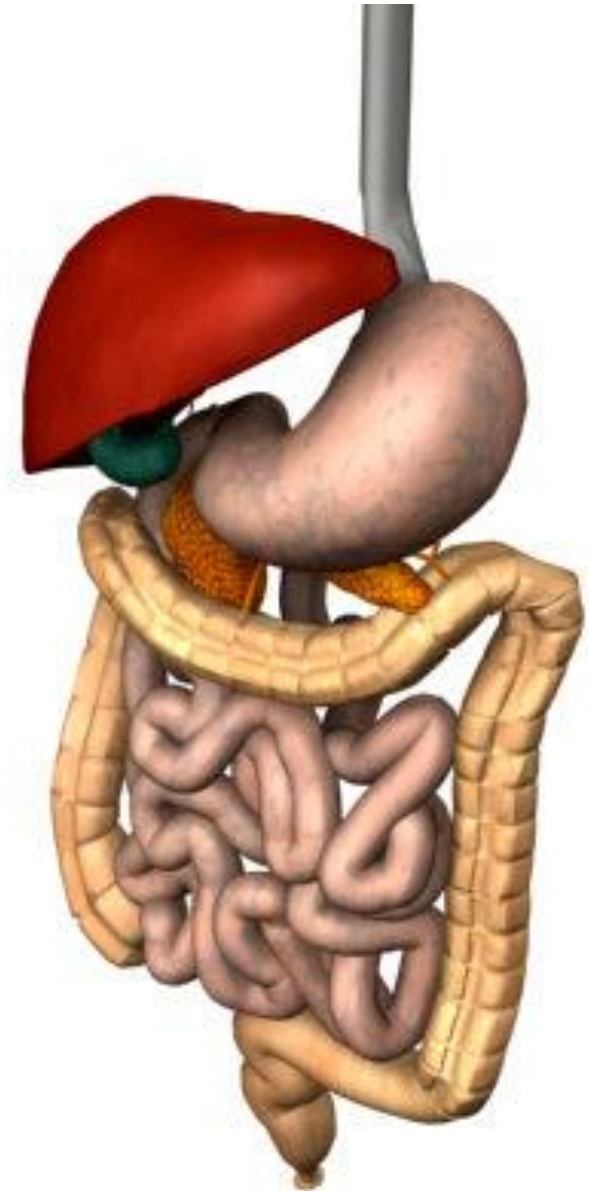
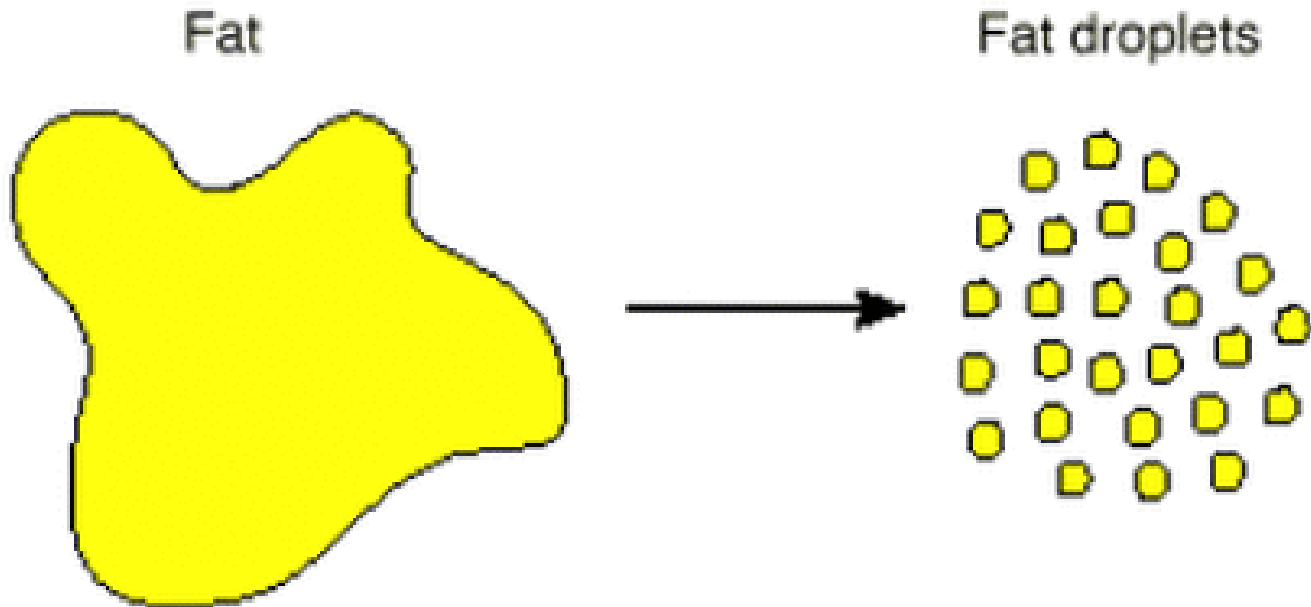




# Liver - Digestive System

## Functions

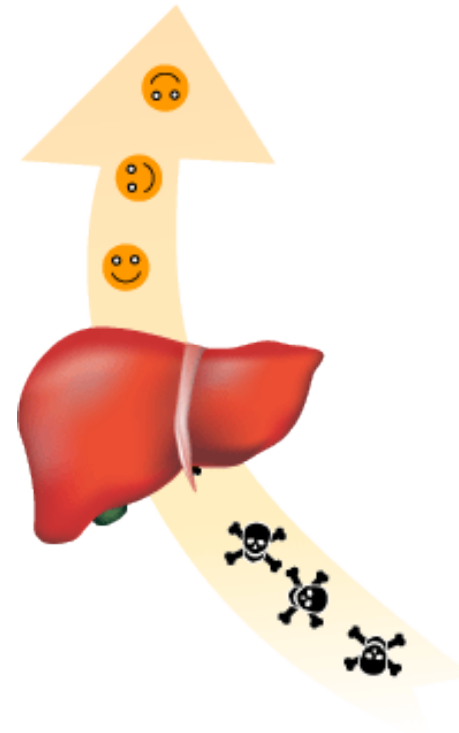
- Produces bile to emulsify fats (mechanical digestion)



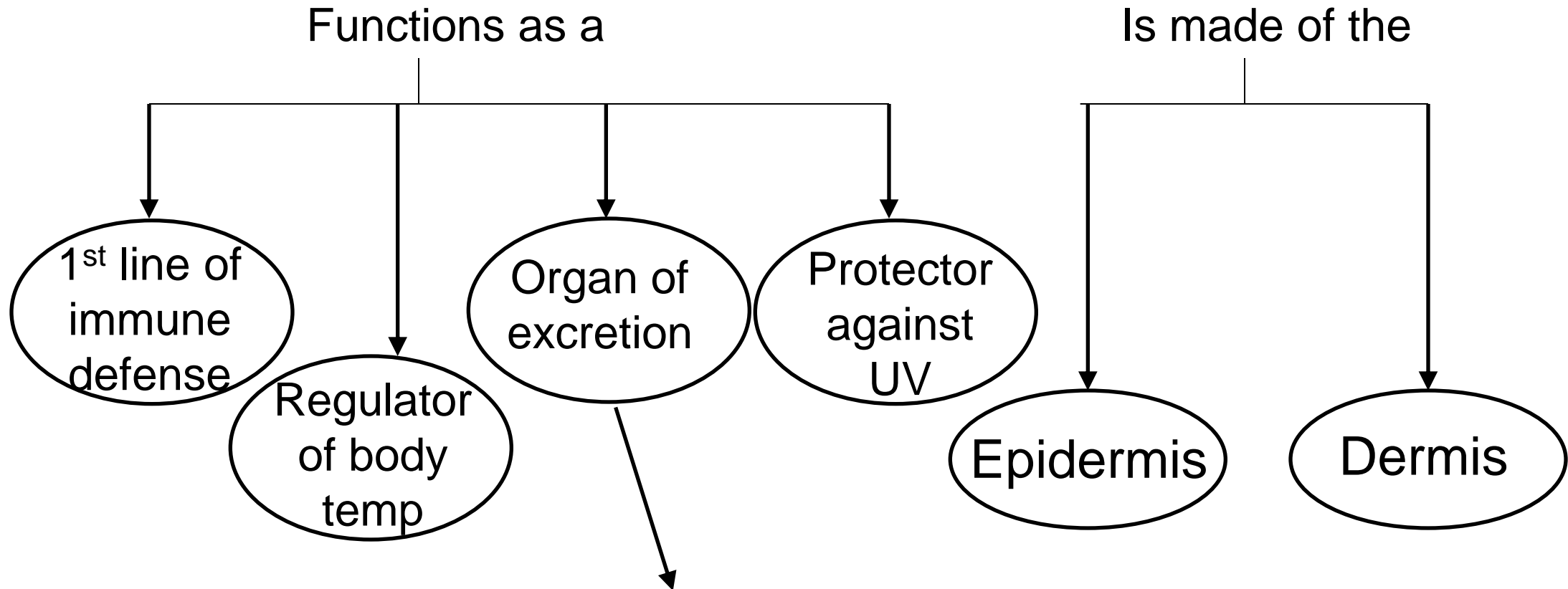
# Liver - Circulatory System

## Functions

- Removes/ breaks down old RBCs
- Filters toxic chemicals (ex. alcohol & drugs) out of blood
- Helps maintain blood-sugar levels by storing and releasing excess glucose

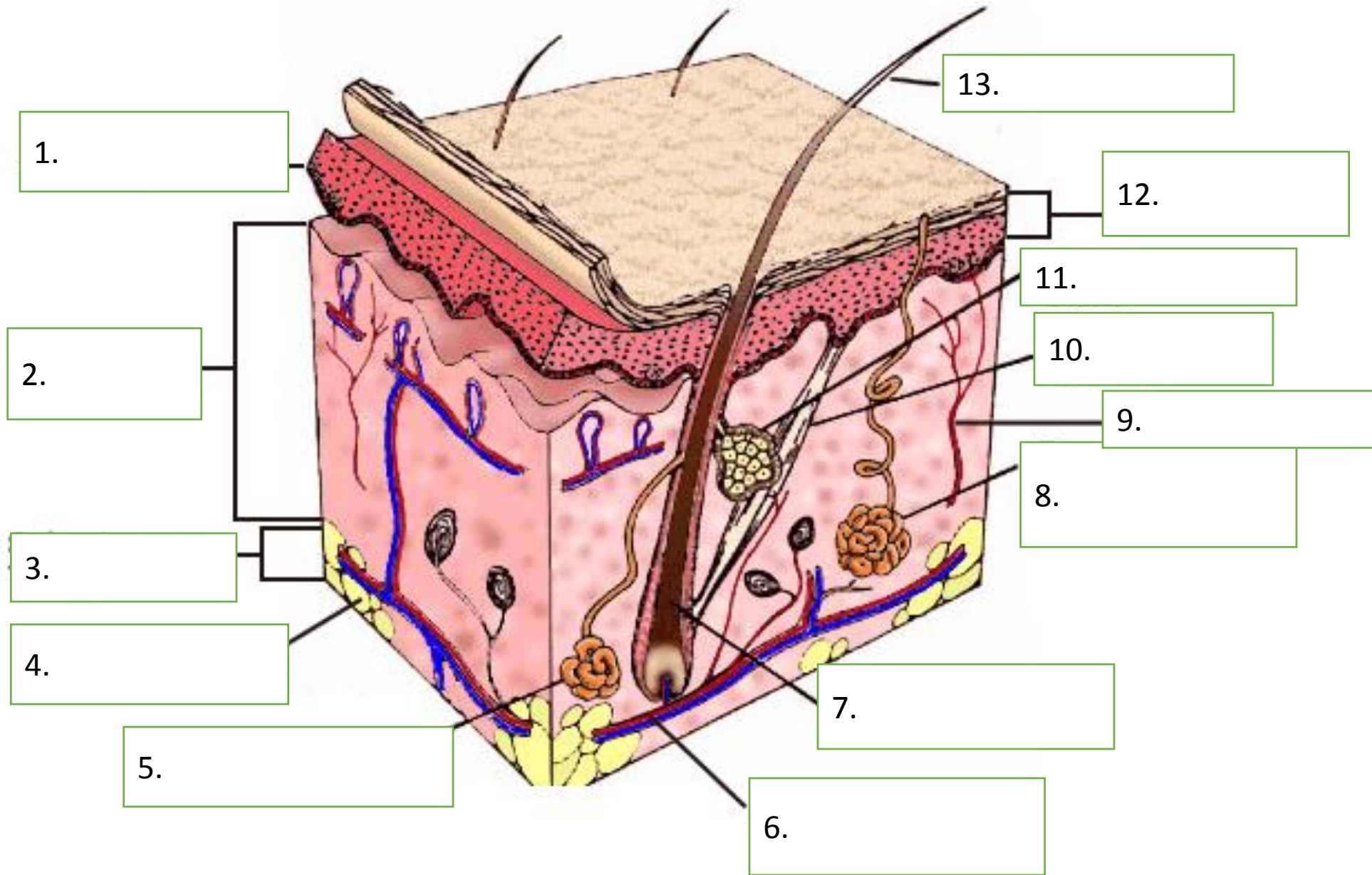


# Skin



Small amounts of urea, salt, water & other chemicals are excreted through the sweat glands in the skin!

