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## Urine Formation

Waste is excreted from the human body mainly in the form of urine. Our kidneys play a major role in the process of excretion. Constituents of normal human urine include 95 percent water and 5 percent solid wastes. It is produced in the nephron which is the structural and functional unit of the kidney. Urine formation in our body is mainly carried out in three phases namely

1. Glomerular filtration
2. Reabsorption
3. Secretion



## Mechanism of urine Formation

The mechanism of urine formation involves the following steps:

### Glomerular Filteration

Glomerular filtration occurs in the glomerulus where blood is filtered. This process occurs across the three layers- epithelium of Bowman’s capsule, endothelium of glomerular blood vessels, and a membrane between these two layers.

Blood is filtered in such a way that all the constituents of the plasma reach the Bowman’s capsule, except proteins. Therefore, this process is known as ultrafiltration.

### Reabsorption

Around 99 percent of the filtrate obtained is reabsorbed by the renal tubules. This is known as reabsorption. This is achieved by active and passive transport.

### Secretion

The next step in urine formation is the tubular secretion. Here, tubular cells secrete substances like hydrogen ion, potassium ion, etc into the filtrate. By this process, the ionic, acid-base and the balance of other body fluids are maintained. The secreted ions combine with the filtrate and form urine. The urine passes out of the nephron tubule into a collecting duct.

### Urine

The urine produced is 95% water and 5% nitrogenous wastes. Wastes such as urea, ammonia, creatinine are excreted in urine. Apart from these, the potassium, sodium and calcium ions are also excreted.

## Osmoregulation

Osmoregulation is the process of regulating body fluids and its compositions. It maintains osmotic pressure of the blood and helps in the [homeostasis](https://byjus.com/biology/homeostasis/). This is why it is recommended to consume more water about 2-3 litres which help in the proper functioning of our kidneys. For example, we consume lots of water during summers but still, we urinate fewer times in summers than winters and the concentration of the urine is also more. The reason is that we lose lots of water from our body in summers through sweating. Thus, to maintain the fluid balance in the body our kidneys reabsorb more water.

## Noted Points on Urine Formation and Osmoregulation

1. Urine is formed in three main steps- glomerular filtration, reabsorption and secretion.

2. It comprises 95 % water and 5% wastes such as ions of sodium, potassium and calcium, and nitrogenous wastes such as creatinine, urea and ammonia.

3. Osmoregulation is the process of maintaining homeostasis of the body.

3. It facilitates diffusion of solutes and water across the semi-permeable membrane thereby maintaining osmotic balance.

4. The kidney regulates the osmotic pressure of blood through filtration and purification by a process known as osmoregulation.