

KIDNEYS & WATER BALANCE

U4:L5

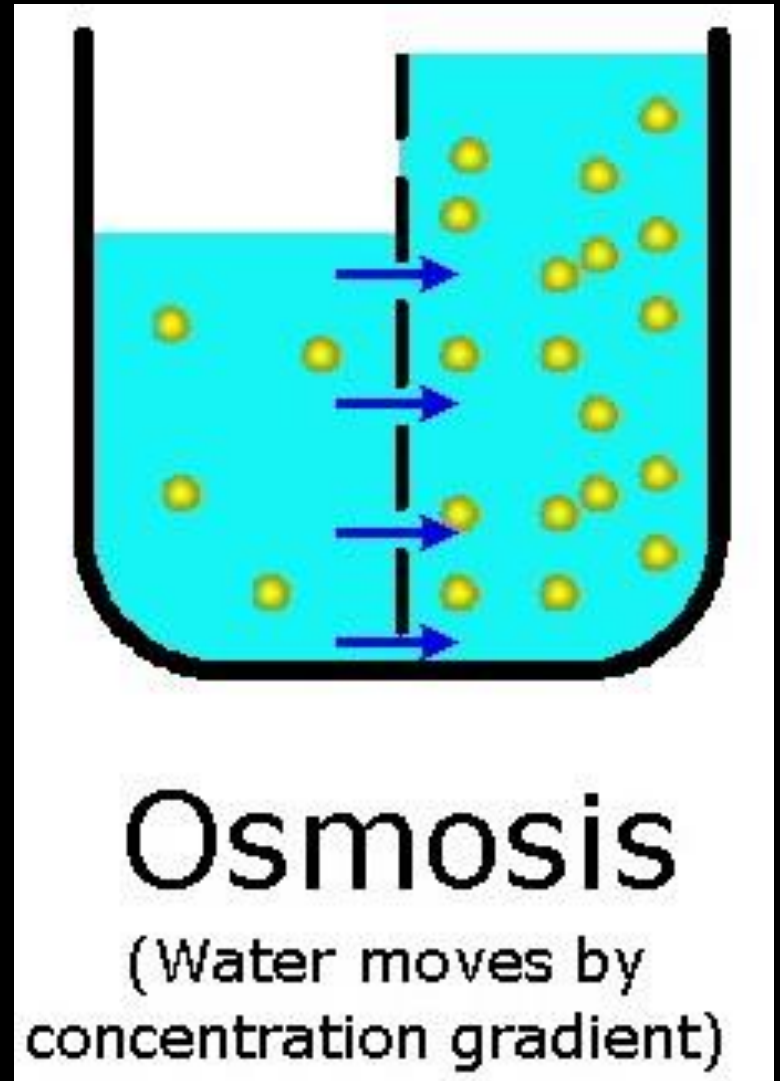
Kidneys filter about **half a cup** of filtrate from the blood each **minute.**