# Skin Structures

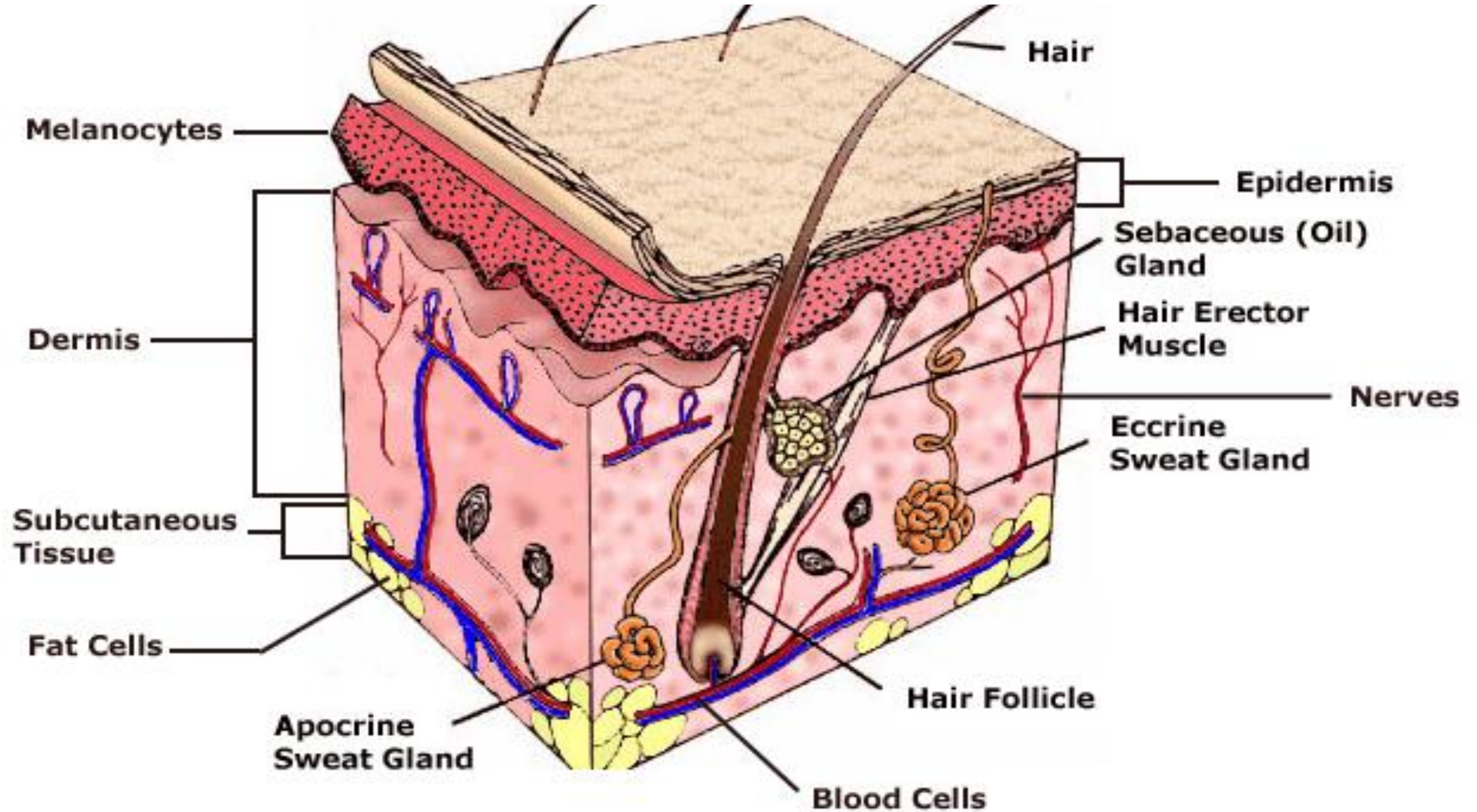


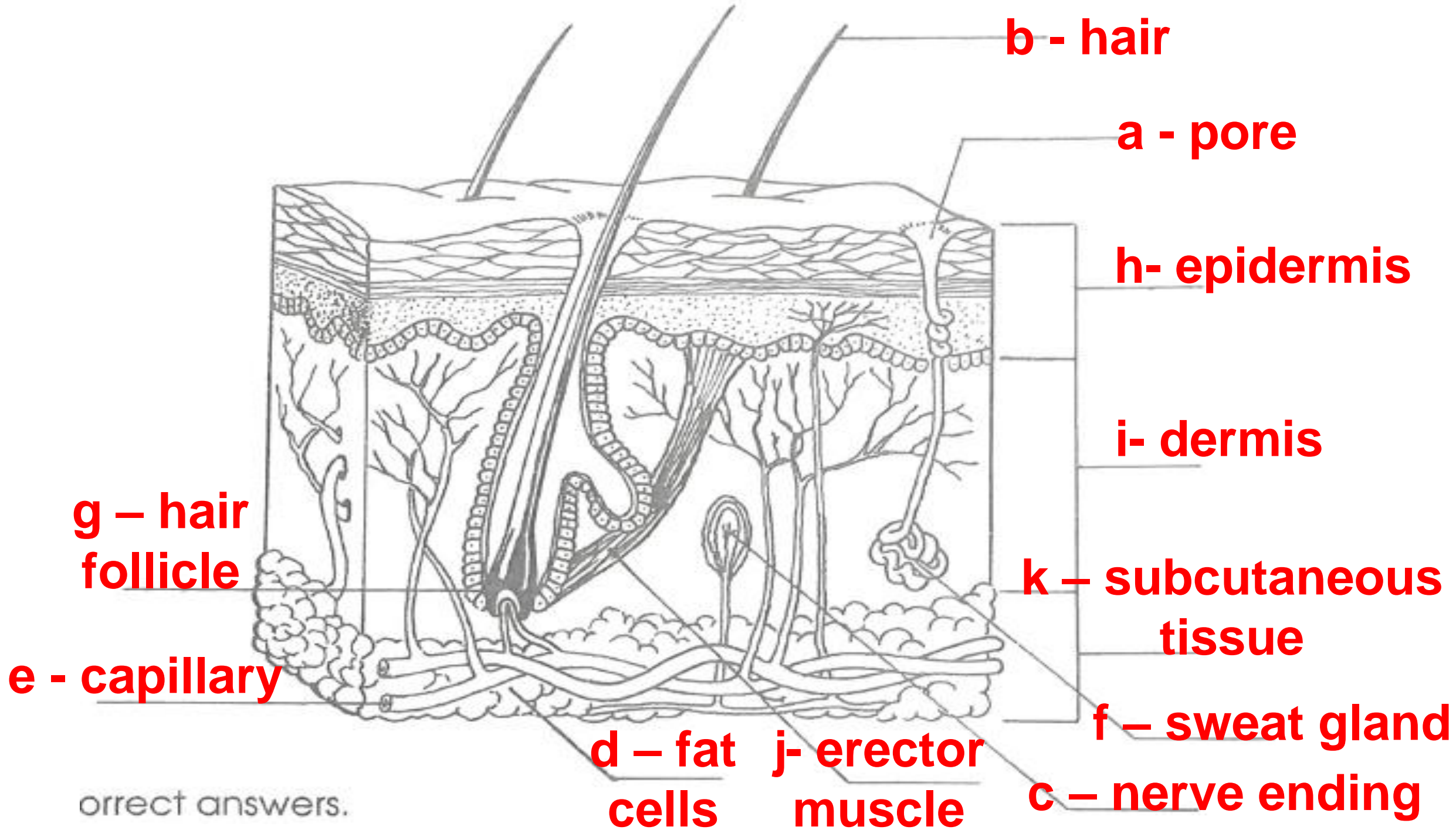
# Skin Structures Word Bank

- Hair
- Epidermis
- Dermis
- Subcutaneous layer
- Adipose (Fat) cells
- Hair follicle
- Blood vessel
- Melanocytes
- Apocrine sweat gland
- Eccrine sweat gland
- Sebaceous (oil) gland
- Hair erector muscle
- Nerves



# Skin Structures





orrect answers.



Epithelium makes up the skin of the body and the lining of the respiratory and digestive tracts. **Skin** is the largest organ of the vertebrate body, composing 15% of the actual weight in an adult. Vertebrate skin is composed of two layers: the outer **epidermis** and the lower **dermis**. There is a protective underlying layer, or **subcutaneous** layer. Cells are constantly lost from the **epidermis** and replaced by new cells produced deep within the epidermis. It takes about 27 days for all of the outer skin cells to be **replaced**. Specialized cells called melanocytes within the epidermis produce a brownish pigment called **melanin**. People of all races have about the same number of melanocytes but differ in the amount of **melanin** produced, thus giving a vast range of skin tones. The dermis is composed mainly of connective tissue, which gives the skin its strength and elasticity. Among the structures in the dermis are blood **vessels**, nerves, hair **roots**, oil **glands** and **sweat** glands. Wrinkling of the skin occurs in the **dermis** layer. Leather goods are made of animal dermis.



# Lesson 2

## Urinary System

### **Kidney structure & function**



[Kidneys For Sale? - YouTube](#)

**When Alberty José da Silva heard he could make money, lots of money, by selling his kidney, it seemed to him the opportunity of a lifetime. For a desperately ill 48-year-old woman in Brooklyn whose doctors had told her to get a kidney any way she could, it was.**

**At 38, Mr. da Silva, one of 23 children of a prostitute, lives in a slum near the airport here, in a flimsy two-room shack he shares with a sister and nine other people.**

**"As a child, I can remember seven of us sharing a single egg, or living for day after day on just a bit of manioc meal with salt," Mr. da Silva said in an interview.**

**He recalled his mother as a woman who "sold her flesh" to survive. Last year he decided that he would, too. Now, a long scar across his side marks the place where a kidney and a rib were removed in exchange for \$6,000, paid by middlemen in an international organ trafficking ring.**

**Among poor men like Mr. da Silva and others who have migrated to slums here from Brazil's parched northeastern backlands, word of the market to sell their organs spread quickly.**

**Some who had done so were already buying houses, businesses, cars and refrigerators.**

**The sums being offered seemed a fortune. The minimum wage here is barely \$80 a month, and work is hard to find. Many men struggle to exist on odd jobs that pay barely a dollar a day. Initially, the organ brokers paid as much as \$10,000 for a kidney -- more than a decade's wages.**

**Donors and recipients were not related, in contrast to the usual preference for legal and medical reasons. In fact, they did not even know each other. But they were linked by a trafficking ring that the authorities now say exploited two very different sets of needs -- for money and for life itself -- at opposite ends of a tangled chain thousands of miles long.**

**Tracing the journey of Mr. da Silva's kidney through that chain, which spanned four continents and ended in a one-bedroom apartment in Brooklyn, reveals the inner workings of a network that human rights groups say is by no means unique. Rather, they say, it is representative of a global black market for organs, including livers, kidneys and lungs, that touches dozens of countries and generates many millions of dollars a year.**

**In Albery da Silva's case, the authorities here say, the organ's odyssey began with two middlemen based in this gritty port city of 1.5 million people: Gedalya Tauber, a former Israeli police officer, and his partner, Ivan Bonifacio da Silva, a retired Brazilian military police officer.**

**The pair, since jailed on organ trafficking charges, not only handed out cash payments, the authorities say, but also arranged for the medical exams to weed out unqualified donors. They then obtained passports and airline tickets for the donors to travel to South Africa, where the transplants took place. Both countries have laws against commercial trade in organs.**



**"Six grand is a lot of money, especially when you don't have any," Mr. da Silva said when asked why he had given up his kidney. "No one here warned us that what we were doing was illegal."**

