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**URINE FORMATION**

 The kidneys filter unwanted substances from the blood and produce urine to excrete them. There are three main steps of urine formation;

1. Glomerular Filtration; this occurs as blood passes into the glomerulus producing a plasma-like filtrate ( minus proteins) and gets captured by the Bowman’s (glomerular) capsule and funneled into the renal tubule. This filtrate produced then becomes highly modified along its route through the nephron by the following processes, finally producing urine at the end of the collecting duct.
2. Tubular Reabsobtion; as the filtrate travels along the lenght of the nephron, the cells lining the tubule selectively, and often actively, take substances from the filtate and move them out of the tubule into the blood. As the glomerulus is a filter, anything suspended in the plasma that can fit through the holes in the filtration membrane can end up in the filtrate, this includes very physiologically important molecules such as water, sodium, chloride, and bicarbonate (along with many others) as well as molecules that the digestive system used a lot of energy to absorb, such as glucose and amino acids. These molecules would be lost in the urine if not reclaimed by the tubule cells. These cells are so efficient that they can reclaim all of the glucose and amino acids and upto 99% of the water and important ions lost due to glomerular filtration. The filtrate that is not reabsorbed becomes urine at the base of the collecting duct.
3. Tubular Secretion; tubular secretion occurs mostly in the PCT and DCT where unfiltered substances are moved fromthe peritubular capillary into the lumen of the tubule. Secretion usually removes substances from the blood that are too large to be filtered, for example; antibiotics and toxins, or those that are in excess in the the blood, for example; hydrogen and potassium. These substances secreted into the tubule are destined to leave the body as componentsof urine.

 **Urine Concentraion**

Concentrated urine is produced by.counter multiplicattion in the kidneys which is the proess of using energy to generate and osmotic gradient that enables you to reabsorb water from the tubular fluid and produce