

Fluid, Electrolyte, and Acid-Base Balance: Electrolyte Homeostasis

1. Electrolytes enter the body in the food we eat and the beverages we drink. What is the main way they leave the body? _____

2. Movement of electrolytes and water between intracellular and interstitial fluid:

Electrolytes move across the cell membrane with (along) their concentration gradient through _____ and against their concentration gradients through _____.

Electrolyte concentrations affect the movement of water between the intracellular and interstitial fluid. Increasing the sodium concentration in the interstitial fluid will cause water to move (into or out of) the cell. This process is called _____.

3. Factors that affect the movement of water between the plasma and the interstitial fluid:

Plasma proteins are too big to move out of the vessel wall; therefore, they would cause water to move (into or out of) the plasma. This is due to the osmotic effect of the proteins, called _____ pressure.

The blood pressure in the vessels force fluid (into or out of) the blood vessels. This force is called _____ pressure.

4. The exchange of fluids between the interstitial fluid and plasma is known as _____.

At the arterial end of the capillary, _____ pressure is greater than the _____ pressure and fluid moves (out of or into) the plasma.

At the venous end of the capillary, _____ pressure is greater than the _____ pressure and fluid moves (out of or into) the plasma.

5. Altering the sodium concentration:

An increase in the plasma sodium concentration would cause a/an (decrease or increase) in interstitial sodium concentration, and _____ would follow.

An increase in sodium in the interstitial fluid would cause the cells to (swell or shrink).

6. Edema is caused by _____ in the interstitial compartment.

The four causes of edema are:

1. _____ (for example, liver failure)

2. _____ (for example, hypertension)

3. _____ (for example, sprained ankle)

4. _____ (for example, surgical removal of lymph nodes)

7. What ion in the plasma has the most significant effect on the extracellular fluid?
_____.

What is the normal concentration of this ion in the plasma? ___ – ___ mEq/L

A decrease in plasma levels of this ion is called _____.

An increase in plasma levels is called _____.

8. What hormone acts in the kidney to reabsorb sodium? _____

What is the major stimulus for the release of this hormone? _____

9. What hormone is necessary for water to be reabsorbed in the kidney? _____

10. An increase in aldosterone will (increase or decrease) plasma levels of potassium.

Some diuretics will cause an (increase or decrease) in plasma levels of potassium.

The normal plasma concentration of potassium is ___ – ___ mEq/L.

11. Hyperkalemia could be due to (acidosis or alkalosis), kidney failure, or increased potassium intake.

Hypokalemia could be due to (acidosis or alkalosis), diuretics, decreased potassium intake, or _____.

12. Normal plasma calcium levels are ___ – ___ mg/dl. Muscle spasms and tetanus can result from (hypercalcemia or hypocalcemia).

13. Hormone control of plasma calcium levels:

_____ lowers plasma calcium levels by inhibiting osteoclasts and stimulating osteoblasts.

_____ increases plasma calcium levels by increasing osteoclasts in the bone, working through vitamin D and working on calcium reabsorption in the kidney.

14. Mrs. Jones has congestive heart failure, hypertension, and a decreased glomerular filtration rate. Check the correct answers: (Quiz section)

Edema:

___ no edema or ___ severe edema

Effect on kidneys:

___ ↓ urine volume or ___ ↑ urine volume

Cause of the edema:

___ ↓ colloid osmotic pressure or ___ ↑ hydrostatic pressure

15. Currently in the ER, Leonard also has congestive heart failure and is on diuretics. His symptoms include muscle weakness and heart palpitations. What is his diagnosis?

_____ (Quiz section)