**SANI NANA FATIMA**

**18/SCI05/010**

**MEDICAL LABORATORY SCIENCES**

**BCH 204 ASSIGNMENT**

1. **OUTLINE THE TOXICITY VALUES AND DEFICIENCY MANIFESTATIONS OF THE FOLLOWING MINERALS.**

**A .Pottasium**

**Toxicity Value**

A potassium level higher than 5.5 mmol/L is critically high, and a potassium level over 6 mmol/L can be life- threatening. Small variations in ranges may be possible depending on the laboratory. Whether you have mild or severe hyperkalemia , you should get prompt medical attention to prevent possible complications.

**Deficiency Manifestation.**

Deficiency typically occurs when your body loses a lot of fluid. Common signs and symptoms of potassium deficiency include weakness and fatigue, muscle cramps, muscle aches and stiffness, tingles and numbness, heart palpitations, breathing difficulties, digestive symptoms and mood changes.

**b. Calcium**

**Toxicity Value.**

The Toxic Condition of Hypercalcemia and Hypercalciuria

Hypercalcemia occurs when serum calcium levels are 10.5 mg/dL (also expressed as 2.63 mmol/L) or greater depending on normative laboratory values.

Calcium toxicity can lead to constipation. It's also possible that the excess calcium can interfere with the absorption of other minerals or cause elevated urinary calcium levels, which lead to kidney stones.

**Deficiency Manifestation.**

Hypocalcemia, commonly known as calcium deficiency disease, occurs when calcium levels in the blood are low. A long-term deficiency can lead to dental changes, cataracts, alterations in the brain, and osteoporosis, which causes the bones to become brittle.

Complications of hypocalcemia can be life-threatening, and if the condition goes untreated, it could eventually lead to death. Symptoms include;confusion or memory loss, muscle spasms ,numbness and tingling in the hands, feet, and face, depression, hallucinations ,muscle cramps, weak and brittle nails,easy fracturing of the bones.

**C. Magnesium**

**Toxicity Value**

Magnesium toxicity, which usually develop after serum concentrations exceed 1.74–2.61 mmol/L, can include hypotension, nausea, vomiting, facial flushing, retention of urine, ileus, depression, and lethargy before progressing to muscle weakness, difficulty breathing, extreme hypotension, irregular heartbeat.

Recommended Dietary Allowance (RDA): Average daily level of intake sufficient to meet the nutrient requirements of nearly all (97%–98%) healthy individuals; often used to plan nutritionally adequate diets for individuals.

Adequate Intake (AI): Intake at this level is assumed to ensure nutritional adequacy; established when evidence is insufficient to develop an RDA.

Estimated Average Requirement (EAR): Average daily level of intake estimated to meet the requirements of 50% of healthy individuals; usually used to assess the nutrient intakes of groups of people and to plan nutritionally adequate diets for them; can also be used to assess the nutrient intakes of individuals.

**Deficiency Manifestation**.

Magnesium deficiency is an electrolyte disturbance in which there is a low level of magnesium in the body. It can result in multiple symptoms. Symptoms include tremor, poor coordination, muscle spasms, loss of appetite, personality changes, and nystagmus. Causes: Alcoholism, starvation, diarrhea, increased urinary loss.

**d.Chloride.**

**Toxicity Value.**

Chloride is an electrolyte. It functions with other electrolytes in your system, such as sodium and potassium, to regulate the amount of fluid and the pH balance in your body. Chloride is most commonly consumed as table salt (sodium chloride).

Chlorine gas is a pulmonary irritant with intermediate water solubility that causes acute damage in the upper and lower respiratory tract. Occupational exposures constitute the highest risk for serious toxicity from high-concentration chlorine (see the image below). Mixing of chlorine bleach (sodium hypochlorite) with ammonia or acidic cleaning agents is a common source of household exposure. As with all poisons, the dose determines the toxicity. Exposure to low concentrations of chlorine for prolonged periods may have destructive effects, as might very short-term exposure to high concentrations. High-level (20%, >30 ppm) acute exposure.

**Deficiency Manifestation**.

Hypochloremia is an electrolyte imbalance that occurs when there’s a low amount of chloride in your body. It functions with other electrolytes in your system, such as sodium and potassium, to regulate the amount of fluid and the pH balance in your body. Chloride is most commonly consumed as table salt (sodium chloride).

You often won’t notice symptoms of hypochloremia. Instead, you may have symptoms of other electrolyte imbalances or from a condition that’s causing hypochloremia. Symptoms include: fluid loss, dehydration, weakness or fatigue ,difficulty breathing, diarrhea or vomiting, caused by fluid loss

Hypochloremia can also frequently accompany hyponatremia, a low amount of sodium in the blood.

Since the levels of electrolytes in your blood are regulated by your kidneys, an electrolyte imbalance such as hypochloremia may be caused by a problem with your kidneys. Learn the basics of kidney health and kidney disease.

Hypochloremia can also be caused by any of the following conditions:

1. congestive heart failure

b.prolonged diarrhea or vomiting

c.chronic lung disease, such as emphysema

d.metabolic alkalosis, when your blood pH is higher than normal

e,Certain types of drugs, such as laxatives, diuretics, corticosteroids, and bicarbonates, can also cause hypochloremia**.**

**e. Iron**

**Toxicity Value.**

The amount of iron ingested may give a clue to potential toxicity. The therapeutic dose for iron deficiency anemia is 3-6 mg/kg/day. Toxic effects begin to occur at doses above 20 mg/kg of elemental iron. Ingestions of more than 60 mg/kg of elemental iron are associated with severe toxicity.Iron toxicity can be classified as corrosive or cellular. Ingested iron can have an extremely corrosive effect on the gastrointestinal (GI) mucosa, which can manifest as nausea, vomiting, abdominal pain, hematemesis, and diarrhea; patients may become hypovolemic because of significant fluid and blood loss.Toxic effects begin to occur at doses above 10–20 mg/kg of elemental iron. Ingestions of more than 50 mg/kg of elemental iron are associated with severe toxicity. 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 is a common cause of too few healthy red blood cells in the body (anaemia). In a pregnant woman, iron deficiency puts the baby at risk of developmental delays.

Iron deficiency anemia signs and symptoms may include:

a.Extreme fatigue.

b.Weakness.

c.Pale skin.

e.Chest pain, fast heartbeat or shortness of breath.

f.Headache, dizziness or lightheadedness.

h.Cold hands and feet.

i.Inflammation or soreness of your tongue.

j.Brittle nails.Untreated iron deficiency can lead to iron-deficiency anemia, a common type of anemia.

**Anemia is a condition characterized by inadequate red blood cells (erythrocytes) or hemoglobin. When the body lacks sufficient amounts of iron, production of the protein hemoglobin is reduced.There are many facets of iron deficiency which include: iron loss, iron intake, iron absorption, and physiological demand and if the iron is depleted at one of these sources it leads to IDA. There are three stages to iron deficiency: pre-latent, latent, and IDA.**