Lab.

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Fasting blood sugar

Lab.

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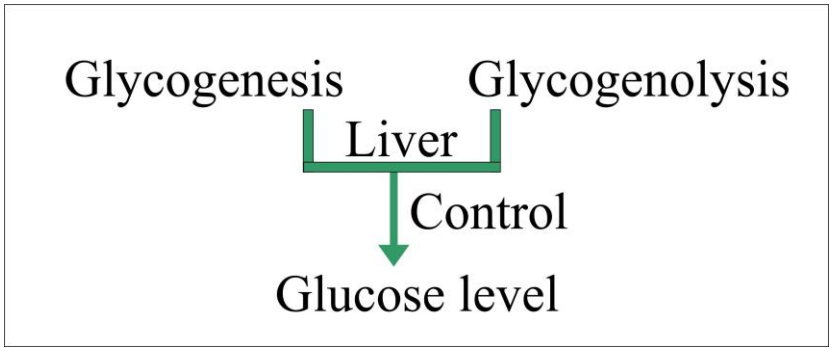
Fasting Blood Glucose (FBS):

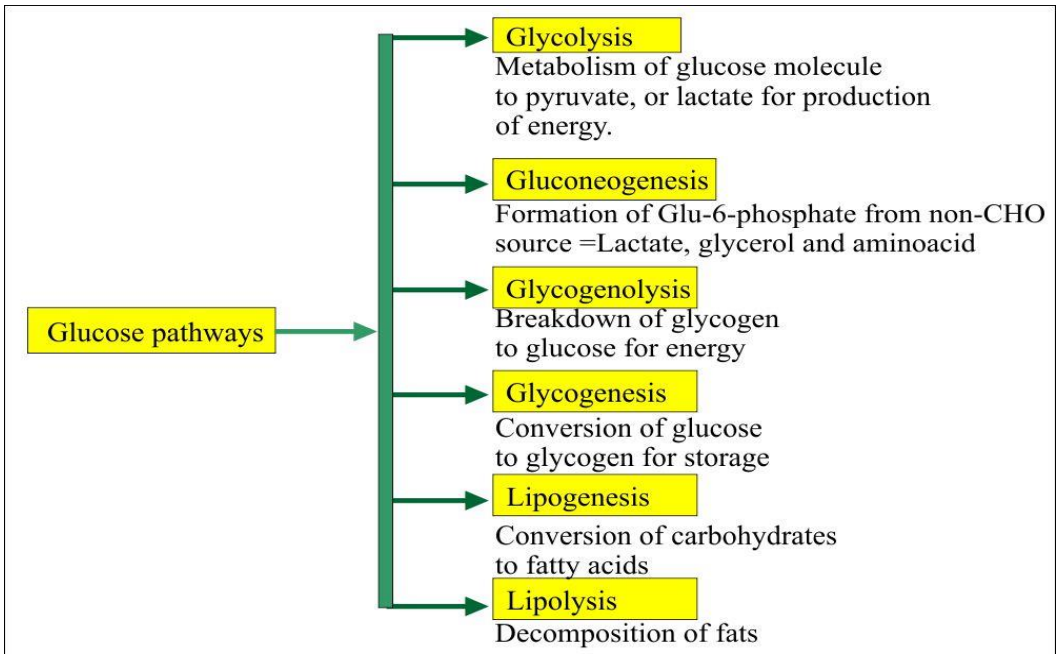
Glucose measurement in the blood is a key test to evaluate and diagnose any carbohydrate-related disorder.

The carbohydrates are major components of the diet and are an important source of energy. Carbohydrates include glycogen and starch, each of which degraded to smallest unit Glucose.

Glucose controlled by insulin and glucagon. Glucose is low in the fasting state.

Increased glucose level leads to its storage as glycogen in the liver. While Decreased glucose level leads to glycogenolysis and forms glucose from the glycogen.





Clinical significance:

An abnormal increase in blood glucose level, referred to as *hyperglycemia*, can be associated with diabetes mellitus and hyperactivity of thyroid, pituitary or adrenal glands.

An abnormal decrease beyond the fasting level, referred to as *hypoglycemia*, is observed in cases of insulin overdose, insulin secreting tumors, mixedema, hypopituitarism, Addison´s disease and conditions interfering with glucose absorbtion.

Principle

In the Trinder reaction1,2, the glucose is oxidized to D-gluconate by the glucose oxidase (GOD) with the formation of hydrogen peroxide. In the presence of peroxidase (POD), a mixture of phenol and 4-aminoantipyrine (4-AA) is oxidized by hydrogen peroxide, to form a red quinoneimine dye proportional to the concentration of glucose in the sample.

$$\beta\text{-D-Glucose} + H_2O + O_2 \xrightarrow{GOD} \text{D-Gluconate} + H_2O_2$$

$$\text{4-AA} + \text{Phenol} \xrightarrow[POD]{H_2O_2} \text{Quinoneimine} + H_2O$$

Procedure:

1. Bring reagents and samples to room temperature.

2. Pipette into labelled tubes:

TUBES	Blank	Sample	CAL. Standard
R1. Monoreagent	1.0 mL	1.0 mL	1.0 mL
Sample	–	10 µL	–
CAL.Standard	–	–	10 µL

3. Mix and let the tubes stand 10 minutes at room temperature or 5 minutes at 37ºC.

4. Read the absorbance (A) of the samples and the standard at 500 nm against the reagent blank.

<u>Calculations</u>:

$$\frac{A\ \text{Sample}}{A\ \text{Standard}} \times C\ \text{Standard} = \text{mg/dL glucose}$$

Samples with concentrations higher than 500 mg/dL should be diluted 1:4 with saline and assayed again. Multiply the results by 4.

Normal values

Serum, plasma (fasting)

Adults	70 - 105 mg/dL (3.89 - 5.83 mmol/L)
Children	60 - 110 mg/dL (3.33 - 6.11 mmol/L)
Newborns	40 - 60 mg/dL (2.22 - 3.33 mmol/L)