**Biology 20 Notes – Kidney Processes**

The kidneys regulate blood composition by three main processes:

1. **Filtration:**
2. **Reabsorption:**
3. **Secretion:**

**Filtration**

* Occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through the walls of the glomerular capillaries and Bowman’s capsule.
* The filtrate is composed of \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (e.g., \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_), \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Your entire blood volume gets filtered approximately 20 to 25 times each day!
* Once the filtrate has entered the Bowman’s capsule, it flows through the lumen of the nephron into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Reabsorption**

* Once inside the nephron, small molecules, such as ions, \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ get reabsorbed from the filtrate: (they move back into the blood)
  + - Specialized proteins called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are located on the membranes of the various cells of the nephron.
    - These transporters grab the small molecules from the filtrate as it flows by them.
    - Transporters are concentrated in different parts of the nephron. For example, most of the Na transporters are located in the proximal tubule, while fewer ones are spread out through other segments.
  + Some transporters require \_\_\_\_\_\_\_\_\_\_\_\_\_\_, usually in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (**active transport**), while others do not (**passive transport**).
  + Water gets reabsorbed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in response to the buildup of reabsorbed \_\_\_\_\_\_\_\_\_\_ in spaces between the cells that from the walls of the nephron.
    - Proximal tubule –
* Loop of Henle –
* Distal Tubule –

**Secretion**

* The movement of waste from the blood into the nephron. This occurs through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This often includes some drugs and poisons (processed by the liver), nitrogen containing wastes and hydrogen ions.

**Kidneys and Water Balance**

* Increase water intake = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Decrease water intake = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* This is regulated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* ADH is produced in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and stored in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**The Role of ADH**

Not enough water

* When you decrease water intake or increase water loss (sweat) the solutes in your blood become more concentrated.
* High \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Water moves from your cells (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) into your blood.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ADH** –

**Diabetes Mellitus –**

**Diabetes Insipidus –**