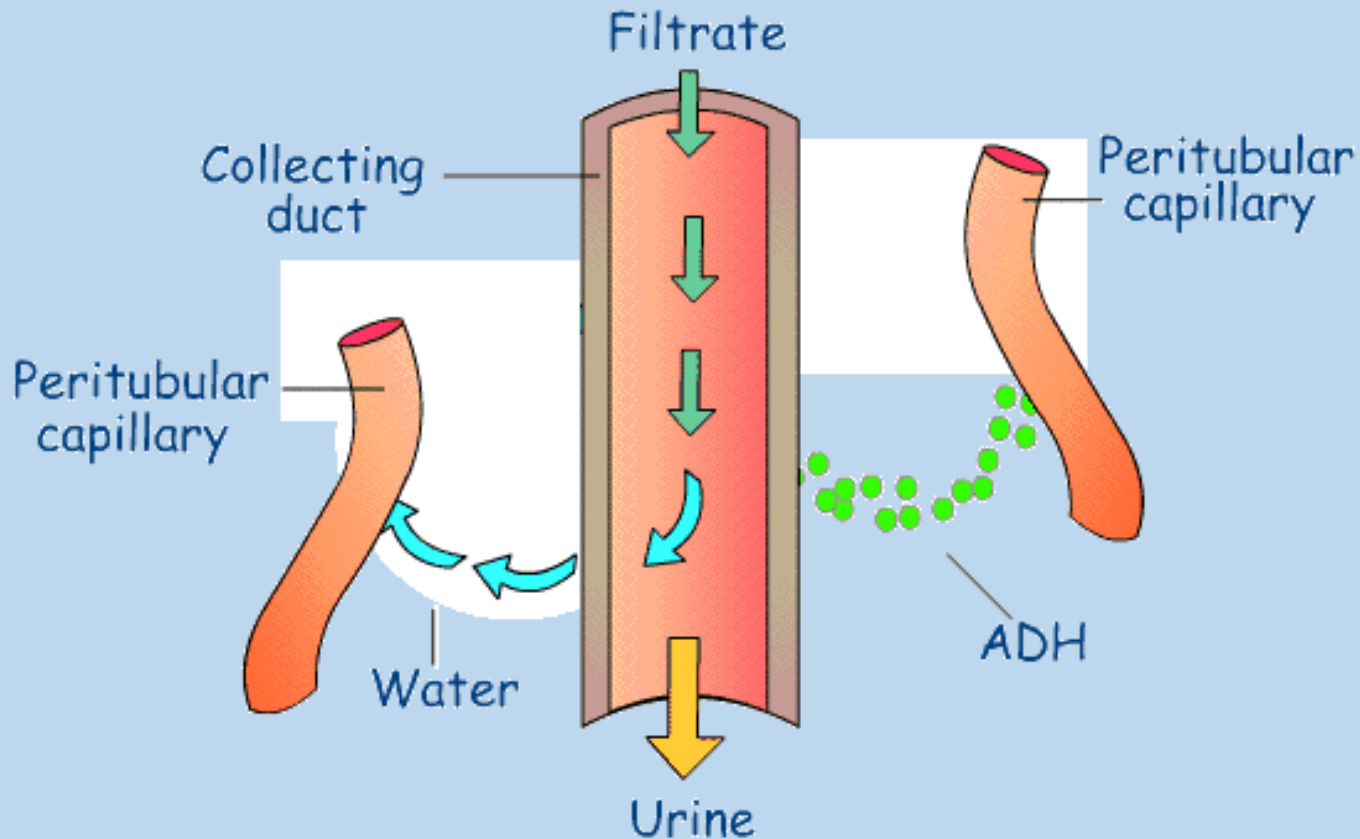
Without **reabsorption** of water, you would produce about **190L** of urine each day!

You usually urinate about **1 L** each day.

