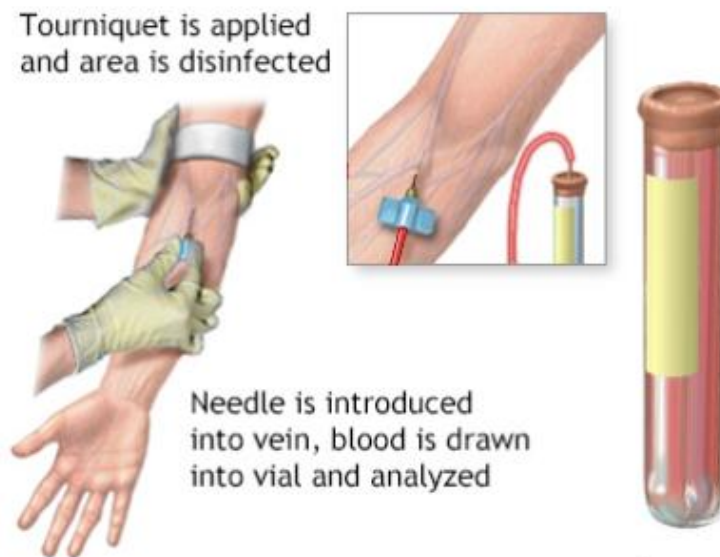




Estimation of Albumin in the blood

Albumin is a protein made by the liver. A serum albumin test measures the amount of this protein in the clear liquid portion of the blood.

Serum albumin is produced by the liver, occurs dissolved in blood plasma and is the most abundant blood protein in mammals. Albumin is essential for maintaining the oncotic pressure needed for proper distribution of body fluids between blood vessels and body tissues; without albumin, the high pressure in the blood vessels would force more fluids out into the tissues. It also acts as a plasma carrier by non-specifically binding several hydrophobic steroid hormones and as a transport protein for hemin and fatty acids. Too much or too little circulating serum albumin may be harmful. Albumin in the urine usually denotes the presence of kidney disease.



What the purpose of albumin test ?

Albumin helps move many small molecules through the blood, including bilirubin, calcium, progesterone, and medicines. It plays an important role in keeping the fluid in the blood from leaking into the tissues.



This test can help determine if you have liver disease or kidney disease, or if your body is not absorbing enough protein.

Albumin gives your body the proteins it needs to keep growing and repairing tissue. It also carries vital nutrients and hormones.

Normal Results

Normal Range

- **Adults**
 - 18 – 60 y → 3.5 – 5.5 g/dl
 - >60 y → 3.4 – 4.8 g/dl
- **Children**
 - 14-18 y → 3.2-4.5 g/dl
 - 4d-14 y → 3.8-5.4 g/dl
 - **Newborns**
 - 0-4 day → 2.8-4.4 g/dl

What Abnormal Results Mean

A. Hypoalbuminemia

Hypoalbuminemia is the condition in which the albumin levels in the blood are lower than normal levels (below 3.5 g / dl). This condition usually occurs after a decrease in the production of albumin in the liver, which may result from liver cell injury and damage to albumin production capacity, or may result from a decrease in the consumption of amino acids, which form the basic units in proteins, due to a diet. Chronic liver disease, such as chronic viral hepatitis and other liver cirrhosis, is the most common cause of low levels of albumin in the blood following the death of hepatic cells and serious damage to the liver's ability to produce



Symptoms associated with liver disease include:

- ✚ Jaundice, which is yellow skin and eyes
- ✚ Tiredness (fatigue)
- ✚ Weight loss
- ✚ Swelling around your eyes, stomach, or legs
- ✚ Fever
- ✚ Vomiting and diarrhea

A low albumin may also be seen in several other conditions, such as:

- ♣ Infection
- ♣ Burns
- ♣ Surgery
- ♣ Chronic illness
- ♣ Cancer
- ♣ Diabetes
- ♣ Hypothyroidism
- ♣ liver disease
- ♣ Inflammation
- ♣ Shock
- ♣ Malnutrition
- ♣ Celiac disease

Effects of Hypo Albuminemia on Body

- Edema
- Hypotension
- Abdominal Distension (Ascites)
- Lack of appetite
- Muscle Cramps
- Fatigue



B. Hyper Albuminemia

Hyper Albuminemia

Causes

- Dehydration
- Vitamin A deficiency

Treatment

- Rehydration
- Zn⁺⁺ supplementation

Note: Hyper Albuminemia is of little to no diagnostic Value in clinical Practice

Principle

- ❖ Measurement of albumin is based on its binding to the indicator dye bromocresol green (BCG) in pH 4.1
- ❖ Forms a blue-green colored complex.
- ❖ The intensity of the blue-green color is directly proportional to the concentration of albumin in the sample.
- ❖ It is determined by monitoring light absorbance at 578 nm.

▪ Reaction:

- Albumin + BCG -----→Albumin-BCG Complex

Procedure

- Take Three Test Tubes and Mark then Unknown(U), Standard(S) and Blank(B).
- Take 1ml of Working Reagent in each tube.
- Add 10 µl of distilled water into Blank(B).
- Add 10 µl of Standard Solution into Test tube marked as Standard(S).
- Add 10 µl of Serum into the test tube marked as Unknown(U).
- Mix and Incubate for 5 minutes at 20—25 degree Celsius.
- Check light absorbance via a calorimeter at 578nm.

- Calculation: Albumin concentration (g/dl) = $\frac{\text{Unknown Absorbance}}{\text{Standard Absorbance}} \times 4$