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PHYSIOLOGY

BCH204

* Potassium
* Calcium
* Magnesium
* Chloride
* Iron

Potassium:

The toxicity value is called hyperkalemia, or high potassium. A normal range of potassium is between 3.6 and 5.2 millimoles per liter (mmol/L) of blood. A potassiumlevel higher than 5.5 mmol/L is critically high, and a potassiumlevel over 6 mmol/L can be life-threatening.

Deficiency manifestation of potassium:

The symptoms of hypokalemia are different depending on how severe your deficiency is.

A temporary decrease in potassium may not cause any symptoms. For example, if you sweat a lot from a hard workout, your potassium levels may normalize after eating a meal or drinking electrolytes before any damage is done.

However, severe deficiencies can be life-threatening. Signs of a potassium deficiency include:

* extreme fatigue
* muscle spasms, weakness, or cramping
* irregular heartbeat
* constipation, nausea, or vomiting

### Calcium:

Hypercalcaemia occurs when serum calcium levels are 10.5 mg/dL (also expressed as 2.63 mmol/L) or greater depending on normative laboratory values. It can be induced by excess intake of calcium or vitamin D, but it is more commonly caused by conditions such as malignancy and primary hyperparathyroidism.

Deficiency manifestation of calcium:

Hypocalcaemia, 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.

* Muscle aches, cramps, and spasms are the earliest signs of a calcium deficiency

### Extreme fatigue

Fatigue associated with calcium deficiency can also cause lightheadedness, dizziness, and brain fog, which involves lack of focus, forgetfulness, and confusion.

### Nail and skin symptoms

Chronic calcium deficiency can affect the skin and nails. The skin may become dry and itchy, and the nails become dry, broken, and brittle. It can also contribute to alopecia, a condition that causes hair to fall out in round patches.

### Osteopenia and osteoporosis

Calcium deficiency can lead to osteopenia and osteoporosis. Osteopenia reduces the mineral density of bones, and it can lead to osteoporosis. Osteoporosis makes bones thinner and more susceptible to fractures. It can cause pain, issues with posture, and eventual disability.

### Painful premenstrual syndrome (PMS)

### Dental Problems

When the body lacks calcium, it pulls it from sources such as the teeth. This can lead to dental problems, including weak roots, irritated gums, brittle teeth, and tooth decay.  
  
Also, calcium deficiency in infants can delay tooth formation.

Magnesium:

 Magnesium toxicity occurs when serum concentrations exceeds 1.74–2.61 mmol/L.

Deficiency manifestation of magnesium:

Magnesium deficiency, also known as hypomagnesaemia, is an often overlooked health problem. The deficiency manifestations are

* Muscle Twitches and Cramps.
* Mental Disorders.
* Osteoporosis.
* Fatigue and Muscle Weakness.
* High Blood Pressure.
* Asthma.
* Irregular Heartbeat.

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 of chloride

The symptoms that may indicate a chloride imbalance include:

* Excessive fatigue.
* Muscle weakness.
* Breathing problems.
* Frequent vomiting.
* Prolonged diarrhea.
* Excessive thirst.
* High blood pressure.

Iron:

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 of iron:

Iron deficiency occurs when the body doesn’t have enough of the mineral iron. This leads to abnormally low levels of red blood cells.

* Unusual Tiredness

This happens because the body needs iron to make a protein called hemoglobin, which is found in red blood cells. Hemoglobin helps carry oxygen around the body.

* Pale skin

Pale skin and pale coloring of the inside of the lower eyelids are other common signs of iron deficiency 

* Shortness of Breath

Hemoglobin enables red blood cells to carry oxygen around the body.

* When hemoglobin is low in the body during iron deficiency, oxygen levels will also be low. This means muscles won’t get enough oxygen to do normal activities, such as walking. As a result, breathing rate will increase as your body tries to get more oxygen.
* Headaches and Dizziness

In iron deficiency, low levels of hemoglobin in red blood cells mean that not enough oxygen can reach the brain. As a result, blood vessels in the brain can swell, causing pressure and headaches 

* Heart Palpitations

Noticeable heartbeats, also known as heart palpitations, can be another symptom of iron-deficiency. In iron deficiency, low levels of hemoglobin mean the heart has to work extra hard to carry oxygen. This can lead to irregular heartbeats, or the feeling that your heart is beating abnormally fast.

* Dry and Damaged Hair and Skin
* Swelling and Soreness of the Tongue and Mouth.