جامعة المستقبل
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Glucose test

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Glucose Definition

Glucose (dextrose) is a reducing monosaccharide that serves as the major fuel of all the tissues.

Molecular formula $C_6H_{12}O_6$ molecular weight 180 g/mol.

Glucose sugar is the most abundant simple carbohydrate unit in nature.

It seldom exists as a monosaccharide in food but is usually joined to other sugars to form disaccharides, starch, cellulose. Glucose makes up at least one of the two sugar molecules in every disaccharide.

Sucrose (cane sugar) = (Glucose +Fructose)

Lactose (milk sugar) = (Glucose and Galactose) .

Maltose (malt sugar) = (2 glucose) (product of starch digestion).

Sources of Blood Glucose

- **Nutritional intake of carbohydrates (grains, starchy vegetables, and legumes)**
- **Breakdown of stored glycogen into glucose (Glycogenolysis)**
- **Conversion of non-carbohydrate sources, as amino acids or from the glycerol moiety of triglycerides to glucose (Gluconeogenesis)**

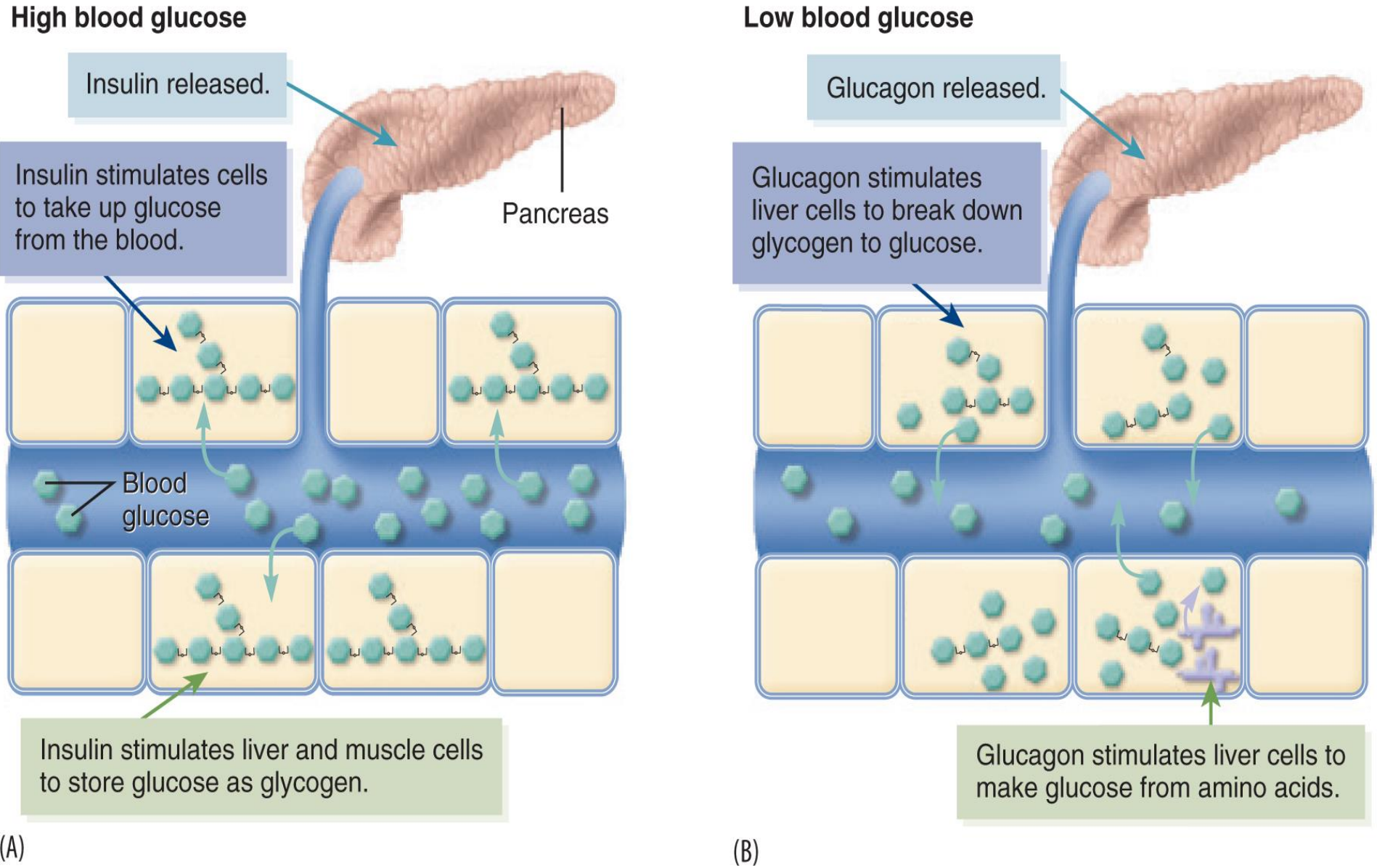
Glucose can be measured in blood and several body fluids

- **Cerebrospinal Fluid CSF**
- **Pleural fluid**
- **Peritoneal fluid (ascites)**
- **Pericardial fluid**
- **Urine (The presence of glucose in the urine is called glycosuria).**

Glucose handling by the kidney

- In normal person، glucose is reabsorbed completely by the kidney (proximal tubule).
- If the blood glucose level exceeds the reabsorption capacity of the tubules, glucose will appear in the urine.
- **Renal Threshold** is the concentration of a substance dissolved in the blood above which the kidneys begin to remove it into the urine.
- Which for glucose is between 160 and 180 mg/dL.

Blood glucose levels are controlled by two principal hormones, insulin and glucagon



Fasting Blood Sugar (FBS), Fasting Plasma Glucose (FPG) Random Blood Sugar (RBS)

Patient Preparation FBS fast for at least 8 hr.

Samples can be collected in tubes

Sodium fluoride tube

Gel tube

Heparin tube

Reference Value

Age	Conventional units mg/dL	International system of units (SI) mmol/L
Child (2-18 years)	60-100	3.3-5.6
Adult	Less than 100	Less than 5.6

Critical values/Critical Result

defined as a value that represents a pathophysiological state at such variance with normal (expected values) as to be life-threatening unless something is done quickly and for which some corrective action could be taken.

Critical values for blood glucose = 40 mg/dL (2.22 mmol/L) may cause brain damage

400 mg/dL (22.2 mmol/L) may cause coma.

Diabetes Mellitus

A disease in which the body either cannot produce insulin or cannot use it properly, resulting in

Hyperglycemia

Glucosuria

Alterations in fat & protein metabolism.

DM develops when

(1) Defects in Insulin production.

(2) Defects in Insulin action (Insulin resistance)

(3) Both are defective.

Decreased blood plasma glucose (hypoglycemia) occurs in the following conditions

1. **Pancreatic islet cell (insulinoma)**
2. **Premature infant; infant delivered to a mother with diabetes**
3. **Insulin overdose (accidental or deliberate).**

The End