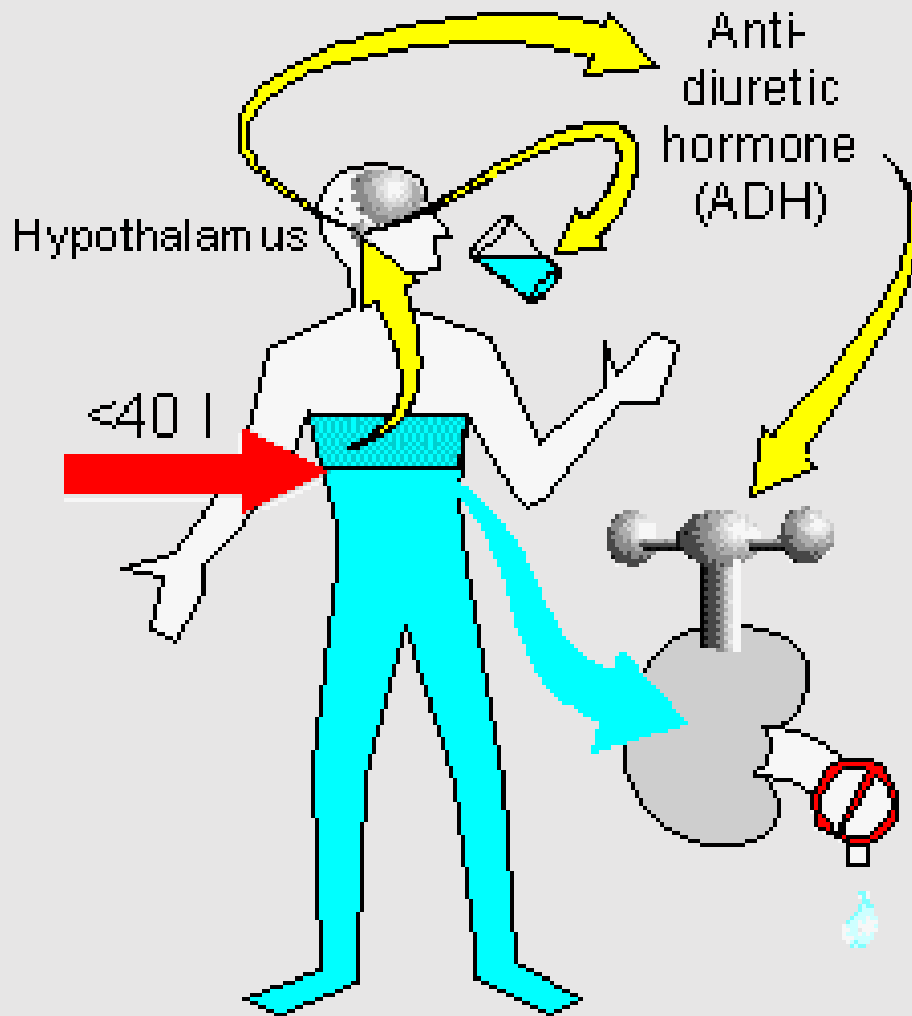


Water
reabsorption
occurs passively by
osmosis

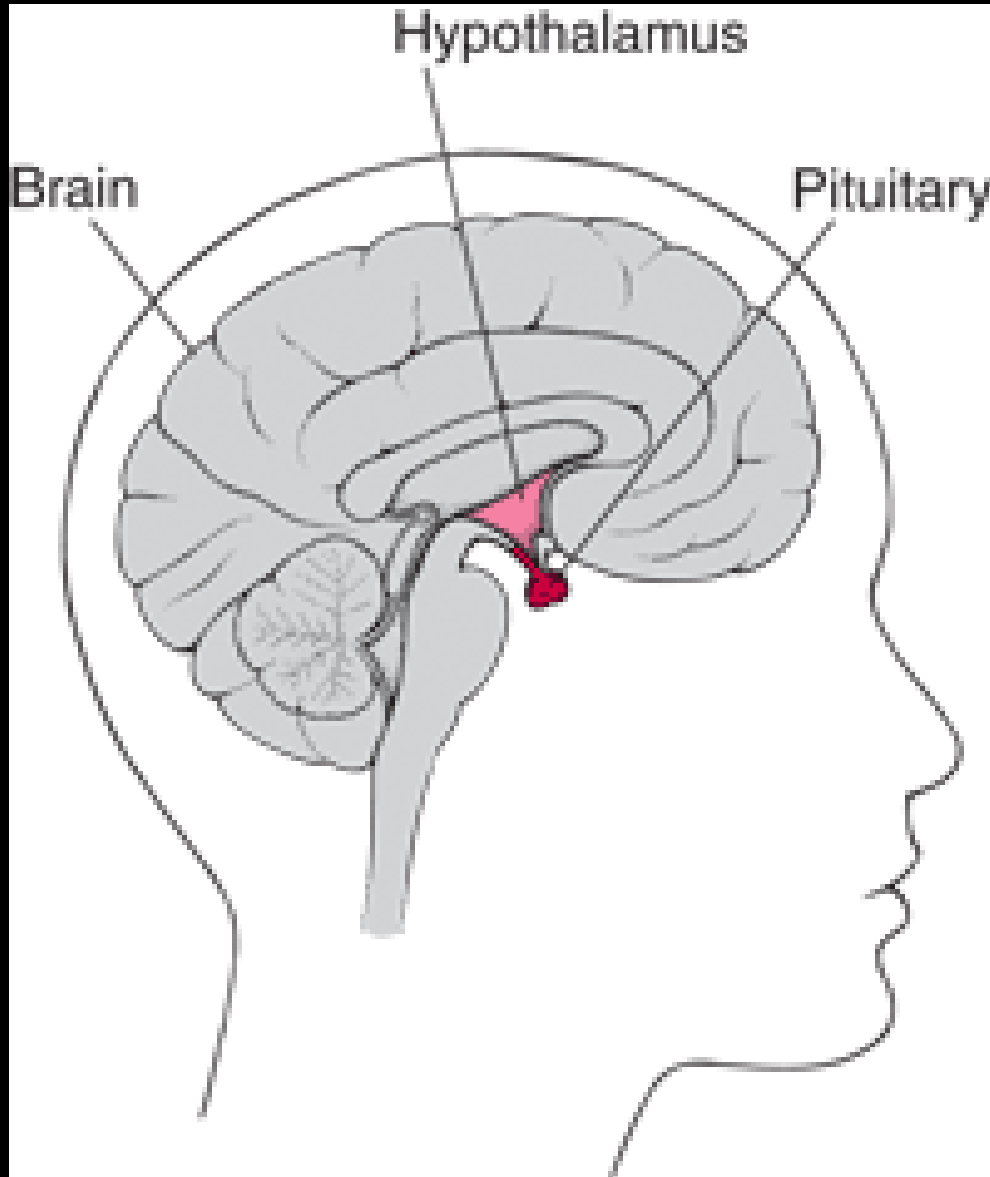




Water conservation by the kidney is controlled by a negative feedback mechanism, which involves a hormone called **antidiuretic