The kidneys filter blood plasma, removing metabolic wastes, toxins from the body and excrete them in the form of urine.Renal tubules of several nephrons connect to a common collecting duct.These include water, inorganic ions, glucose, amino acids and various metabolic wastes such as urea and creatinine.Blood enters the Bowman's capsule via the afferent arteriole, passes through a ball of capillaries called the glomerulus, and leaves via the efferent arteriole.Hydrostatic and osmotic pressures drive water and solutes from blood plasma through a filtration membrane into the capsular space of nephron.There are 3 steps in the formation of urine: glomerular filtration, tubular reabsorption and secretion, water conservation.Sodium re-absorption is most important, as it creates osmotic pressure that drives water and electrical gradient that drives negatively charged ions.The main function of the loop of Henle is to create and maintain an osmolarity gradient in the medulla that enables the collecting ducts to concentrate urine at a later stage.Blood enters the kidney via the renal artery, which divides to smaller arteries and finally arterioles.The filtered blood is then collected in to a series of larger veins and exits the kidney through the renal vein.This creates a concentration gradient that favors sodium diffusion from tubular fluid into the cells.Sodium is absorbed by symport proteins that also bind glucose and some other solutes.The urine is collected in collecting ducts and leaves the kidney via the ureters.A nephron consists of 2 major parts: Bowman's capsule; and a long renal tubule.The proximal convoluted tubule, reabsorbs about two thirds of the filtrate.Sodium level inside the epithelial cells is kept low thanks to the sodium-potassium pumps that constantly pump sodium ions out into the extracellular space.The amount of filtrate produced per minute is called glomerular filtration rate, or GFR.Some of the re-absorption also occurs by the paracellular route through tight junctions between the epithelial cells.The GFR is kept at a stable value by several feedback mechanisms within the kidneys.In this process, water and solutes are driven through the epithelial cells that line the tubule into the extracellular space.About half of nitrogenous wastes also re-absorbs back to the bloodstream.During this process, they also maintain constant volume and composition of the blood, or homeostasis.The arterioles get into contact with functional units of the kidney called nephrons.This is where blood filtration and urine formation take place.The GFR is also under sympathetic and hormonal control.This is known as renal autoregulation.They are then taken up by the peritubular capillaries.At the same time, tubular secretion also takes place.