

Estimation of Blood Glucose

Glucose:

Glucose is a simple sugar that is a permanent and immediate primary source of energy for all of the cells in our body. The glucose in the blood is obtained from the food that you eat. This glucose gets absorbed by the intestines and distributed to all of the cells in the body through the bloodstream and breaks it down for energy.

Laboratory-Based Criteria for Diagnosis of Diabetes Mellitus and Gestational Diabetes Mellitus

Laboratory Test	Value	Comment
Fasting Blood Glucose* (FBG) (8h)	70-99 mg/dL 100-125 mg/dL >126 mg/dL	Normal value Impaired fasting Blood glucose Diabetes Mellitus
Random Blood Glucose (RBG)	>200 mg/dL	Indicative of diabetes in a patient with suspected diabetes mellitus
Glucose Tolerance Test (2 h)* (GTT)	<140 mg/dL 140-199 mg/dL >200 mg/dL	Normal Impaired glucose tolerance Diabetes Mellitus
Hemoglobin A1 C (HA1C)	5.7-6.4% >6.5%	Increased risk of diabetes Diabetes Mellitus
<p>*Fasting Blood Glucose means no calorie intake for at least 8 h. *Glucose Tolerance Test is typically performed using 75 g of glucose given orally; the test is performed in the morning in ambulatory patients after overnight fasting.</p>		

Blood Sugar Regulation :

A body's homeostatic mechanism keeps blood glucose levels within a narrow range. It is composed of several interacting systems, of which hormone regulation is the most important.

There are two types of mutually antagonistic metabolic hormones affecting blood glucose levels: catabolic hormones (such as glucagon, growth hormone, cortisol

and catecholamine) which increase blood glucose; anabolic hormone (insulin), which decreases blood glucose.

Principle :

Glucose is oxidised to gluconic acid and hydrogen peroxide in presence of glucose oxidase. Hydrogen peroxide react with 4-amino

Clinical significance :

Hyperglycemia:

Hyperglycemia or high blood sugar is a condition in which an excessive amount of glucose circulates in the blood plasma.

This is generally a blood glucose level of 180 mg/dl, but symptoms and effects may not start to become noticeable until later numbers like 270-360 mg/dl.

Causes of hyperglycemia :

Persistent hyperglycemia this is can be seen in :

- Diabetes mellitus
- Hyperadrenocorticism(Cushing's Syndrome)
- Acromegaly
- Hyperthyroidism

Hypoglycemia :

Hypoglycemia is currently defined as a blood glucose value of less than 50 mg/dl. Clinically, hypoglycemia is defined by Whipple's triad: low plasma glucose level, symptoms consistent with hypoglycemia, and resolution of symptoms with correction of the low glucose level.

Causes of hypoglycemia :

Fasting hypoglycemia

- Pancreatic disorders:
 1. Islet beta-cell hyperfunction (adenoma, , hyperplasia)
 2. Islet alpha-cell hypofunction or deficiency Pituitary-adrenal disorders.
- Pituitary-adrenal disorders:
 - 1- Hypopituitarism
 - 2- Addison's disease

Questions for Discussion

- 1- What are the types of Diabetes mellitus?
- 2- Compare between Diabetes mellitus type I and type II?