



AL-Mustaqbal University College

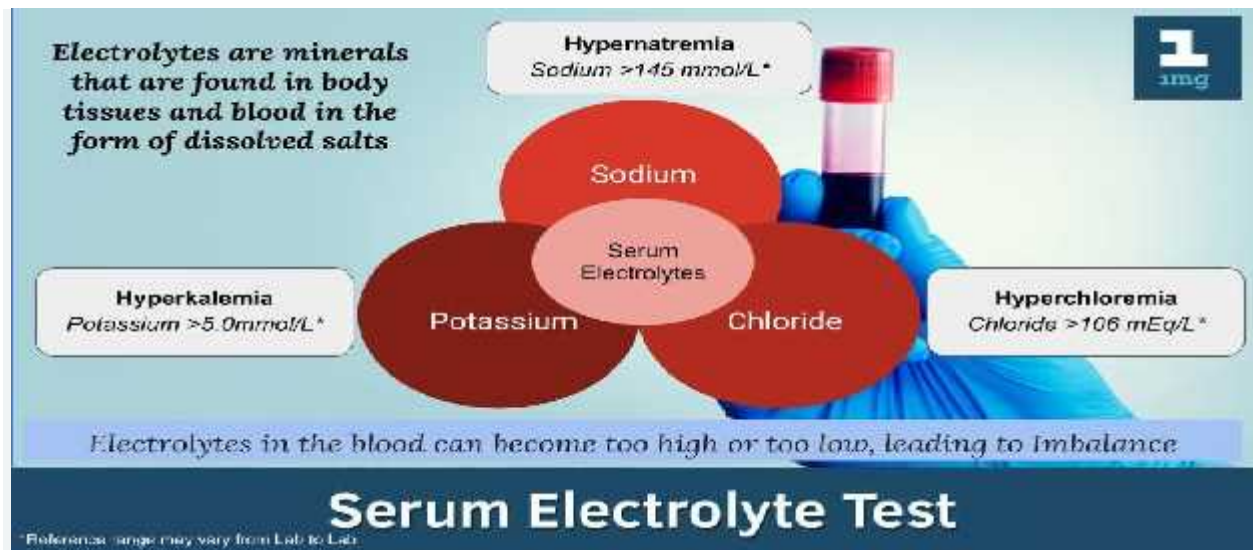
**Medical laboratory Techniques
Department**

Clinical Biochemistry

**Lecture Three(3)
(Serum Electrolytes Tests)**



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An electrolyte test can help determine whether there's an electrolyte imbalance in the body. **Electrolytes** are salts and minerals, such as sodium, potassium, chloride and bicarbonate, which are found in the blood. They can conduct electrical impulses in the body. The test is sometimes carried out during a routine physical examination, or it may be used as part of a more comprehensive set of tests.

What are electrolyte disorders?

An electrolyte disorder occurs when the levels of electrolytes in your body are either too high or too low. Electrolytes are naturally occurring elements and compounds in the body. They control important physiologic functions.

Examples of electrolytes include: calcium, chloride, magnesium, phosphate, potassium, sodium

- These substances are present in your blood, bodily fluids, and urine. They're also ingested with food, drinks, and supplements.
- Electrolytes need to be maintained in an even balance for your body to function properly. Otherwise, vital body systems can be affected. Severe

electrolyte imbalances **can cause serious problems** like coma, seizures, and cardiac arrest.

Symptoms of electrolyte disorders?

Mild forms of electrolyte disorders may not cause any symptoms. Such disorders can go undetected until they are discovered during a routine blood test. Symptoms usually start to appear once a particular disorder becomes more severe.

common symptoms of an electrolyte disorder include: irregular heartbeat , fast heart rate ,convulsions or seizures nausea ,vomiting ,diarrhea or constipation ,abdominal cramping ,muscle weakness ,muscle cramping, irritability ,confusion ,headaches

Causes of electrolyte disorders?

Electrolyte disorders are most often caused by a loss of bodily fluids through prolonged vomiting, diarrhea, or sweating. They may also develop due to fluid loss related to burns. Certain medications can cause electrolyte disorders as well.

Types of electrolyte disorders?

Elevated levels of an electrolyte are indicated with the prefix “hyper-.” Depleted levels of an electrolyte are indicated with “hypo-.”

Conditions caused by electrolyte level imbalances include:

- calcium: hypercalcemia and hypocalcemia
- chloride: hyperchloremia and hypochloremia
- magnesium: hypermagnesemia and hypomagnesemia
- phosphate: hyperphosphatemia or hypophosphatemia
- potassium: hyperkalemia and hypokalemia
- sodium: hypernatremia and hyponatremia

1-Calcium

Calcium is a vital mineral that your body uses to stabilize blood pressure and control skeletal muscle contraction. It's also used to build strong bones and teeth.