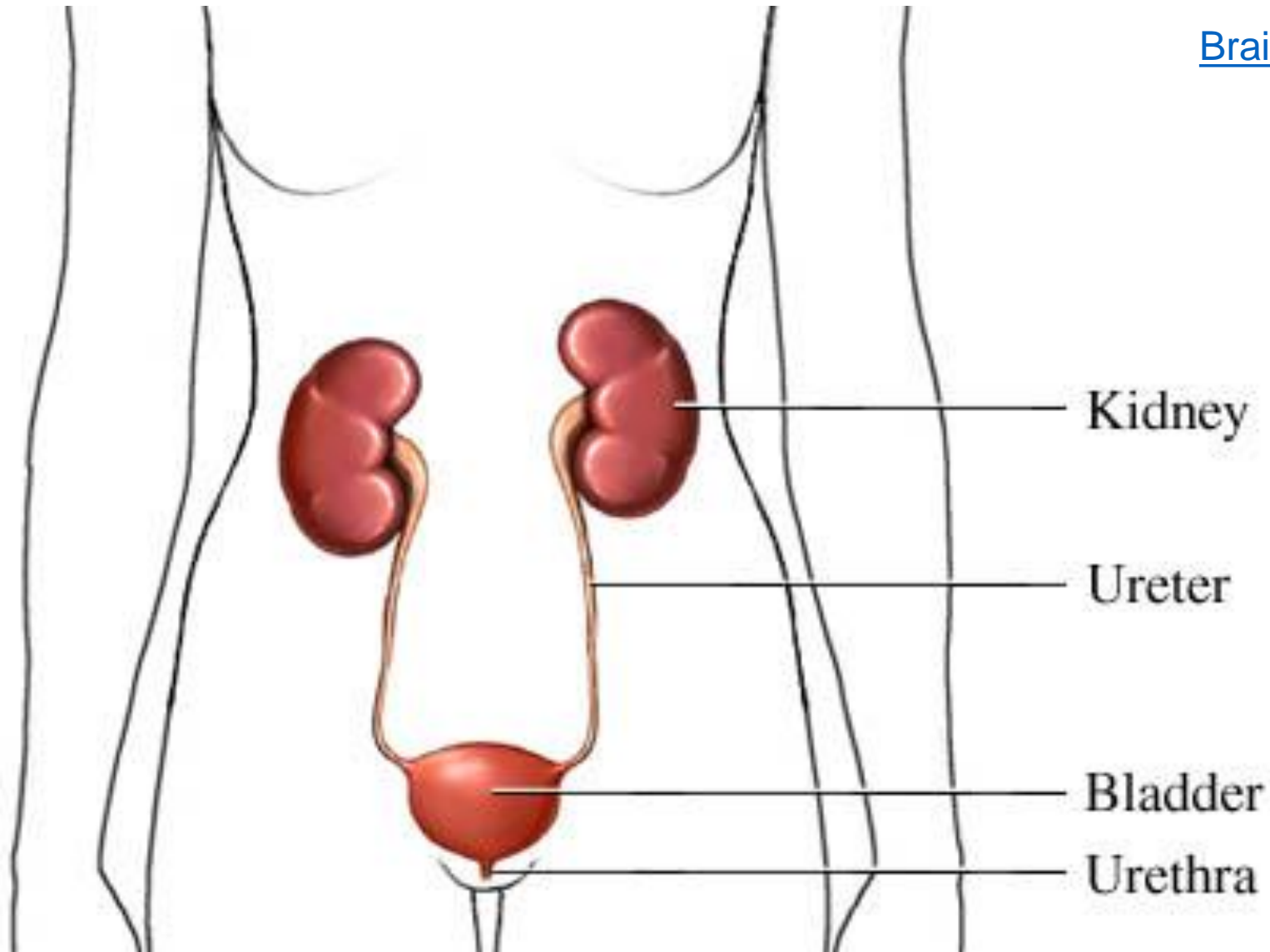


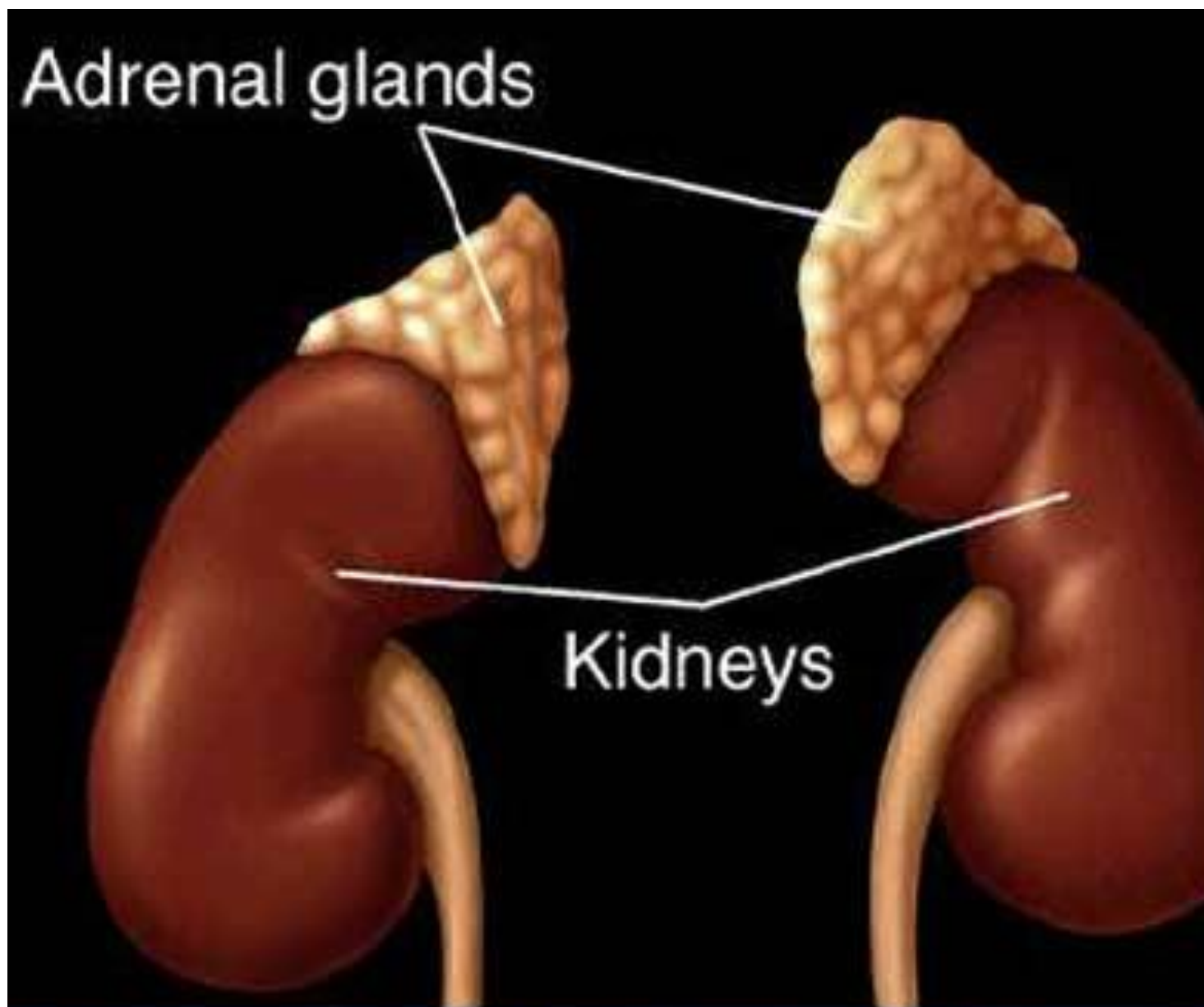
Live kidney donors show the scars caused by operations to remove their kidneys in Lahore, Pakistan, in 2004. They were demanding financial help from the Pakistani government to help them pay off their debts, which they could not pay off even after selling a kidney.

Keystone/AP Photo/K.M. Chaudhary

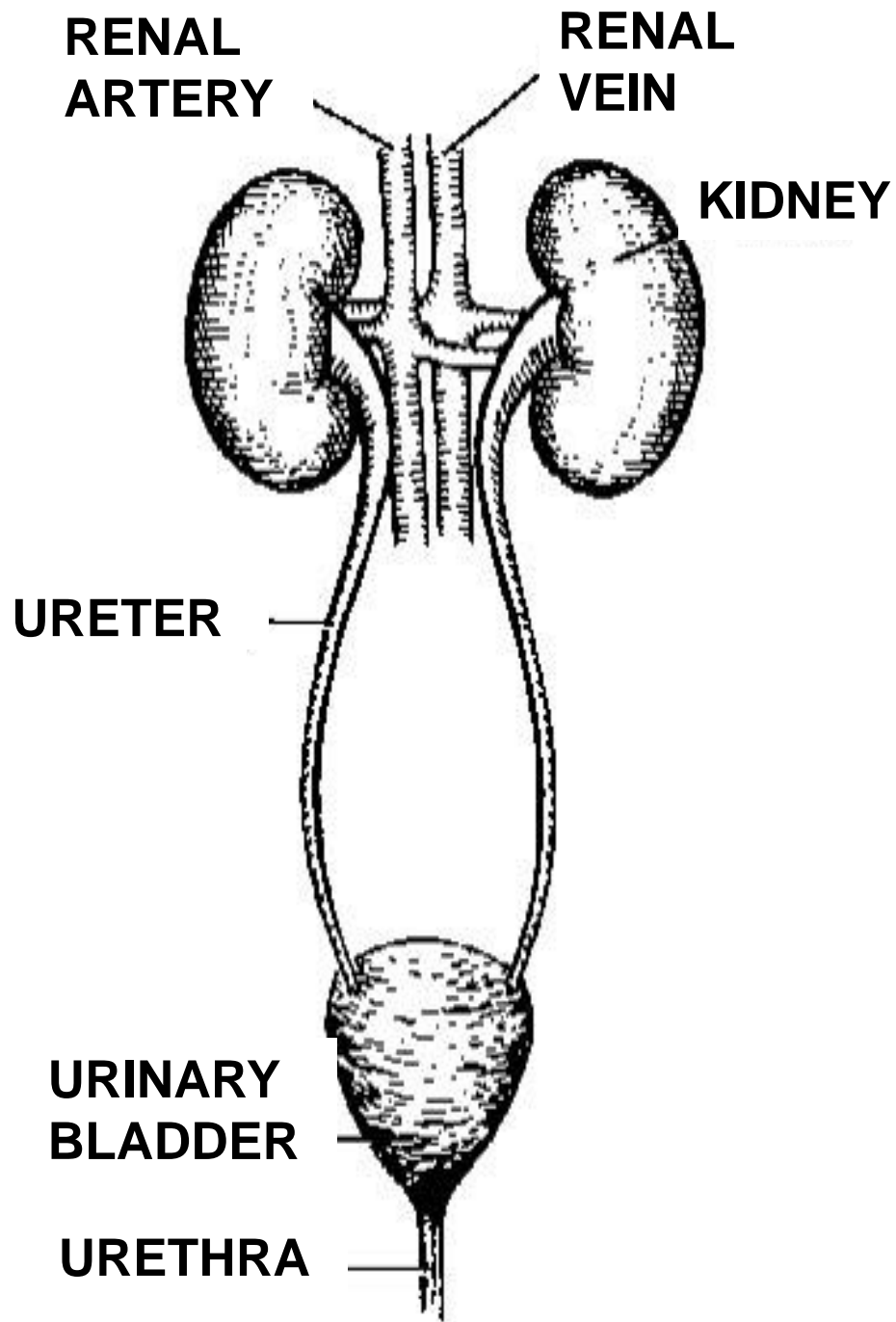
# The Urinary System

[Brainpop Urinary System](#)





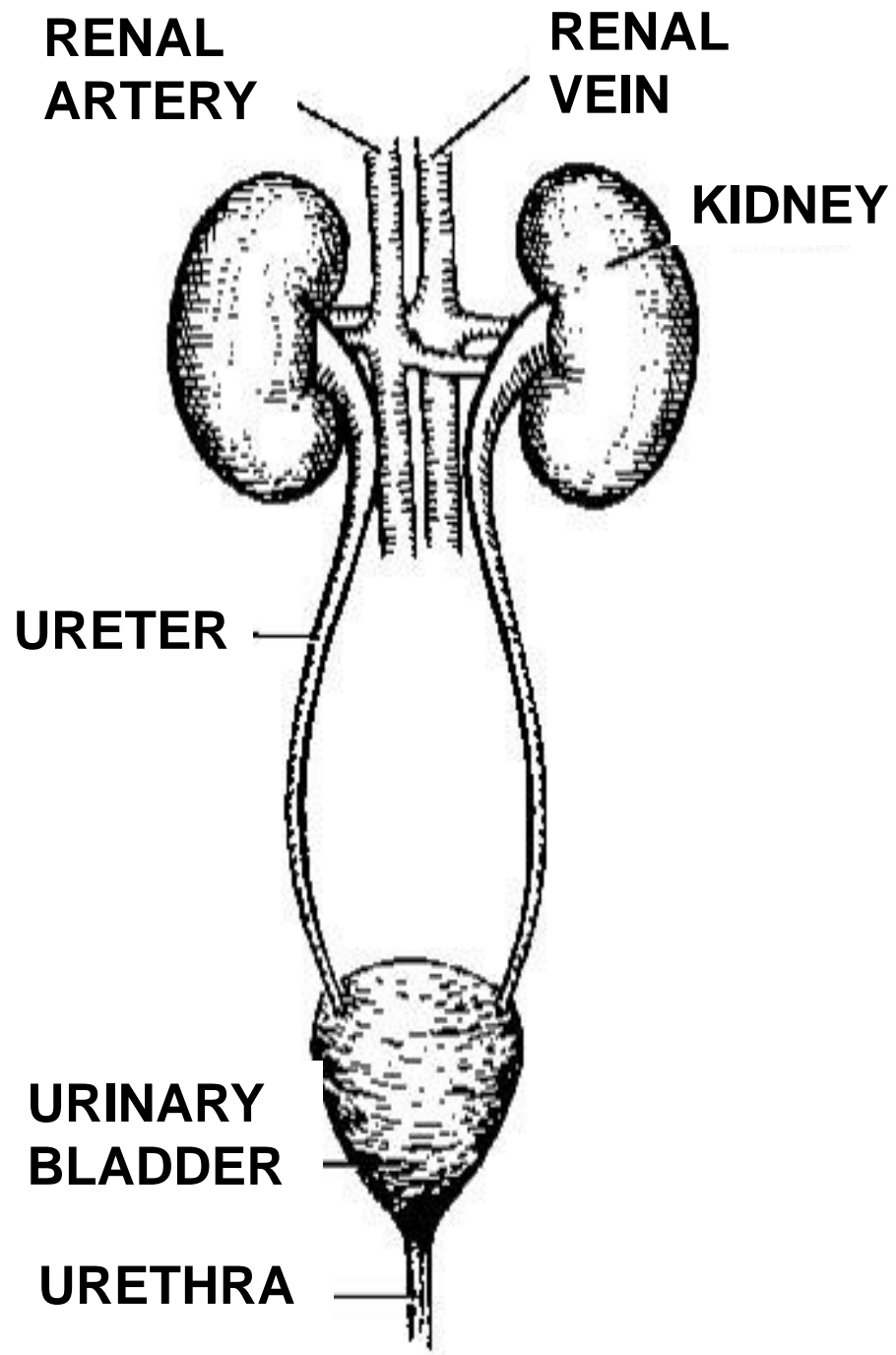




## The Urinary System

### Kidneys:

- filter waste from blood
- receive blood from renal artery & return blood to renal vein
- made of many nephrons
- contain ~1 million **nephrons** (functional units that filter the blood to create urine)
- maintain balance of water, pH, salts, & other ions
- maintain blood volume & blood pressure

