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Postprandial & Fasting Blood Glucose – Glucose Tolerance Test (GTT)

Lecture two
Practical

What is Blood glucose ?

(blood sugar) is the primary energy Blood glucose source for body cells.

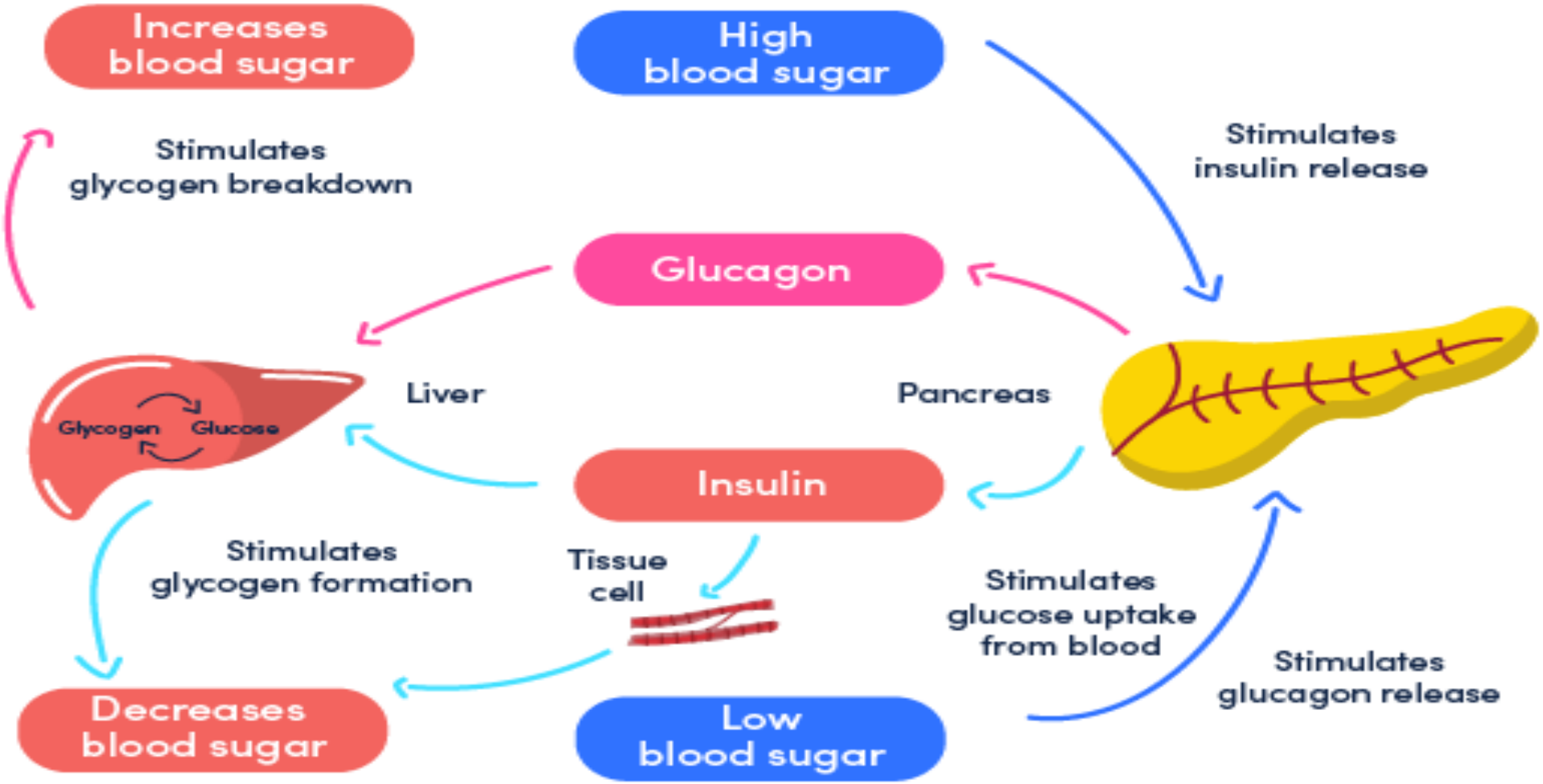
It comes from the food we eat and is regulated by pancreatic hormones.

Normal plasma glucose levels range between 80–120 mg/dL.