Hypercalcemia is when you have too much calcium in the blood. This usually happens due to:

- hyperparathyroidism
- kidney disease
- thyroid disorders
- lung diseases, such as tuberculosis or sarcoidosis
- certain types of cancer, including lung and breast cancers
- excessive use of antacids and calcium or vitamin D supplements
- medications like lithium, theophylline, or certain water pills

Hypocalcemia is a lack of adequate calcium in the blood stream. Causes can include:

- kidney failure
- hypoparathyroidism
- vitamin D deficiency
- pancreatitis
- prostate cancer
- malabsorption
- certain medications, including heparin, osteoporosis medicine, and antiepileptic drugs

2-Chloride

Chloride is necessary for maintaining the proper balance of bodily fluids.

Hyperchloremia occurs when there is too much chloride in the body. This can happen as a result of:

- severe [dehydration](#)

- kidney failure
- dialysis

Hypochloremia develops when there is too little chloride in the body. This is often caused by sodium or potassium problems, as discussed below. Other causes can include:

- cystic fibrosis
- eating disorders, such as anorexia
- scorpion stings
- acute kidney injury

3-Magnesium

Magnesium is a critical mineral that regulates many important functions, such as:

- muscle contraction
- heart rhythm
- nerve function

Hypermagnesemia means excess amounts of magnesium. This is a disorder that primarily affects people with [Addison's disease](#) and [end-stage kidney disease](#).

Hypomagnesemia means having too little magnesium in the body. Common causes include:

- alcohol use disorder
- malnutrition
- malabsorption
- chronic diarrhea
- excessive sweating
- heart failure
- certain medications, including some diuretics and antibiotics

4-Potassium

Potassium is particularly important for regulating heart function. It also helps maintain healthy nerves and muscles.

Hyperkalemia may develop due to high levels of potassium. This condition can be fatal if left undiagnosed and untreated. It's typically triggered by:

- severe dehydration
- kidney failure
- severe acidosis, including diabetic ketoacidosis
- certain medications, including some blood pressure medications and diuretics
- adrenal insufficiency, which is when your cortisol levels are too low

Hypokalemia occurs when potassium levels are too low. This often happens as a result of:

- eating disorders
- severe vomiting or diarrhea
- dehydration
- certain medications, including laxatives, diuretics, and corticosteroids

5-Sodium

Sodium is needed in the body to maintain fluid balance and is critical for normal body function. It also helps to regulate nerve function and muscle contraction.

Hypernatremia happens when there is too much sodium in the blood. Abnormally high levels of sodium may occur due to:

- inadequate water consumption
- severe dehydration
- excessive loss of bodily fluids as a result of prolonged vomiting, diarrhea, sweating, or respiratory illness
- certain medications, including corticosteroids

Hyponatremia develops when there is too little sodium. Common causes of low sodium levels include:

- excessive fluid loss through the skin from sweating or burns
- vomiting or diarrhea
- poor nutrition
- alcohol use disorder
- [overhydration](#)
- thyroid, hypothalamic, or adrenal disorders
- liver, heart, or kidney failure
- certain medications, including diuretics and seizure medications
- [syndrome of inappropriate secretion of antidiuretic hormone \(SIADH\)](#)

6-Phosphate

The kidneys, bones, and intestines work to balance phosphate levels in the body. Phosphate is necessary for a wide variety of functions and interacts closely with calcium.

[Hyperphosphatemia](#) can occur due to:

- low calcium levels
- chronic kidney disease
- severe breathing difficulties
- underactive parathyroid glands
- severe muscle injury
- tumor lysis syndrome, a result of cancer treatment
- excessive use of phosphate-containing laxatives

Low levels of phosphate, or [hypophosphatemia](#), can be seen in:

- acute alcohol abuse
- severe burns
- starvation

- vitamin D deficiency
- overactive parathyroid glands
- certain medication use, such as **intravenous (IV) iron treatment**, niacin, and some antacids

Risk factors for electrolyte disorders

Anyone can develop an electrolyte disorder. Certain people are more at risk because of their medical history. Conditions that increase risk for an electrolyte disorder include:

alcohol use disorder

cirrhosis

congestive heart failure

kidney disease

eating disorders, such as anorexia and bulimia

trauma, such as severe burns or broken bones

thyroid and parathyroid disorders

adrenal gland disorders

Preventing electrolyte disorders.

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Read more: <https://www.surgeryencyclopedia.com/Ce-Fi/Electrolyte-Tests.html#ixzz5gZxCB4RZ>.

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