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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

Glomerular filtration,
Reabsorption
Secretion.

Key Points on Urine Formation and Osmoregulation

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

It comprises 95 % water and 5% wastes such as ions of sodium, potassium and calcium, and nitrogenous wastes such as creatinine, urea and ammonia.
Osmoregulation is the process of maintaining homeostasis of the body.
It facilitates diffusion of solutes and water across the semi-permeable membrane thereby maintaining osmotic balance.
The kidney regulates the osmotic pressure of blood through filtration and purification by a process known as osmoregulation.

Urine concentration

A urine concentration test determines how well your kidneys are functioning. The test may be used to test your kidneys' response to:

too much fluid intake (water loading)
too little fluid intake (dehydration)
a hormone that should concentrate your urine, antidiuretic hormone (ADH)

the Purpose of a Urine Concentration Test

The main reason this test is ordered is to see if you are suffering from central diabetes insipidus — a disease that causes excessive urination. This form of diabetes can occur when a head injury affects how your brain releases antidiuretic hormone (ADH). ADH normally increases the amount of water the kidneys retain. In central diabetes insipidus, your brain does not release enough ADH.

A urine concentration test can also be used to evaluate:

dehydration
kidney failure
heart failure
other hormone problems
complications of a urinary tract infection

How to prepare for a urine concentration test

Depending on how the lab plans to analyze your urine, before the test you may be asked to:

drink excess fluids
avoid fluids for a period of time
take ADH (which can be taken in either pill form or a nasal spray).