hormone (ADH)**. This is also sometimes called **vasopressin**.



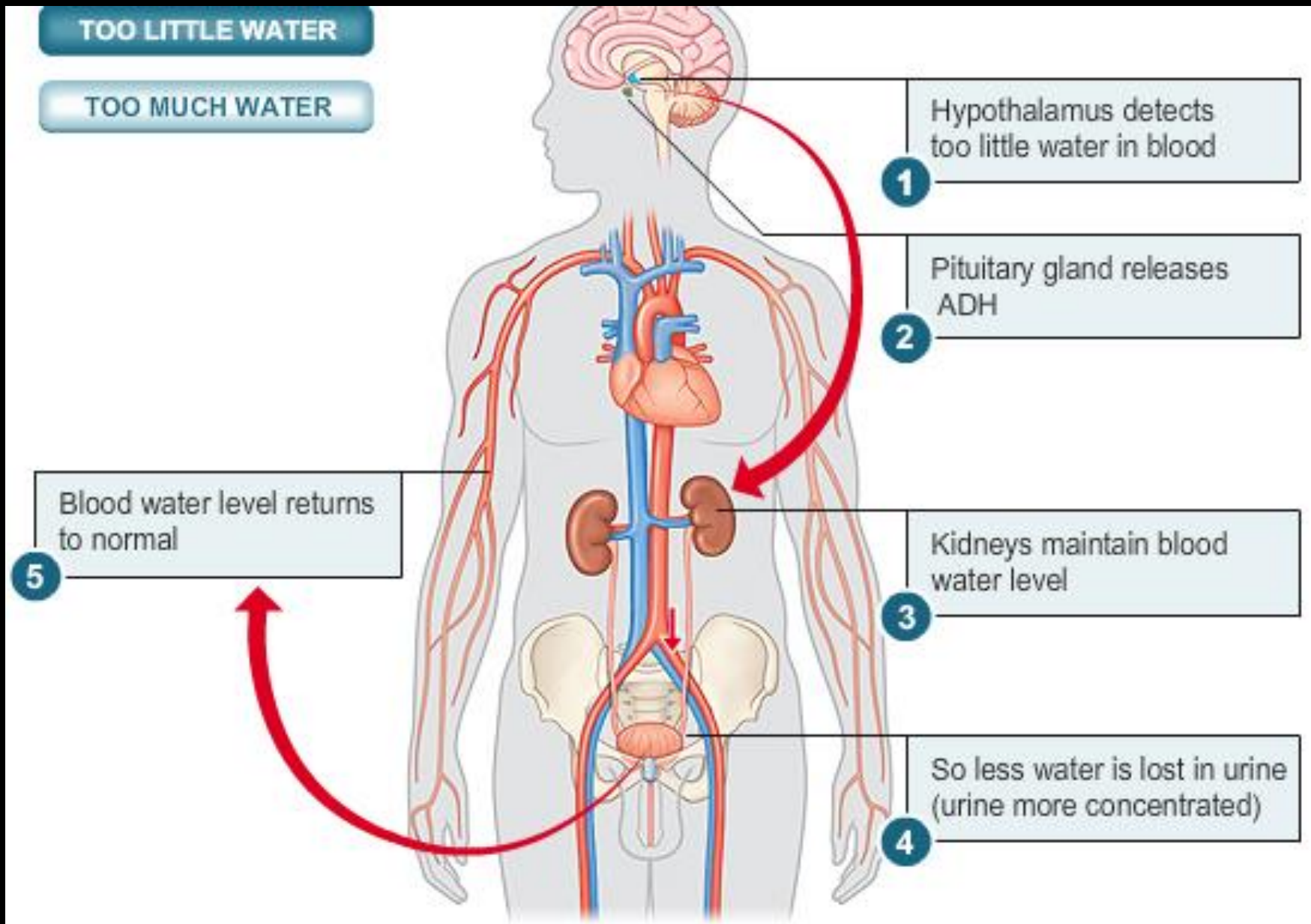
- Low water levels in the blood signals the body to produce ADH
- This hormone increases the permeability of the distal tubule and collecting duct to water