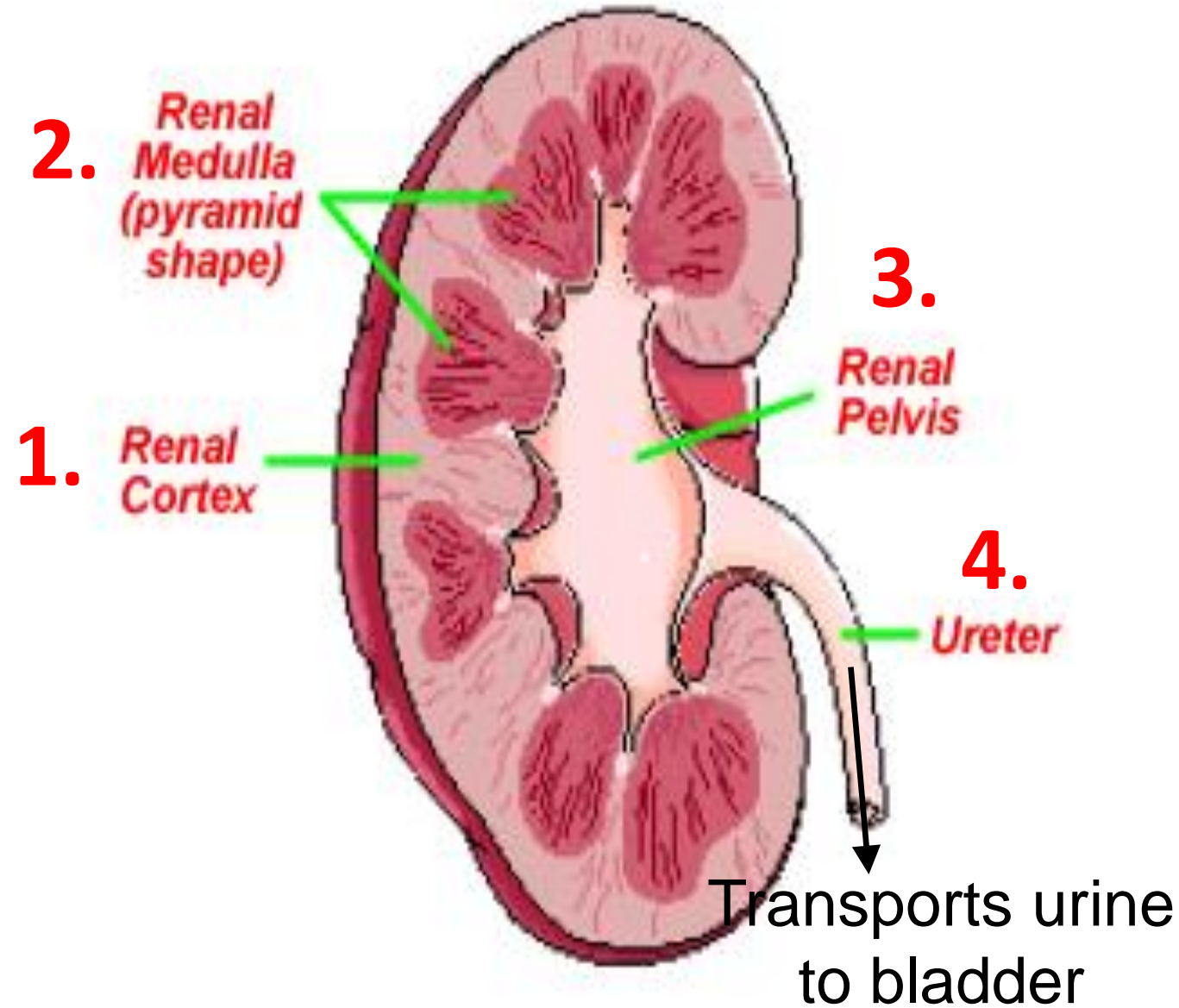


Ureters - carry urine from kidney to bladder

Bladder - stores urine

Urethra - Tube through which urine exits the body

# Kidney (Cross Section)



## Layers of the Kidney

### #1 - **Cortex**

This layer contains the nephrons. Think of the cortex as the filtering layer of the kidney.

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### #2 - **Medulla**

The middle layer or the collecting layer. Tubes carrying filtered wastes travel from the cortex, through the medulla towards the pelvis.

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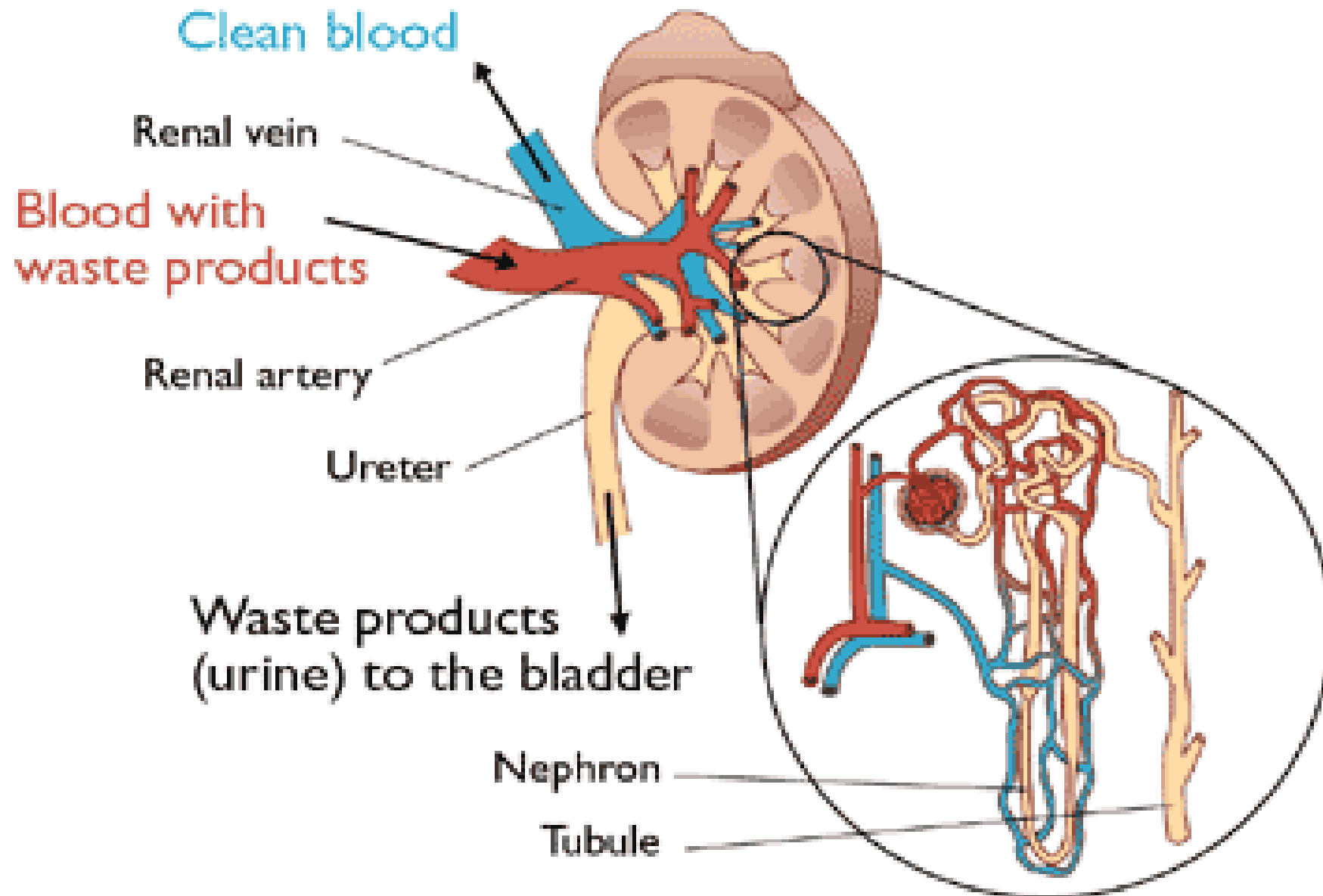
### #3 - **Pelvis**

This is the area where all of the collecting tubules come together & connect with the ureter (which is structure #4).

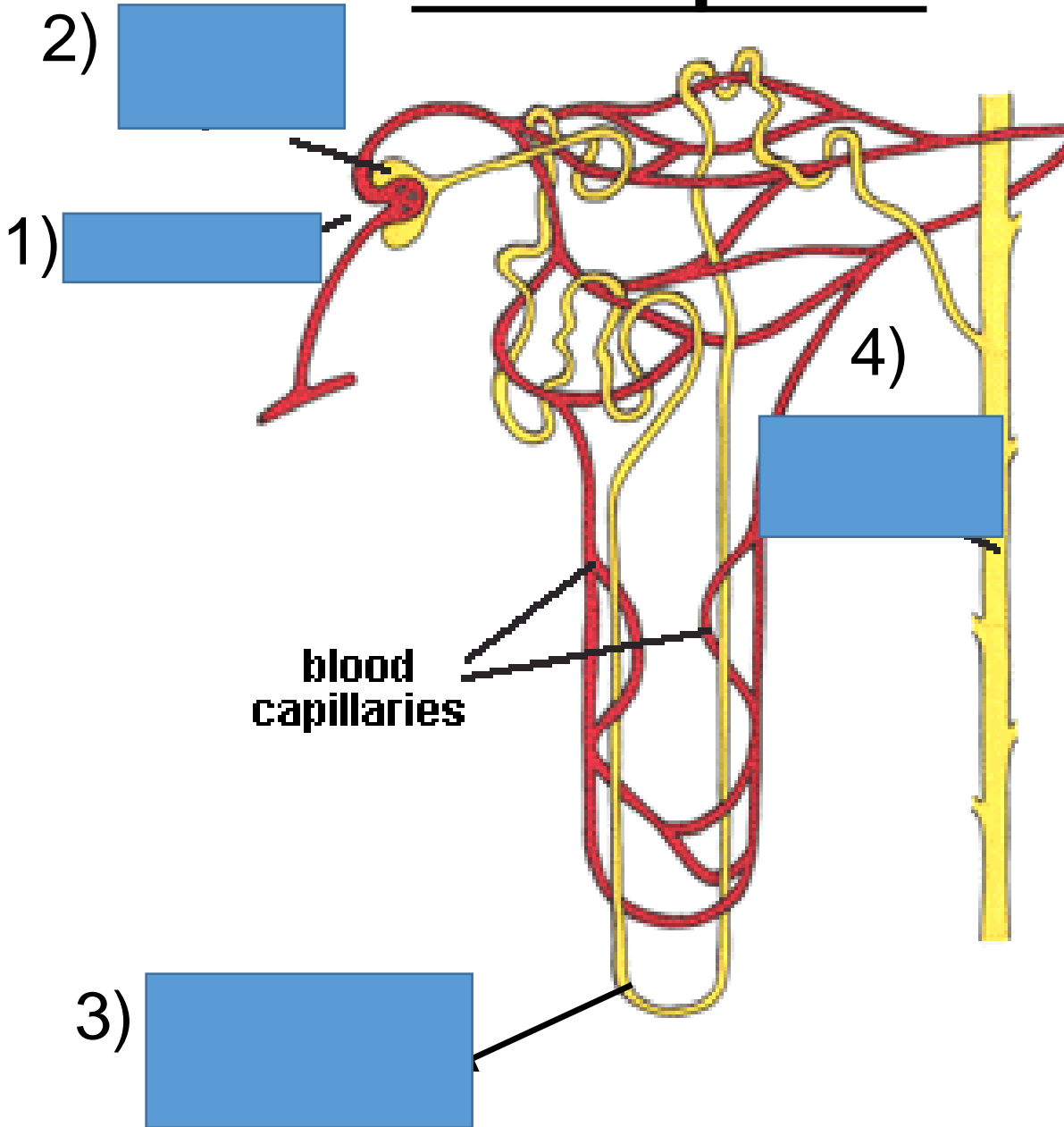
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#4 - The **Ureter** transports the liquid waste (urine) to the urinary bladder.

