

LAB 12_BIOCHEMISTRY

BLOOD GLUCOSE ESTIMATION

Normally, the body maintains the blood glucose level at a reference range between about 70 - 105 mg/dL in serum or plasma and 65 – 95 mg/dL in whole blood. The human body naturally tightly regulates blood glucose levels as a part of metabolic homeostasis.

Estimation Methods

1. Chemical methods based on oxidation-reduction reactions with alkaline copper reduction and alkaline ferricyanide reduction with an indicator substance that changes colour when reduced. Since other blood compounds also have reducing properties (e.g., urea, which can be abnormally high in uremic patients). This technique can produce erroneous readings in some situations.
2. Enzymatic methods like glucose oxidase method and hexokinase method. The more recent technique, using enzymes specific to glucose as substrate. The enzymatic hexokinase method is the basis for the reference method for the determination of glucose in serum or plasma. The international standard way of measuring blood glucose levels is in terms of a molar concentration, measured in mmol/L (millimoles per liter; or millimolar or milligrams per decilitre).

The fasting blood glucose level, which is measured after a fast of 8 hours, is the most commonly used detection of overall glucose homeostasis. The metabolic response to a carbohydrate challenge is conveniently assessed by a postprandial glucose level drawn 2 hours after a meal. In addition, the glucose tolerance test, consisting of several timed measurements after a standardized amount of oral glucose intake is used to aid in the diagnosis of diabetes.

Glucose level Indication

Normal fasting glucose from 70 to 99 mg/dL (3.9 to 5.5 mmol/L).

(Pre-diabetes) from 100 to 125 mg/dL (5.6 to 6.9 mmol/L).

More than one testing occasion Diabetes 126 mg/dL (7.0 mmol/L) and above.

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Clinical Conditions:

Hyperglycemia – Increase in blood glucose above normal.

- Diabetes mellitus
- Hyperthyroidism, hyperpituitarism and increased adrenocortical activity.

Hypoglycemia– Decrease in Blood glucose below normal.

- Overdose of insulin for diabetic treatment.
- Hypothyroidism, hypopituitarism and hypoadrenalism, insulinoma

Note: *Glucose can be measured in the whole blood, serum or plasma, but plasma is recommended for diagnosis of diabetes mellitus. Concentration of glucose is higher in arterial than in venous samples.*

Report for this Lab should be included:

- 1) Introduction
- 2) Materials & Methods
- 3) Calculations
- 4) Results
- 5) Discussion