Jonathan Quang 12/4/14

Biology- Ms.Prabhu

Homework #12B

Part II:

* 1. Ammonia - NH3 that is released by cells when they liberate amino groups
  2. Bowman’s capsule - A capsule in the nephron that surrounds the glomerulus. If collects the fluid filtered out of the blood from the glmoerular capillaries.
  3. Collecting duct - This is the duct that the distal tubule empties urine into in the renal cortex.
  4. Filtrate - The fluid filtered out of the glomerular capillaries is called the filtrate.
  5. Glomerulus - A dense capillary meshwork within a nephron.
  6. Loop of Henle - The part of a kidney tubule that forms a loop in the medulla of the kidney. Water, salts, and other molecules are reabsorbed here.
  7. Nephron - Microscopic filters packed together in the renal cortex
  8. Osmolarity - The measure of the concentration of ions and other solutes in blood.
  9. Osmoregulation - The process where an animal maintains a homeostatic balance of water and salt in their body.
  10. Renal cortex- the outer portion of the kidney between the renal capsule and the renal medulla
  11. Renal medulla - the innermost portion of the kidney
  12. Urea - The less toxic form of ammonia that mammals covert ammonia to.
  13. Urine -the fluid produced and excreted by the urinary system that contains water and dissolved wastes

Part III:

1.nephridia, Malpighian tubules, protonephridia, nephridia  
2.renal cortex, renal medulla, renal pelvis, ureter, bladder, urethra  
3.glomerulus, Bowman's capsule, proximal tubule, loop of Henle, distal tubule  
4.proximal tubule, collecting duct, loop of Henle, renal medulla  
5. urea, H+ ions, salt, water  
6.homeostasis, renin, angiotensin, erythropoietin, red blood cells  
7.hypothalamus, posterior pituitary, ADH, distal tubule, collecting duct, aquaporins, concentrated

Part IV:

1.Homeostasis is the regulation of the stable internal environment.  
2.Osmoregulation is the maintaining of the right levels of water and dissolved substances in the body.  
3. Most metabolic waste must be dissolved in water to be excreted.  
4.The problem with ammonia is that it is a toxic byproduct of metabolizing food, and metabolizing food is something all animals have to do.  
5.Urea is created by combining ammonia and carbon dioxide in the liver.  
6. Urea is advantageous because it has lower toxicity than ammonia. Urea is limiting because water is required to dissolve it and get rid of it.  
7. Uric acid is what animals such as birds, insects, and desert animals convert ammonia into. Uric acid is excreted as a paste, so it requires less water. Uric acid can be found in bird poop. The white part of bird poop is uric acid.  
8. The kidneys maintain levels of water and dissolved minerals as well as controlling blood pressure.  
9. Kidneys may be considered inefficient because 99% of what is filtered into the kidney from the blood is reabsorbed and eventually ends up in the blood stream.  
10. Based on these inefficiencies, kidneys do more reabsorbing than filtering.  
11. What are the networks of filtering units the kidneys are composed of? The kidneys are composed of a network of nephrons.  
12. Blood enters the kidneys through the renal artery.  
13.The term renal refers to the kidney.  
13,1) Blood is forced through a system of tiny capillaries. These capillaries lead to the glomerulus.  
13,2) Bowman's capsule is a cup-like sac that the glomerulus forces fluid into. Blood becomes filtrate here. Filtrate contains water, urea, and other smaller ions and molecules such as glucose, sodium, and amino acids.  
13,3) the twisted tube that follows the Bowman’s capsule is the proximal convoluted tubule. Organic solutes and filtrate are mainly reabsorbed in the proximal convoluted tubule.  
13,4) The loop of Henle is found after the proximal convoluted tubule within the renal cortex and the renal medulla.  
13,4a) The main functions of the loop of Henle are extracting water the body needs from filtrate, pumping out salts the body wants to keep, and making the medulla hypertonic as a result of the two functions before this one.   
13,4b) Some molecules are moved by passive transport and others are moved by active transport because in different portions of the medulla, different substances are at different concentrations. Going down from the descending end of the tubule and up the ascending end, water is always transported by passive transport because there is a higher salt concentration in the medulla than inside the tubule. Water will diffuse out of the tubule by osmosis. Going up the ascending end of the tubule, salts are transported by active transport because the outside medulla already has a higher salt concentration. To export salt out into an area of higher concentration, active transport must be used.  
13,4c) The loop of Henle makes a hypertonic solution because it actively transports salt into the medulla. This makes a higher concentration of water inside than outside. As a result, water will be drawn out.  
13,4d) The medulla is so salty because a relatively large quantity of salts flows out of the filtrate when the filtrate ascends the loop of Henle. This is necessary because a large salt concentration gradient will cause water to flow out of the tubule by diffusion. This gives the body a chance to utilize hormones to regulate the amount of aquaporins, which in turn, regulates the amount of water that is absorbed into the medulla.  
13,5). The distal tubule is further away from Bowman's capsule in terms of tubule length. The proximal tubule is closer. The proximal tubule mainly deals with ejecting substances from the tubule into the medulla. The distal tubule mainly deals with having organic substances reabsorbed back into the blood.  
13,6) The collecting duct brings the remaining products to the medulla of the kidney. Alcohol disrupts the kidney because it interferes with hormones that regulate how much of a substance should be reabsorbed. Urine becomes more clear because antidiuretic hormone becomes dysfunctional with alcohol. As a result, less water is reabsorbed from urine. This leads to a hangover because if less water is reabsorbed from urine, more of it is excreted. This means that less water is present in the body. The dehydration leads to a hangover.  
13,7) Urine travels to the bladder from the kidney through ureters.   
13,8) A sphincter allows the urine to escape the bladder and exit through the urethra.