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### Question

1. Outline the toxicity values and deficiency manifestation of the following minerals:

- Potassium
- Calcium
- Magnesium
- Chloride
- Iron

**A. POTASSIUM:** the normal serum potassium levels are between 3.5 and 5.0 mmol/L (3.5 and 5.0 mEq/L). Any value above this range is referred to as toxic.

#### DEFICIENCY MANIFESTATION

Usually symptoms of low potassium (hypokalaemia) are mild. At times the effects of low potassium can be vague. There may be more than one symptom involving the gastrointestinal (GI) tract, kidneys, muscles, heart, and nerves.

- Weakness, tiredness, or cramping in arm or leg muscles.
- Tingling or numbness
- Nausea or vomiting

- Abdominal cramping, bloating
- Constipation
- Palpitations (feeling your heart beat irregularly)
- Passing large amounts of urine or feeling thirsty most of the time
- Fainting due to low blood pressure
- Abnormal psychological behavior: depression, psychosis, delirium, confusion.

**B. CALCIUM:** the toxicity value of calcium in the blood is 10.5mg/dL or greater.

#### DEFICIENCY MANIFESTATION

- Numbness
- Tingling Fingers
- Muscle cramps
- Lethargy
- Poor appetite
- Weak or brittle fingernails
- Difficulty swallowing
- Fainting
- Mental confusion, irritability, depression, and anxiety
- Tooth decay
- Insufficient blood clotting
- Bone fractures
- Osteopenia or osteoporosis
- Growth and development delays in children

- Heart problems involving blood pressure and heart rhythms.

**C. MAGNESIUM:** Normal serum magnesium concentrations range between 0.75 and 0.95 millimoles (mmol)/L. Toxicity value is seen when serum magnesium level is above 0.95mmol/L.

#### DEFICIENCY MANIFESTATION

- nausea
- loss of appetite
- numbness and tingling in the extremities
- cramps and muscle contractions
- seizures
- personality changes
- abnormal heart rhythms
- coronary spasms

Hypocalcemia and hypokalemia may be included.

**D. CHLORIDE:** Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism, e.g. in congestive heart failure. Healthy individuals can tolerate the intake of large quantities of chloride provided that there is a concomitant intake of fresh water.

#### DEFICIENCY MANIFESTATION

Symptoms include:

- fluid loss

- dehydration
- weakness or fatigue
- difficulty breathing
- diarrhea or vomiting, caused by fluid loss.

**E. IRON:** In terms of blood values, iron levels above 350–500 µg/dL are considered toxic, and levels over 1000 µg/dL indicate severe iron poisoning.

### DEFICIENCY MANIFESTATION

Iron deficiency, or sideropenia, is the state in which a body lacks enough iron to supply its needs.

- Weakness
- Pale skin
- Chest pain, fast heartbeat or shortness of breath
- Headache, dizziness or lightheadedness
- Inflammation or soreness of your tongue
- Brittle nails
- Unusual cravings for non-nutritive substances, such as ice, dirt or starch
- Poor appetite, especially in infants and children with iron deficiency anemia