# How the kidney works



# The Nephron



**1. Glomerulus** cluster of capillaries where blood enters the kidneys

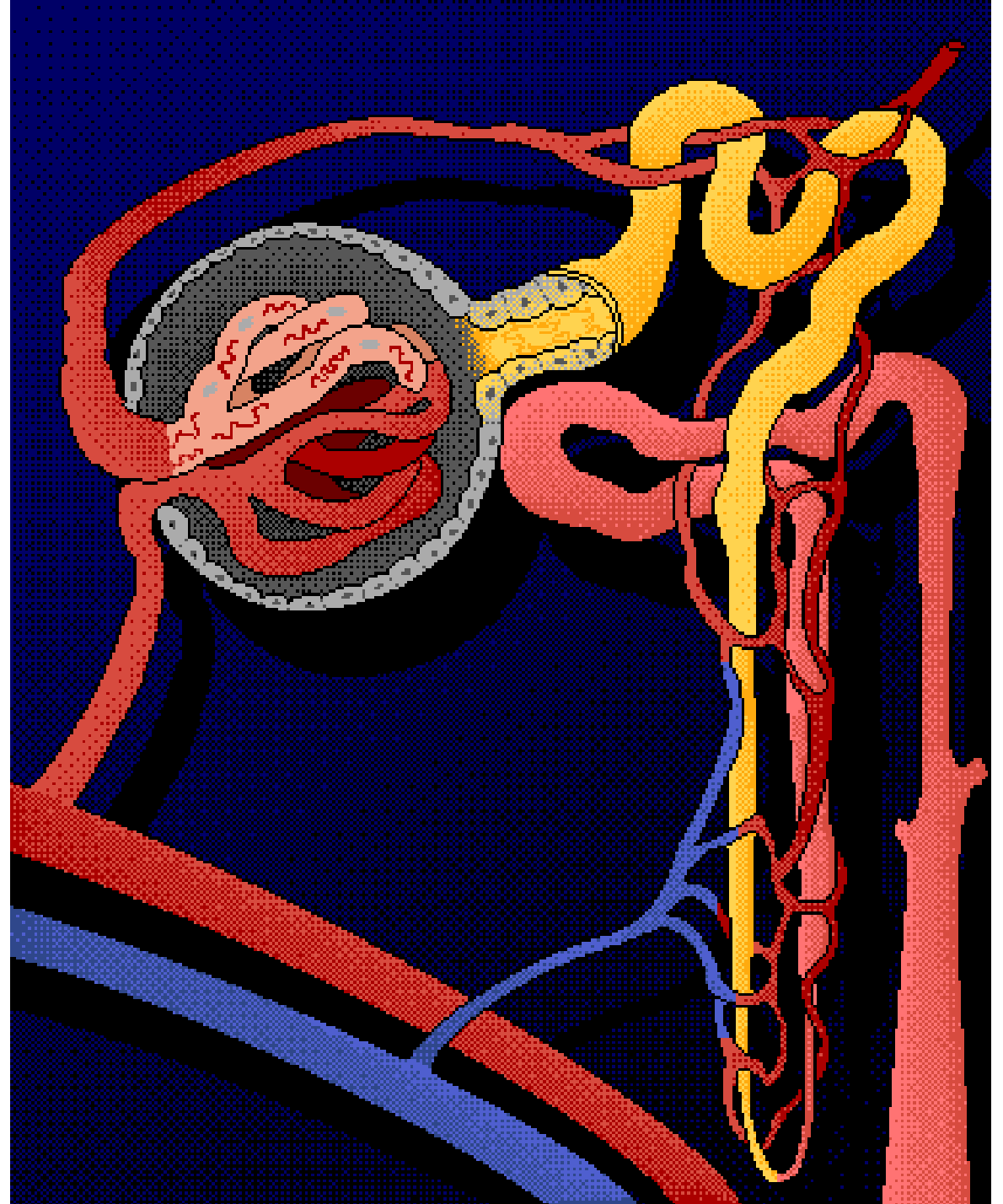
**2. Bowman's capsule** C" shaped structure surrounding each glomerulus. It is here that materials such as urea, salts, water, glucose & others (known as the filtrate) pass from the blood into the nephron.

**3. Loop of Henle** : As the filtrate travels through this tubule, useful substances are reabsorbed into the surrounding capillaries

**4. Collecting duct** : collects the metabolic wastes filtered from the blood which form urine and transports them to urinary bladder

## The Nephron (cont.)

- **urea, salts, & some water are excreted**
- **glucose, amino acids, & most H<sub>2</sub>O are reabsorbed back into the blood**



## Structure of Nephron

Label the parts of a nephron on the diagram to the right.

- a. Bowman's capsule
- b. renal arteriole
- c. glomerulus
- d. capillaries
- e. loop of Henle
- f. collecting tubule

**a – Bowman's capsule**

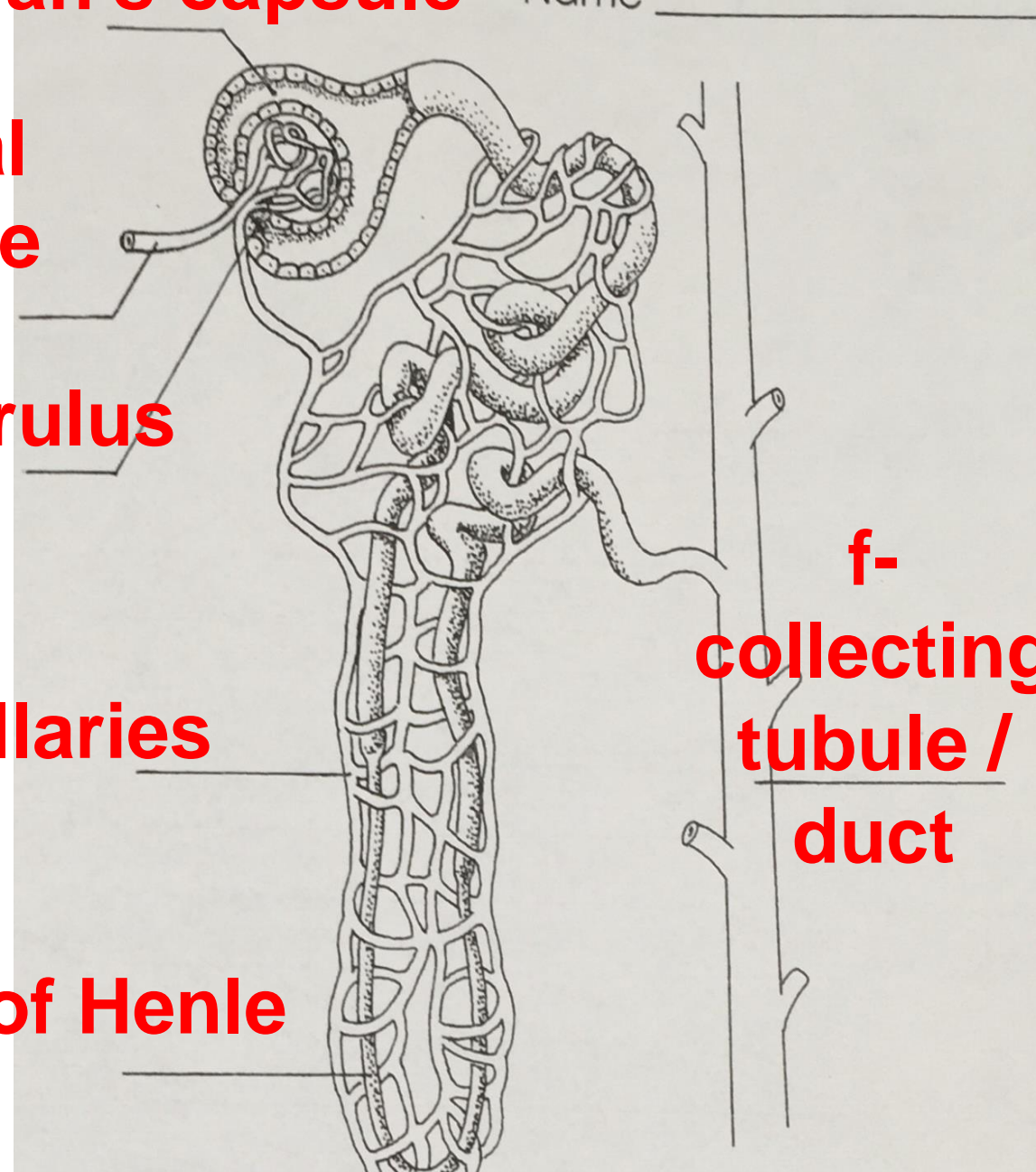
**b- renal arteriole**

**c- glomerulus**

**d – capillaries**

**e – loop of Henle**

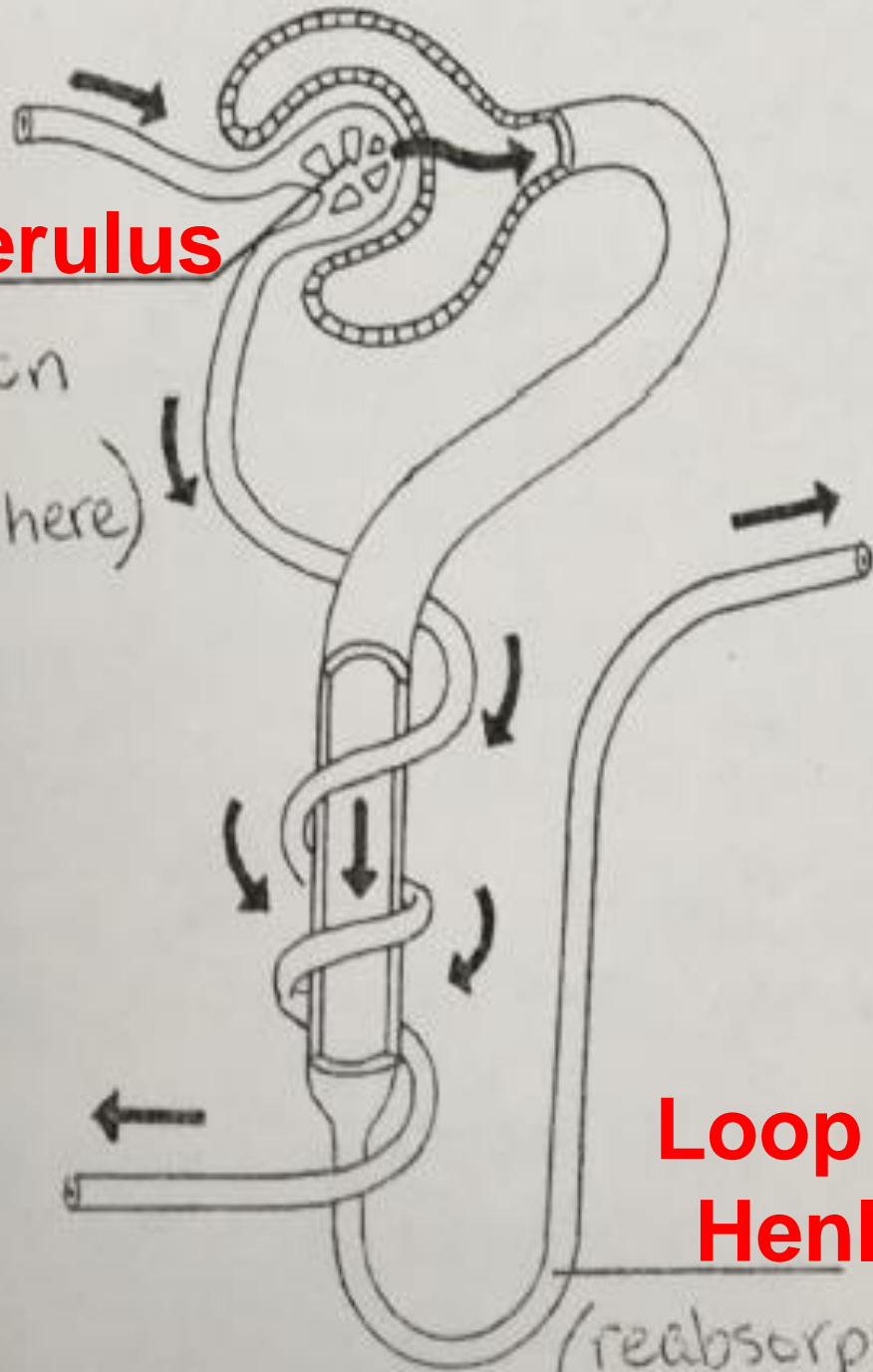
**f- collecting tubule / duct**





**glomerulus**

(filtration  
takes  
place here)



