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**ASSIGNMENT ON MINERAL METABOLISM**

**Answer**

**Minerals, their deficiency manifestations and toxicity values**

Minerals are inorganic elements required elements required for a variety of functions in the body. They can be grouped under Macrominerals (those minerals required in excess of 100mg per day) and Microminerals/trace elements (those required in amounts less than 100mg per day).

**Potassium**

Potassium is a macromineral, essential for normal body functions. It is necessary for muscle function, the transmission of nerve impulses and for carbohydrateand protein metabolism.

**Deficiency manifestations:**

1. Muscle weakness
2. paralysis
3. mental confusion
4. acidosis

**Toxicity value of potassium**

The normal concentration of potassium in serum level in the body is around 3.5 – 5 mEq/l. when the level is altered to be higher or lower results to toxicity. The results include;

1) **Hyperkalaemia:** increase in potassium concentration above normal of 3.5 to 5mEq/l. it causes renal failure, Acidosis, cell damage.

2) **Hypokalaemia:** decrease in potassium concentration below normal of 3.5 to 5mEq/l. it causes GIT loses, renal losses, alkalosis.

**Calcium**

Calcium is another macromineral, needed for the formation and maintenance of bones, the development of teeth and healthy gums. It is necessary for blood clotting, stabilizes many body functions and is thought to assist in healing bowel cancer. It also helps with protein structuring in DNA and RNA.

**Deficiency manifestations:**

1) Osteoporosis

2) Osteopenia

3) Tetany

4) Muscle cramps

5) Convulsions

6) Rickets

**Toxicity value of calcium**

The normal plasma calcium concentration is 9 - 11mg%. when the level is altered to be higher or lower results to toxicity. The results include;

1) **Calcium deficiency disease (hypocalcemia**): decrease in calcium concentration below plasma concentration level due to poor calcium intake over a long period of time (especially in childhood).

2) **Hypercalcemia:** increase in calcium concentration above plasma concentration level.

**Magnesium**

Also a macromineral, Magnesium is the major component of chlorophyll, the green pigment in plants. Magnesium is present in all tissues including bone. Magnesium is an active component of several enzyme systems in which thymine pyrophosphate is cofactor. Oxidative phosphorylation is greatly reduced in the absence of magnesium.

**Deficiency manifestations:**

1) Muscle spasms

2) Tetany

3) Confusions

4) Seizures

**Toxicity value of magnesium**

The Human blood serum magnesium concentration is 1–3.5 mg/dL. when the level is altered to be higher or lower results to toxicity. The results include;

1)**Hypomagnesemia:** Hypomagnesemia is an abnormally low serum magnesiumlevel.

2) **Hypermagnesemia:** Hypermagnesemia is the increase in normal serum magnesium level. It is uncommon but is occasionallyseen in renal failure.

**Chloride**

Chloride is a macromineral, a principal extracellular anion aids in electrolyte balance, osmotic balance, acid base balance and gastric HCI formation.

**Deficiency manifestations:** Deficiencies secondary to vomiting and diarrhea

**Toxicity value of Chloride**

The concentration of chloride in plasma is 95–105 mEq/L. when the level is altered to be higher or lower results to toxicity.

**Iron**

This is a micromineral, a very essential mineral as it is

essential for many enzymes, including catalase, and is important for growth. Iron is also required for a healthy immune system and for energy production. Iron as a constituent of haemoglobin, helps in the transport of oxygen.

**Deficiency manifestations:** Microcytic anemia

**Toxicity value of Iron**

Iron may accumulate in the body because of

* Iron therapy given in excessive amounts or for too long
* Repeated blood transfusions
* Chronic alcoholism
* Overdose of iron

Iron overload can also result from an inherited iron overload disease ([**hemochromatosis**](https://www.msdmanuals.com/professional/hematology-and-oncology/iron-overload/hereditary-hemochromatosis)), a potentially fatal but easily treatable genetic disorder in which too much iron is absorbed.

An [overdose of iron](https://www.msdmanuals.com/professional/injuries-poisoning/poisoning/iron-poisoning) is toxic, causing vomiting, diarrhea, and damage to the intestine and other organs. The tolerable uptake level is 45mg so when higher could result to the complications above.