

Name: _____

WRAP-UP OF KIDNEY AND RELATED CONCEPTS

(Ch. 43, pp. 742-743)

SECTION 43.4: ACID-BASE BALANCE

So far, we've focused on how kidneys maintain the _____ and _____ of extracellular fluid. They also help keep the ECF from becoming too _____ or _____ (alkaline). This overall _____ balance is maintained through control over the concentration of _____ ions and other dissolved ions. _____ systems, _____, and _____ excretion provide the control.

Normally, the extracellular pH of the human body is maintained between _____ and _____. A variety of _____ and _____ enter the blood by absorption from the _____ and as a result of normal _____. Typically, cell activities produce an excess of _____ which dissociate into _____ and other fragments, lowering pH. This effect is minimized when the excess _____ ions react with _____ molecules. An example is the _____ - _____ buffer system:

Equation

The excess _____ is neutralized and the _____ formed is exhaled by the _____. This has only a temporary effect since only the _____ system eliminates excess H⁺. The same reactions proceed in _____ (from left to right) in cells of the nephron wall. The _____ resulting from the reverse reactions moves from the nephron cells into the _____ fluid and then into the bloodstream where it can buffer excess _____. The _____ that formed in the nephron cells is then _____ into the nephron where it may do 2 things: if it reacts with bicarbonate ions to form _____, this gas is returned to the blood and exhaled by the lungs. If it combines with _____ ions or _____ it leaves the body in the _____.

SECTION 43.5: KIDNEY MALFUNCTIONS

Abnormally high blood pressure (_____) can adversely affect the _____, _____, and _____ system. Restricted intake of _____ lessens the problem.

_____ acid, _____ salts and other wastes can settle out of urine and collect in the _____ as kidney _____. These hard deposits may lodge in the _____ or _____ and disrupt _____ flow.

Kidney malfunctions may result in accumulation of toxic by-products of _____

breakdown leading to _____, _____, and loss of _____ or death.

A _____ machine acts like a kidney to restore proper _____ balances. In _____, the machine is connected to an _____ or a _____; blood is pumped through tubes made of a special porous material which allows the blood to exchange materials and achieve the proper mix of _____, _____, etc. In _____ dialysis, fluid of the proper composition is put into the patient's _____; a membrane in the body called the _____ serves as the membrane for dialysis.

SECTION 43.5: ON FISH, FROGS, AND KANGAROO RATS

In freshwater, bony fishes and _____ gain _____ and lose _____. Water moves in by _____, either through the gills or skin. Excess _____ leaves as _____ urine, formed in kidneys. Solute losses are balanced by solutes gained from _____ and the inward pumping of _____ by cells of the gills.

In seawater, marine fishes have body fluids about three times _____ salty than seawater. Such fishes _____ water by osmosis, they drink water, and excrete ingested solutes _____ concentration gradients (ie. concentrated urine). Excess solutes are also pumped out by cells in the _____.

The Kangaroo rat (lives in the desert) has extremely long _____ of _____. The solute concentration in the _____ fluid around the loops (deep in _____ of the kidney) becomes very _____. Thus there is a very high _____ gradient that pulls nearly all _____ out of the ducts (ie. reabsorption). As a result, Kangaroo rats excrete a tiny volume of _____ and its 3 to 5 times more _____ than that of humans.