**Loop of  
Henle**

(reabsorption  
takes place here)

Label these two parts. Indicate the areas where filtration and reabsorption take place. Tell whether each of the following substances that is filtered from the blood in the glomerulus is reabsorbed, excreted as part of the urine, or both.

water           **BOTH**          

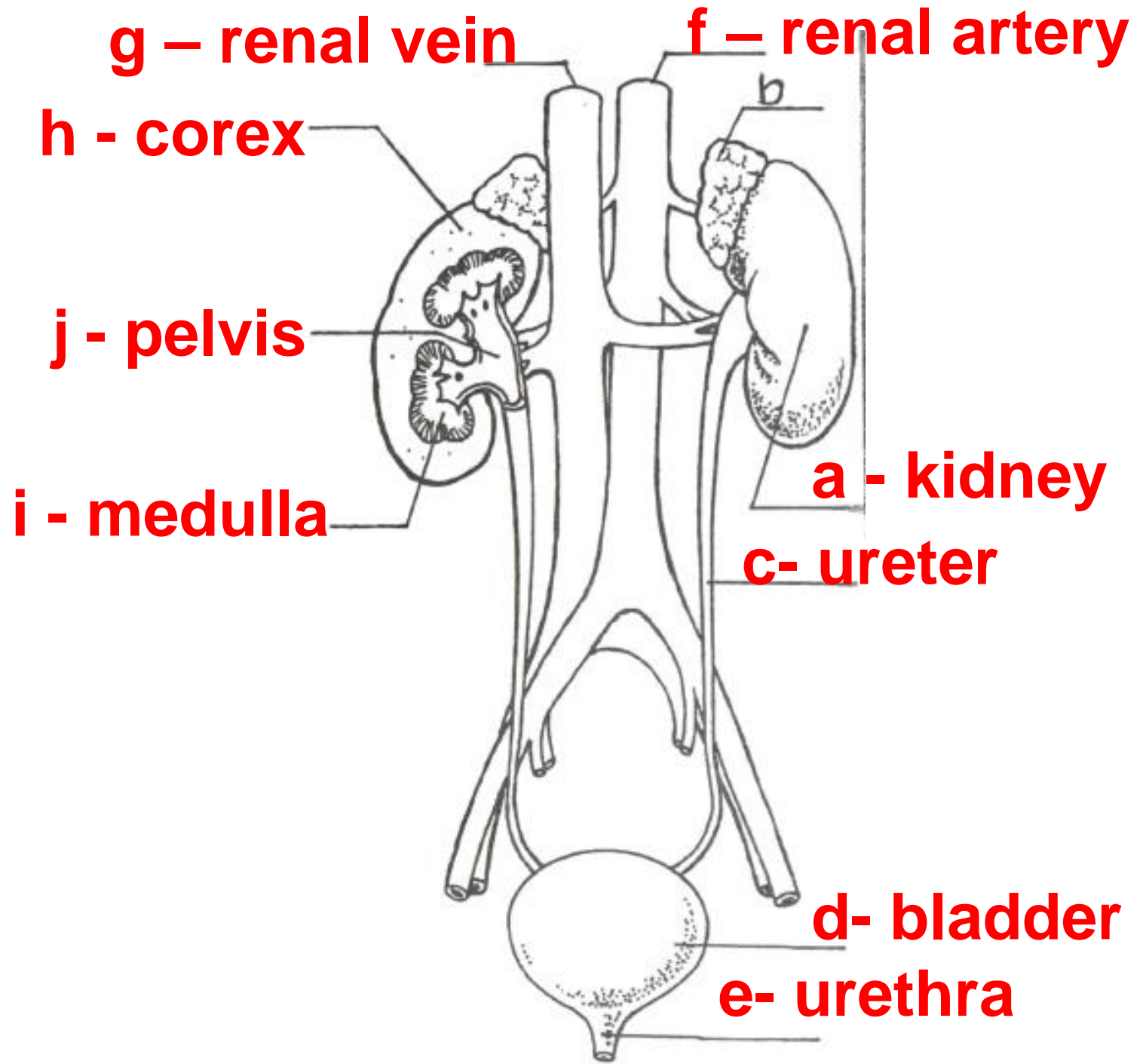
amino acids           **reabsorbed**          

glucose           **reabsorbed**          

salt           **BOTH**          

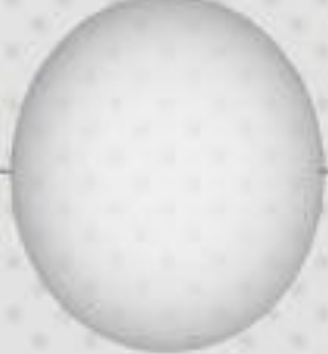
urea           **excreted**





Fill in the blanks below with the correct answers.

Kidneys are the “filters” of the urinary system. They control essential balance between body salts and water. They remove from the blood nitrogenous wastes, water, urea, nonvolatile foreign substances, excess salt and excess water. The kidney is enclosed by a connective tissue capsule and is divided into an outer cortex and an inner medulla. The loop of Henle functions chiefly for water resorption. The liquid waste, called urine, collected by the kidneys passes through the ureter to the bladder. The urinary bladder is a strong muscular organ that stores the urine until it can be excreted via the urethra.



## **NO COLOR. TRANSPARENT.**

You're drinking a lot of water.  
You may want to cut back.



## **PALE STRAW COLOR.**

You're normal, healthy and well-hydrate



## **TRANSPARENT YELLOW.**

You're normal.



## **DARK YELLOW.**

Normal. But drink some water soon.



## **AMBER OR HONEY.**

Your body isn't getting enough water.  
Drink some now.



## **SYRUP OR BROWN ALE.**

You could have liver disease.  
Or severe dehydration. Drink water and  
see your doctor if it persists.

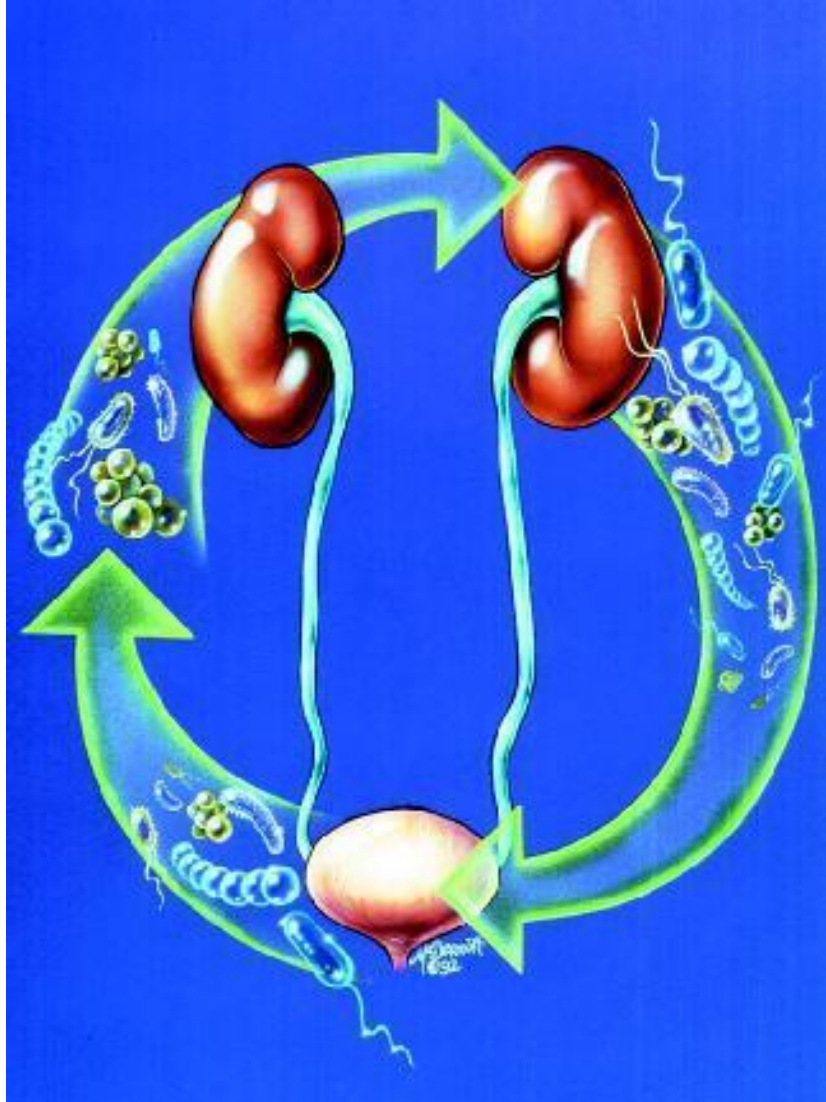
**DISCLAIMER: This is not intended to diagnose or treat any urinary issues you may be experiencing. Call your doctor!!!**

