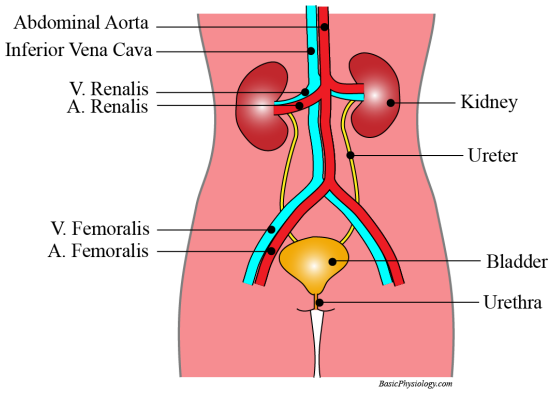
# F.1. Introduction to the Urinary System

## A. Basic organs of the urinary system:

1.
The **Urinary system** consists of six separate organs:

a) Two kidneys
b) Two ureters
c) One bladder
d) One urethra




2.
The two kidneys (left and right) **filtrate** the blood continuously to remove waste and to regulate the amount of water in the body (= the water balance).

3.
The blood comes from the heart through the (abdominal) aorta and the artery renalis (renal = kidney) into the kidney.

4.
Most of the blood, after filtering, flows back into the body through the venous renalis and the inferior vena cava.

5.
The waste and any excess water are secreted through the ureters as **urine**.

6.
The two ureters are long small tubes that push the urine from the kidneys to the bladder.

7.
The bladder collects the urine that is continuously formed by the kidneys and stores this until there is a convenient moment to pee!

8.
The urethra connects the bladder to the outside world. Note that the urethra is much shorter in females than in man, where the urethra runs along the length of the penis.

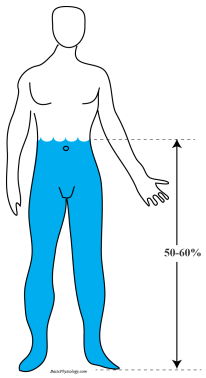
9.
Btw, the two kidneys, are located retroperitoneal, that is behind the abdominal cavity (=peritoneum), protected by the back muscles and the lower ribs.

10.
The urinary bladder however is located inside the peritoneum at the bottom, so that it can 'grow' in size when it gets filled!

## B. Water Balance:

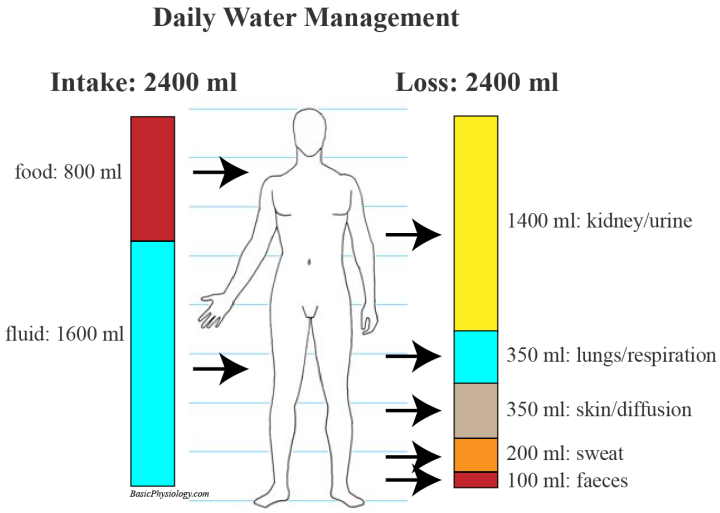
1.
You may not realize this, but your body is actually a huge sack of water!

2.
In general, your body consists 50-60% of water. So, if your weight is, let's say, 80 kg, then the total amount of water in your body is 45 liters (±13 gallons)!




3.
Most of this water is located inside all the cells (= *intracellular* water; about 66%). A smaller amount is located between the cells (= *interstitial* fluid; about 30%) and the smallest amount is in your blood vessels (= *plasma*; about 3 liters).

4.
Every day, this water needs to be refreshed, the blood needs to be filtered, the waste removed etc. This also implies that, every day, we need to drink water.




5.
As shown in the diagram, every day, we need to take, on average, about 2.4 liters/day (although this can vary a lot between individuals).

6.
Most of this intake we do by drinking (water, coffee, coke, etc.). But some 30% is taken through our food.

7.
In order not to **swell**, we then also need to **remove** a similar amount of water every day!

8.
Most of the water (some 60%) is excreted by the **kidney** into urine.

9.
But we also lose water with our **respiration**.

10.
Some water is also lost though our skin. This

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| Every time we breathe air inside our lungs, this air is wetted ('humidified'). When we then exhale, this 'wetted' air flows out of our body and its water content are 'lost'. | is sometimes called "perspiratio insensibilis" (=invisible perspiration). |
| 11.<br>And, finally, we can also lose some water through real perspiration (sweating) and with our feces. | 12.<br>But please note that all these values are highly variable. For example, in **diarrhea**, you would lose much more water with the feces! |