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DEPARTMENT: ANATOMY **COURSE:** MEDICAL BIOCHEMISTRY

COURSE CODE: BCH 204

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

POTASSIUM: Hyperkalemia, or high potassium. A normal range of potassium is between 3.6 and 5.2 millimoles per liter (mmol/L) of blood. A potassium level higher than 5.5 mmol/L is critically high, and a potassium level over 6 mmol/L can be life-threatening.

DEFICIENCY MANIFESTATIONS: Certain conditions can cause potassium deficiencies, or hypokalemia. These include:

Kidney disease

Overuse of diuretics

Excessive sweating, diarrhea, and vomiting.

Magnesium deficiency.

Use of antibiotics, such as carbencillin and penicillin.

These signs and symptoms manifest when the serum potassium concentration is greater than or equal to 7.0 milliequivalents per liter.

CALCIUM: The toxicity values when serum calcium levels are 10.5mg/dL also expressed as 2.63mmol/L or greater depending on normative laboratory values.

DEFICIENCY MANIFESTATIONS: 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.

MAGNESIUM: magnesium toxicity usually develop after serum concentrations exceed 1.74-2.61 mmol/L, can include hypotension.

DEFICIENCY MANIFESTATIONS: Magnesium deficiency, also known as hypomagnesemia, is an often overlooked health problem. Other health problems associated with magnesium loss include diabetes, poor absorption, chronic diarrhea, celiac disease and hungry bone syndrome.

SERUM MAGNESIUM LEVELS

4 to 6meq/L (4.8 to 7.2 mg/dL or 2 to 3 mmol/L)	Nausea, flushing, headache, lethargy, drowsiness, and diminished deep tendon reflexes.
6 to 10 meq/L (7.2 to 12 mg/dL or 3 to 5mmol/L)	Somnolence, hypocalcemia, absent deep tendon reflexes, hypotension, bradycardia, and ECG changes)
Above 10 meq/L (12 mg/dL or 5 mmol/L)	Muscle paralysis, respiratory paralysis, complete heart block, and cardiac arrest, in most cases, respiratory failure precedes cardiac collapse.

CHLORIDE: Normal levels of chloride for adults are in the 98-107 mEq/L range. If your test shows a chloride level higher than 107 mEq/L, you have hyperchloremia.

DEFICIENCY MANIFESTATIONS: Hyperchloremia; Symptoms include: Fluid retention, high blood pressure, muscle weakness, spasms, or twitches, irregular heart rate, confusion, difficulty concentrating, and personality changes.

IRON: Toxic effects begin to occur at doses above 10-20mg/kg of elemental iron. Ingestions of more than 50mg/kg of elemental iron are associated with severe toxicity. In terms of blood values, iron levels above 350-500 microgram/dL are toxic, and levels over 1000microgram/dL indicate severe iron poisoning.

DEFICIENCY MANIFESTATIONS: Iron deficiency occurs when a body does not have enough of the mineral iron. This leads to abnormally low levels of red blood cells, iron deficiency anemia is the common worldwide. Iron deficiency varies depending on the severity of anemia, how quickly it develops, your age and current state of health.

Deficiency manifestations symptoms include: Unusual tiredness, paleness, shortness of breath, heart palpitations, swelling and soreness of the tongue and mouth, restless leg syndrome.