# Lesson 3

## **Excretory Malfunctions**

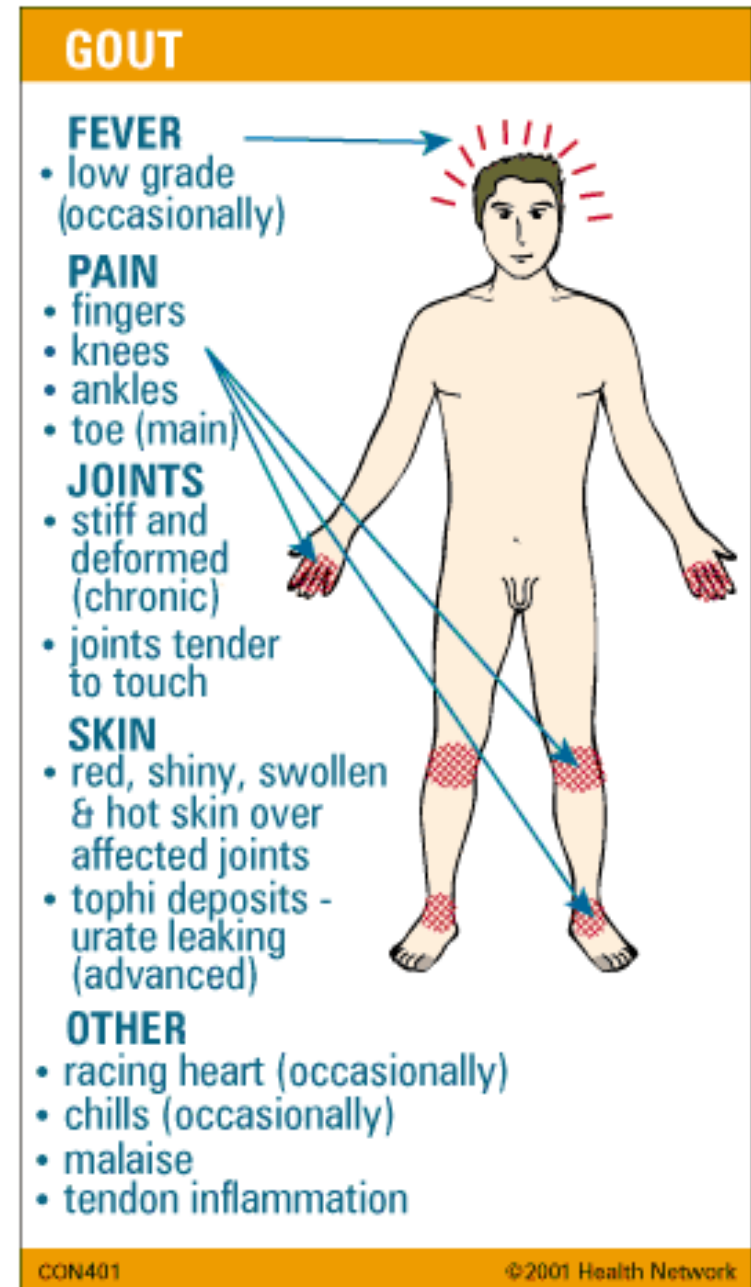


# Excretory System Disorders



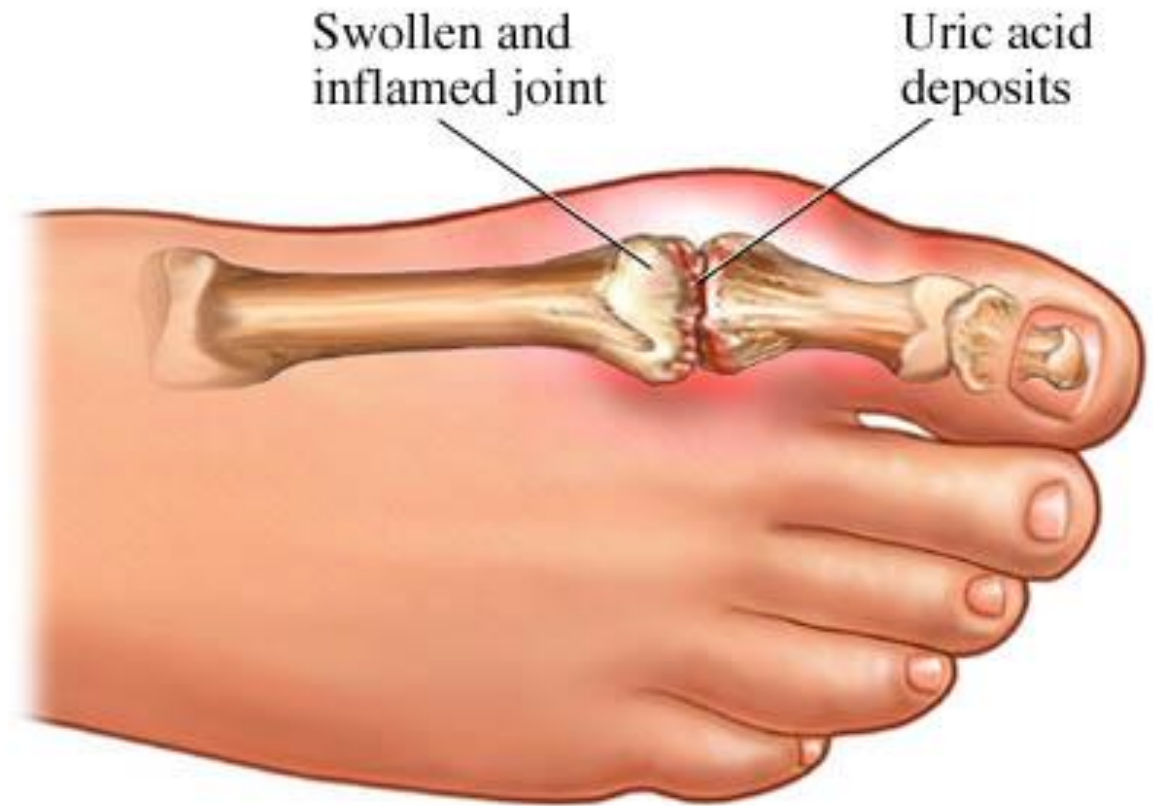
# 1. Gout (a type of arthritis)

- Cause – excess uric acid (from red & organ meats, red wine and chocolate) builds up in the joints
- Disruption of homeostasis - arthritis-like pain
- Treatment/Prevention – anti-inflammatory meds, healthy diet, less red meat





# Gout



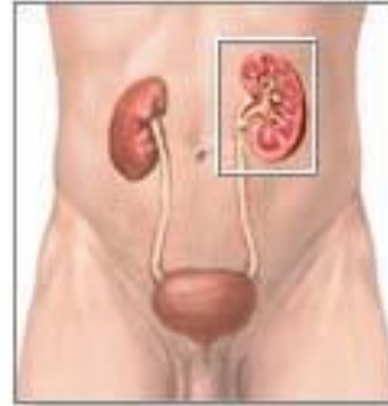


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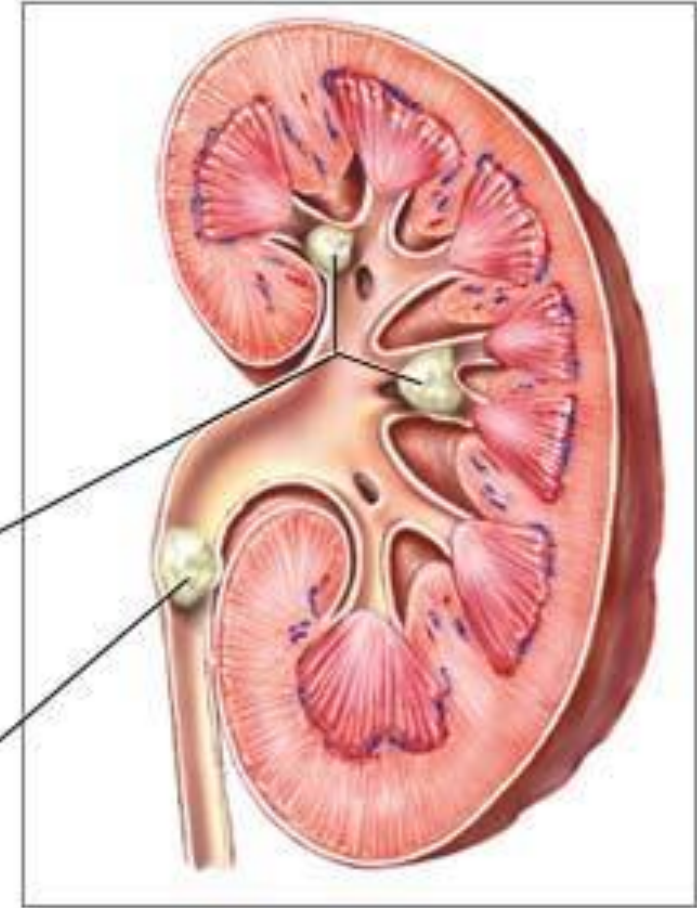
## 2. Kidney Stones

- **Cause - poor diet, high blood pressure, some are genetic**
- **Disruption of homeostasis – build up of calcium, uric acid inside the kidneys (pain)**
- **Treatment – meds, soundwaves to break apart stone, passes when urinating**



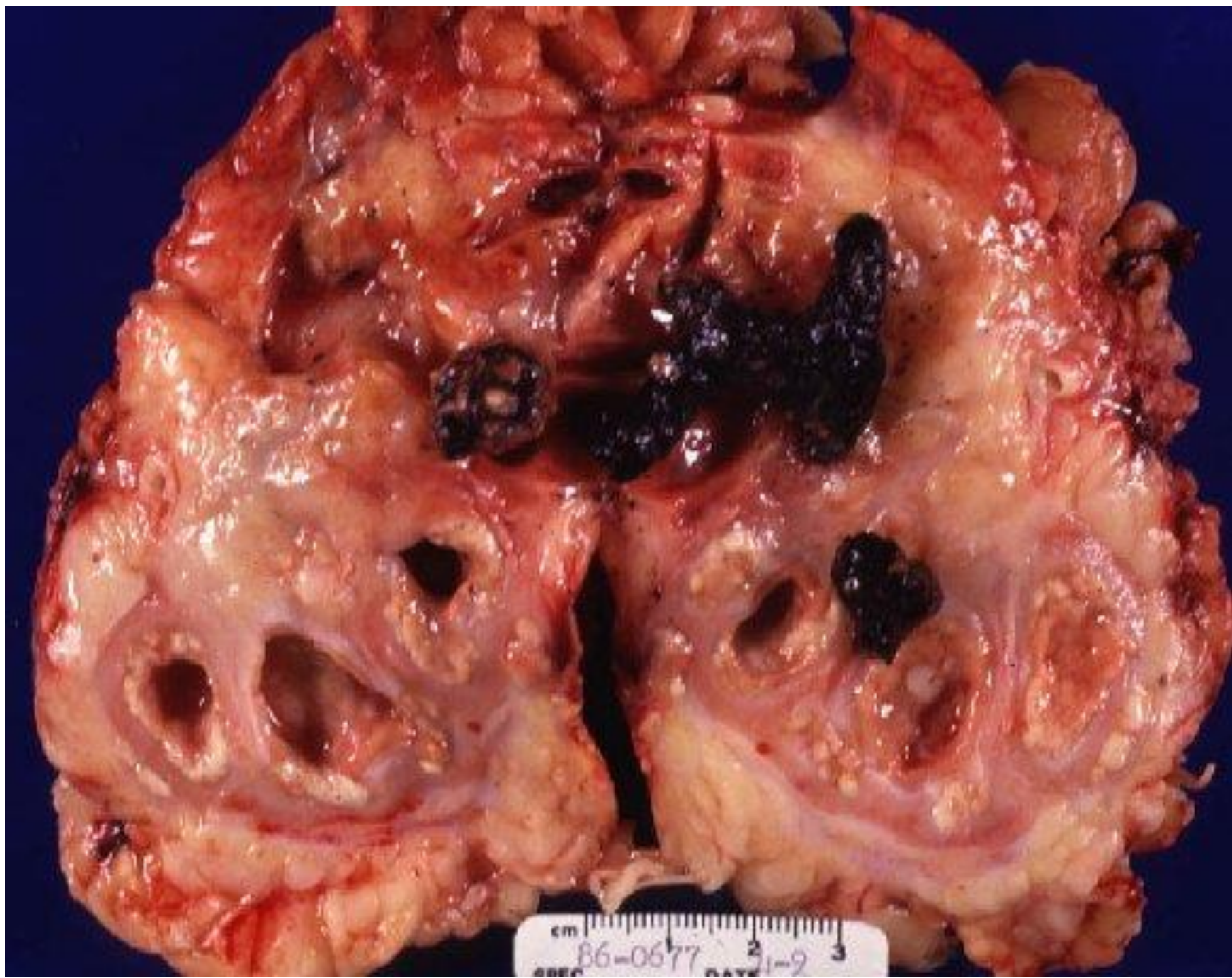
Kidney stones in the minor and major calyces of the kidney

Kidney stone in the ureter



ADAM.

[Video - Seinfeld, Modern Family, Friends](#)