**ADH is produced
by the
hypothalamus and
is released by the
pituitary gland in
the brain**

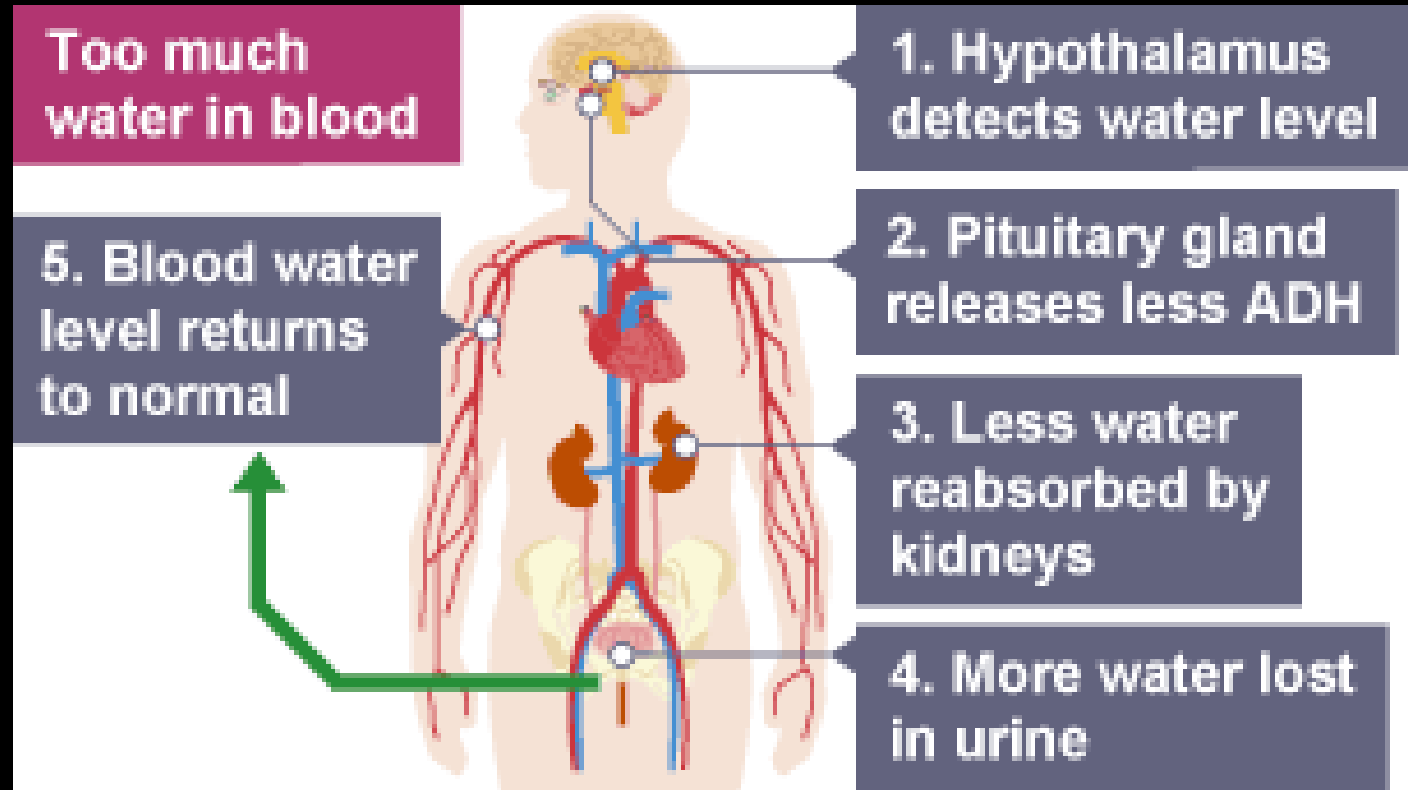
TOO LITTLE WATER

TOO MUCH WATER



High water levels in the blood signal the body to stop producing ADH

- The cell membranes of the distal tubule and the collecting duct become impermeable to water
- As a result, they do not allow water to return to the blood...urine becomes very dilute.



Fizzy:

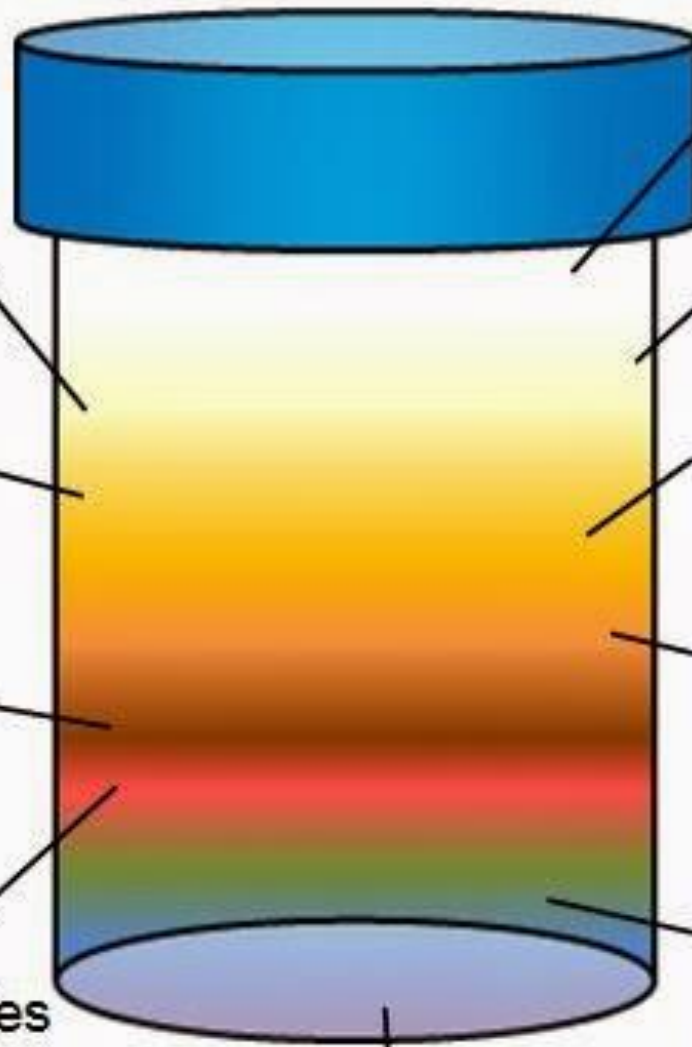
Normal, excess protein, kidney problem

Transparent Yellow:
normal

Dark Yellow:
normal, but in need of water soon

Brown:
severely dehydrated, liver disease

Pink / Red:
Eaten beets / blueberries
rhubarb, blood in urine



Clear:
excess water

Pale Straw Yellow:
healthy

Honey/Amber:
dehydrated

Orange:
dehydrated, liver/ bile duct condition, food dye

Blue / Green:
rare genetic disease, bacteria or medication, food dye

Purple:
does not exist

Alcohol
inhibits the
production
of ADH



That means
it makes
you
urinate
more!



Caffeine increases the rate of salt and water loss from the kidneys.

