Normal Electrolyte Lab Values

It is important to know normal electrolyte lab values and be familiar with the ranges for varying ions. This is helpful in recognizing abnormal lab values, as well as helping assess which organ systems may be affected.

PLAY PICMONIC

Potassium (K^+)

Banana

Potassium is the major cation inside of cells, and helps to create a membrane potential, which helps in neurotransmission, heart function and muscle contraction. Potassium is regulated by renal function.

3.5 to 5.0 mEq/L

(3) Tree (.5) Hand to (5) Hand

Normal serum potassium levels range from 3.5 to 5.0 mEq/L. Patients with serum values below 3.5 are considered hypokalemic, and can develop U-waves, weakness and constipation. Patients with values above 5.0 are considered hyperkalemic, and can display weakness, diarrhea, cramping and arrhythmias with peaked T-waves.

Calcium (Ca^{2+})

Calcium-cow

Calcium serves a wide array of functions in the body, working in signal transduction, muscle contraction, neurotransmission, vasodilation and hormone secretion. The normal range for serum calcium is 8.5-10.5 mg/dL.

8.5 to 10.5 mg/dL

(8) Ball (.5) Hand to (10) Tin (.5) Hand

The normal range for serum calcium is 8.5-10.5 mg/dL. Patient who are hypocalcemic can display depression, hallucinations, tingling and paresthesias, and these can further progress to arrhythmias and myocardial infarction. Hypercalcemic patients may develop nausea and vomiting, which can progress to cerebellar ataxia and coma if the condition worsens, or is not corrected.

Phosphate (PO_4^{3-})

Phosphate-P

Phosphorous is a key component of DNA and RNA, and is extensively used to transport cellular energy in ATP. It mainly exists as a phosphate ion in humans, and the normal serum value of phosphate is between 2.5-4.5 mg/dL.

2.5 to 4.5 mg/dL

(2) Tutu (.5) Hand to (4) Fork (.5) Hand

The normal serum value for serum phosphate is 2.5-4.5 mg/dL. Hypophosphatemia can manifest as muscle and neurological dysfunction, and disruption of muscle and blood cells due to lack of ATP. Conversely, patients who are hyperphosphatemic can display diarrhea and calcification

(hardening) of organs and soft tissue, and can show a decreased ability to use iron, calcium, magnesium, and zinc.

Magnesium (Mg^{2+})

Magnesium-magazine

The normal serum value for magnesium is 1.5 to 2.5 mEq/L. This electrolyte is important in cellular function, and affects cardiovascular function, dreaming, muscle contraction, and insulin regulation.

1.5 to 2.5 mEq/L

(1) Wand (.5) Hand to (2) Tutu (.5) Hand

Normal magnesium serum levels range between 1.5 to 2.5 mEq/L. Patients who are hypomagnesemic show muscle weakness, increased reflexes, tetany, and can develop convulsions. On the other hand, those with hypermagnesemia show bradycardia and flushing at mildly increased levels. As the hypermagnesemia increases, patients can show flaccid paralysis and EKG changes. At levels above 15, respiratory arrest and asystole occurs.

Sodium (Na^{+})

Salt-shaker

Sodium is a major contributor to cell osmolality and overall body water balance. It is also important in neuroconduction and muscle contraction.

135 to 145 mEq/L

135-sleigh to 145-reindeer

Normal sodium serum values range from 135-145 mEq/L. Patients with hyponatremia show symptoms of lethargy, anorexia, muscle cramping, and nausea. Those with hypernatremia display increased thirst, muscle twitching, hyperreflexia, seizures and can progress to coma.

Chloride (Cl^{-})

Chlorine-dispenser

Chloride is an important anion in the body, which is essential to maintaining acid-base homeostasis, along with cellular metabolism. Furthermore, chloride plays a role in neuronal firing, as it interacts with GABA transport. It is tightly controlled by the kidney, and the normal serum range is from 95-105 mEq/L.

95 to 105 mEq/L

95-pool to 105-pool

Normal chloride levels in the serum range from 95-105 mEq/L. Decreased chloride may be seen in patients with metabolic alkalosis, whereas increased chloride levels may be observed in those with respiratory or metabolic acidosis.