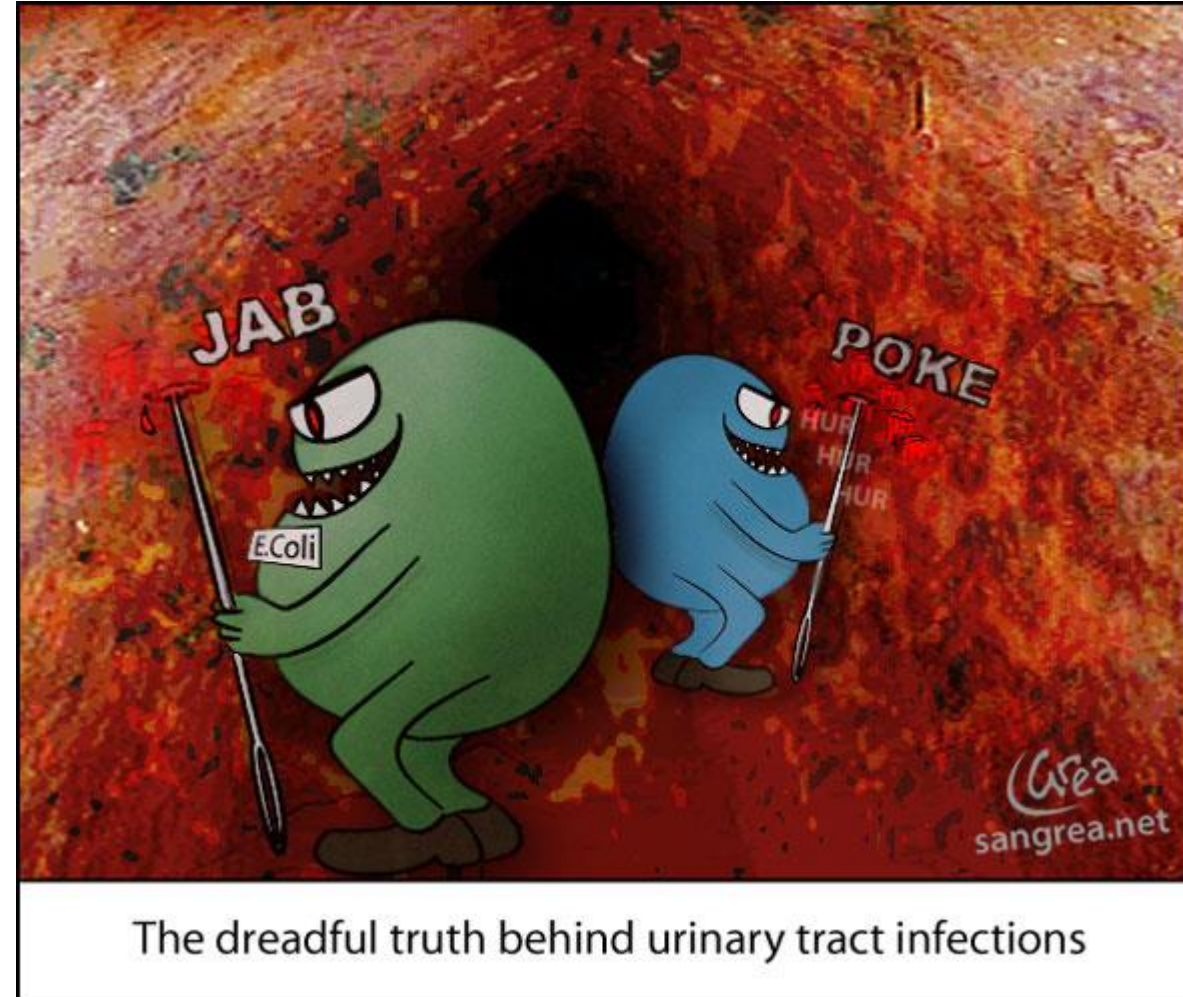




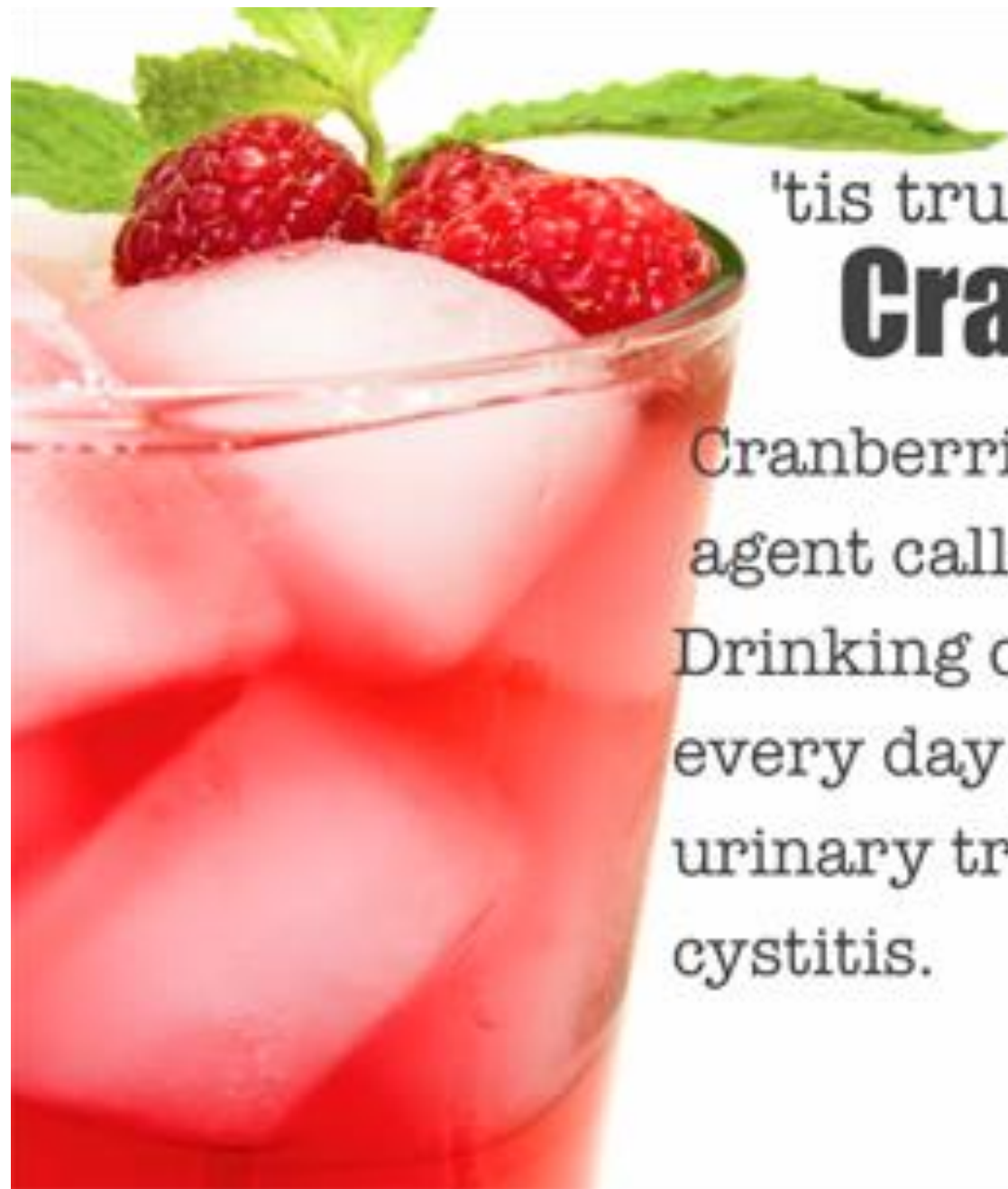
(c) [www.urinarystones.info](http://www.urinarystones.info)

# 3. Urinary Tract Infection

- Cause - E. coli bacteria infect the urethra
- Disruption of homeostasis - inflammation and painful urination
- Treatment – antibiotics
- Prevention – good hygiene, cranberry juice







'tis true:

## **Cranberry Juice**

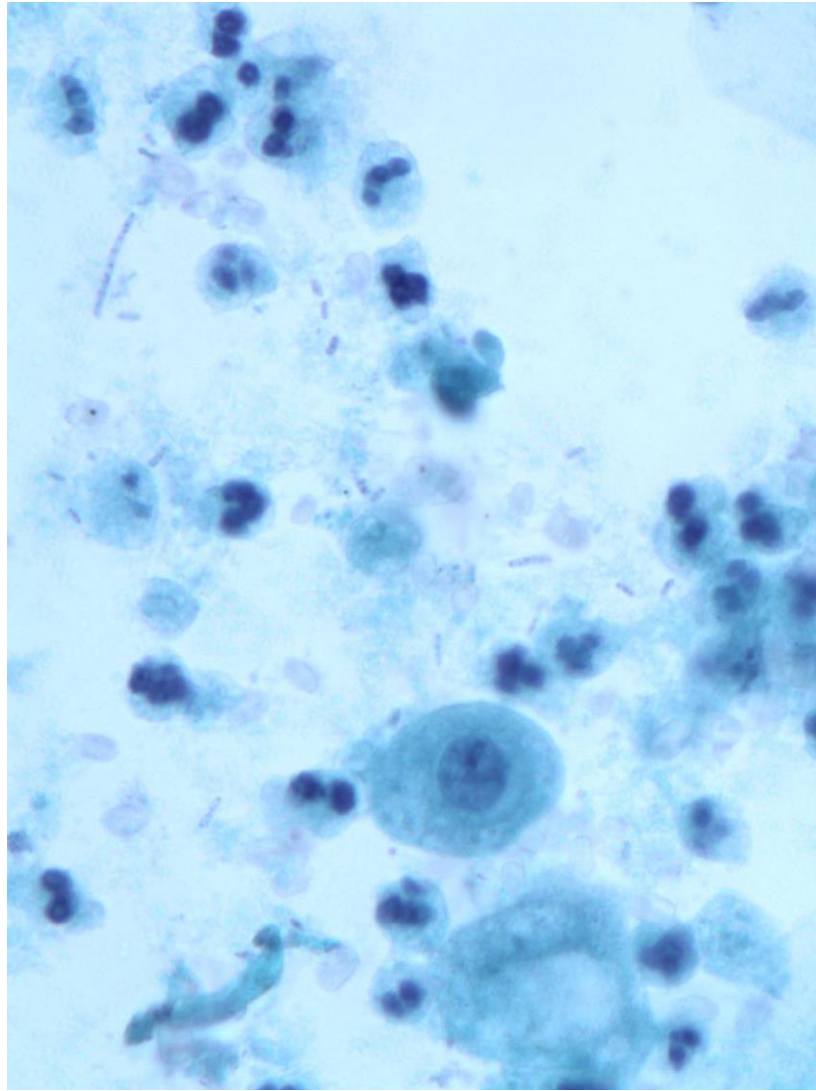
Cranberries contain an antibacterial agent called hippuric acid.

Drinking one glass of cranberry juice every day can reduce the risk of urinary tract infections and prevent cystitis.

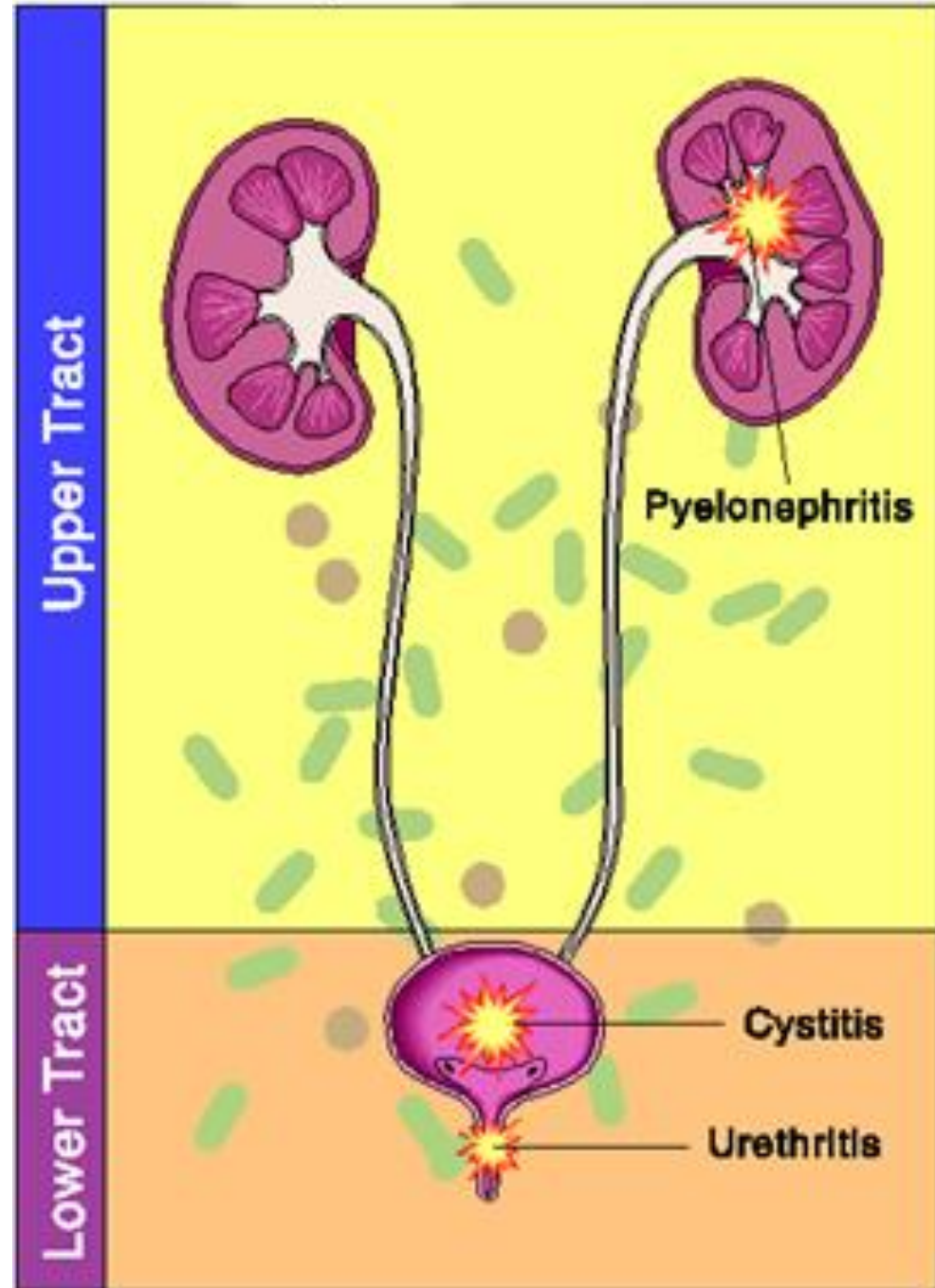


Simply Easy . Healthy You  
[www.MamasHealth.com](http://www.MamasHealth.com)





# Urinary Tract Infections



# Is your urine ...?



## PINK TO REDDISH.

Have you eaten beets, blueberries or rhubarb recently? If not, you may have blood in your urine. It could be nothing. Or it could be a sign of kidney disease, tumors, urinary tract infections, prostate problems or something else. Maybe even lead or mercury poisoning. Contact your doctor.

**DISCLAIMER: This is not intended to diagnose or treat any urinary issues you may be experiencing. Call your doctor!!!**

# Is your urine ...?



## **SYRUP OR BROWN ALE.**

You could have liver disease.  
Or severe dehydration. Drink water and  
see your doctor if it persists.

**DISCLAIMER: This is not intended to diagnose or treat any urinary issues you may be experiencing. Call your doctor!!!**



# Is your urine ...?



## ORANGE.

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You may not be drinking enough water. Or you could have a liver or bile duct condition. Or it could be food dye. Contact your doctor.

**DISCLAIMER: This is not intended to diagnose or treat any urinary issues you may be experiencing. Call your doctor!!!**

# Is your urine ...?



## BLUE OR GREEN.

Okay, this is different. There is a rare genetic disease that can turn your urine blue or green. Also certain bacteria can infect the urinary tract. But it's probably a food dye in something you ate. Or a medication. You won't die from it, but see your doctor if it persists.

**DISCLAIMER: This is not intended to diagnose or treat any urinary issues you may be experiencing. Call your doctor!!!**



# Is your urine ...?



## FOAMING OR FIZZING.

A harmless hydraulic effect, if occasional. But could indicate excess protein in your diet or a kidney problem. See a doctor if foaming happens all the time.

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