Caffeine is classified as a diuretic, which means that it

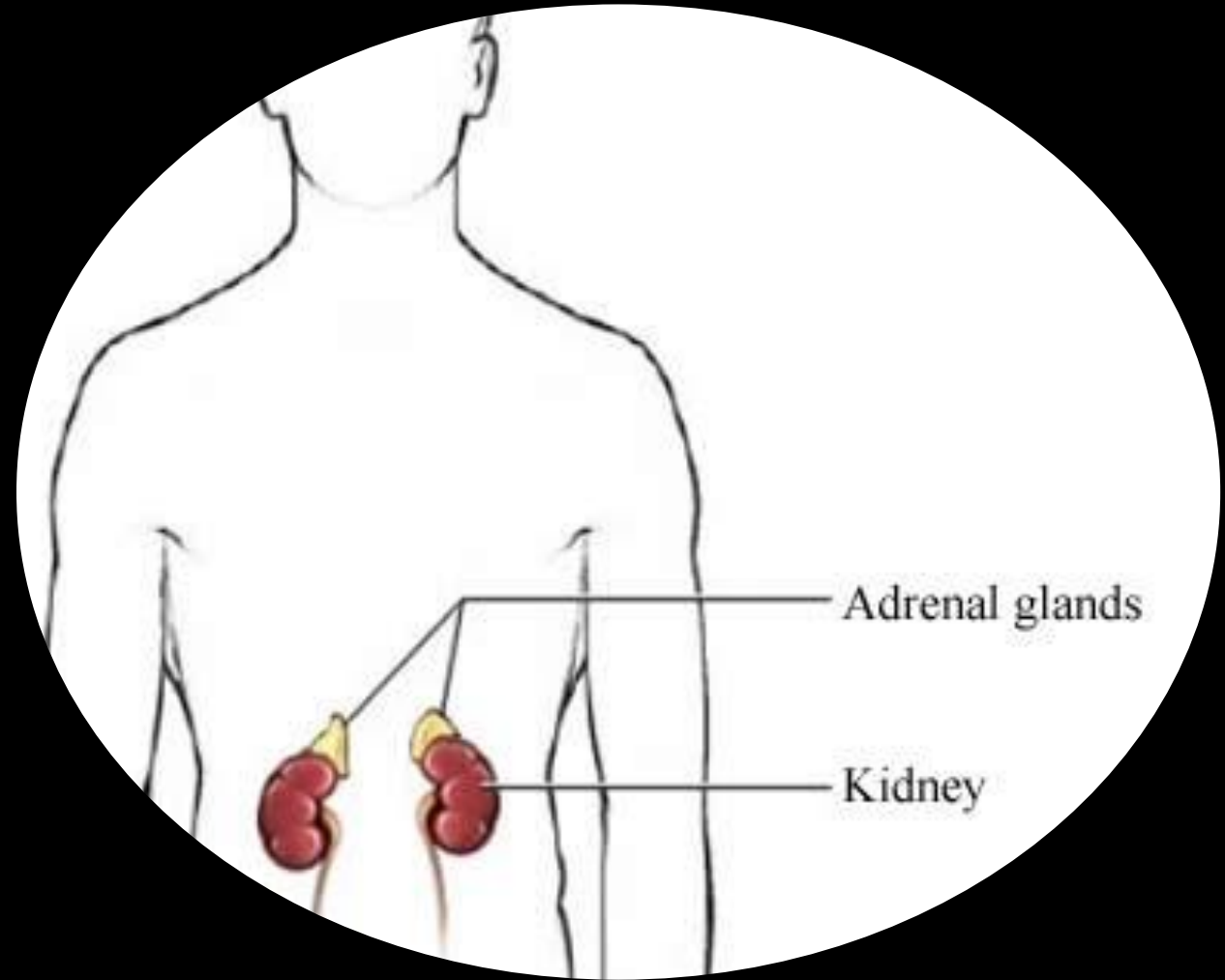
increases urine output.

Caffeine increases glomerular blood pressure, which increases blood filtration, resulting in an increase in urine



KIDNEYS
& BLOOD
PRESSURE

A hormone called aldosterone, which is produced in the adrenal gland (located on top of the kidneys) acts on the nephrons to increase the reabsorption of water and sodium





The increased sodium and water reabsorption from the distal tubule reduces urine output and increases blood volume

The increased blood volume helps stretch the heart muscle.

This causes the heart to generate more pressure with each beat, thereby increasing the blood pressure.

