

HUMAN EXCRETORY SYSTEM ANSWERS

1. Excretion is the removal of metabolic wastes that have travelled in the bloodstream at some stage before removal. Secretion is the production and release by a cell of some substance that is used elsewhere in the body in some process. Defaecation is the removal of solid wastes that are produced by the digestive tract.
2. Urinary system - urine containing a large amount of excess water, excess salts, urea and uric acid; Respiratory system - carbon dioxide and water; Skin - sweat containing small quantities of water, excess salts, urea and uric acid.
3. After protein is broken down in the digestive tract to amino acids, most amino acids are reused in the body. However those that are not required are broken down to ammonia. Ammonia is toxic to animals if it accumulates in high concentrations, so it is converted to urea in the liver. This nitrogenous waste of urea travels in the blood to the kidneys where it is excreted in urine.
4. (a) excess water and salts, urea, uric acid, a very small number of amino acids and proteins
4. (b) Urine containing an excess of glucose (e.g. diabetes), urea (e.g. over-nutrition of protein), proteins and blood is a sign of a medical disorder.
5. There are over one million nephrons in each kidney and each has two functions, filtration of blood and reabsorption of useful compounds such as glucose and water. Blood enters the kidney through the Renal Artery. In the filtration process, blood pressure forces blood plasma to be filtered through the epithelium of the Glomerulus and Bowman's Capsule wall to produce a primary filtrate which enters the kidney tubule. The primary filtrate is blood plasma minus the blood cells and large protein molecules. As the filtrate passes through the Convuluted Tubule and the Loop of Henle, much of the water and glucose is reabsorbed into the blood. The water is reabsorbed by osmosis and the glucose is reabsorbed by active transport. The fluid that remains is called urine and travels through the Collecting Duct to the Ureter.

6. Each kidney has 3 regions, the outer cortex containing the glomerulus and Bowman's Capsule and the proximal and distal convoluted tubules of the nephrons, the middle medulla containing the Loop of Henle and the collecting tubule of the nephrons, and the inner pelvis which transfers the urine into the ureter. Since desert animals reabsorb more water back into the bloodstream and produce more concentrated urine, they have a longer Loop of Henle. As the Loop of Henle is in the medulla, this area is thicker in desert animals.

7. Excess coffee is a diuretic and inhibits the function of the hormone responsible for water reabsorption in the nephron. Hence too much water is excreted in urine, and a person will become mildly dehydrated.

8. Dialysis tubing is thin plastic film with tiny holes that allow the passage of small molecules (e.g. water, glucose, urea, uric acid) but not large molecules (e.g. protein). The dialysis machine filters all of the blood in the patient's blood by diffusion, and simulates the first filtration process of the nephron. However, the second reabsorption process of the nephron cannot be simulated by the machine.

9. Urea (e.g. most terrestrial animals) and ammonia (e.g. fish)