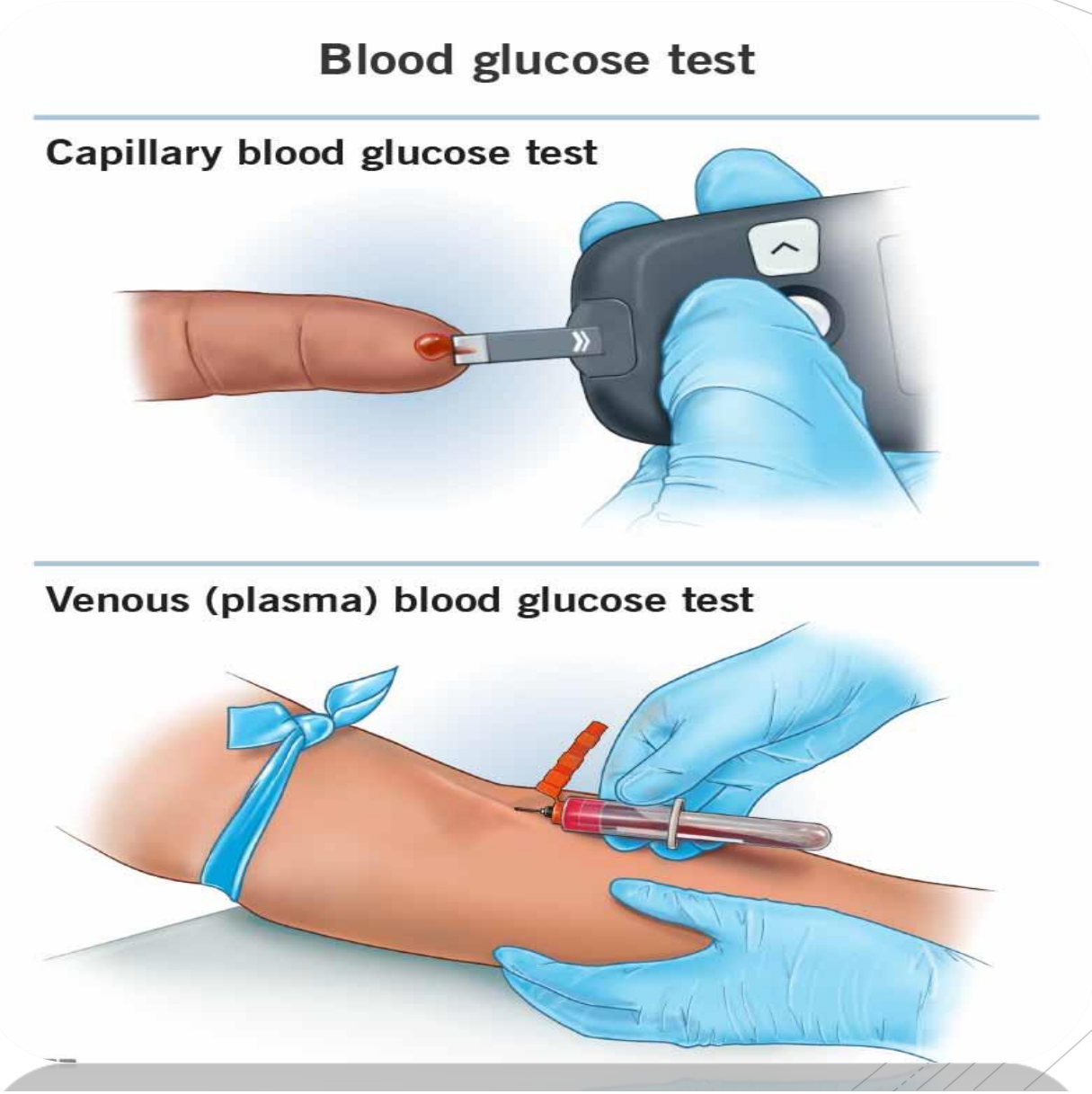
Hormonal Regulation of Glucose

- Insulin: secreted by pancreatic β-cells; decreases blood glucose by promoting cellular uptake and glycogen storage.
- Glucagon: secreted by α-cells; increases blood glucose by stimulating glycogen breakdown.
- Imbalance leads to hypoglycemia or diabetes mellitus.

What does insulin do in the body?



Blood Glucose Tests



Types of Blood Glucose and Diagnostic Tests

Fasting Blood Glucose (FBG):
Measures blood glucose levels after at least 8 hours of fasting to assess baseline glucose metabolism.

Postprandial Blood Glucose (PPBG):
Evaluates blood glucose concentration 2 hours after a meal, reflecting the body's ability to manage a glucose load.

Random Blood Glucose (RBG):
Determined at any time of the day, regardless of meals; useful for quick screening of abnormal glucose levels.

Oral Glucose Tolerance Test (OGTT):
Assesses the body's efficiency in metabolizing glucose by measuring blood glucose levels before and after consuming a standardized glucose solution.

Glycated Hemoglobin (HbA1c):
Indicates average blood glucose levels over the past 2–3 months by measuring the percentage of glucose bound to hemoglobin.

Urine Glucose Screening:
Detects the presence of glucose in urine as an indirect indicator of hyperglycemia, often used as a preliminary test.

Clinical Importance of GTT

- A **glucose tolerance test** determines how quickly glucose is cleared from the blood. The test is usually used to diagnose **prediabetes**, **diabetes**, and is used to check for diabetes that occurs with pregnancy (**gestational diabetes**).

Principle of the GTT (GOD-POD Method

- Glucose + O_2 → (Glucose Oxidase) → Gluconic acid + H_2O_2
- H_2O_2 + 4-Aminophenazone + Phenol → (Peroxidase) → Quinone dye (pink)
- Absorbance measured at 505 nm corresponds to glucose concentration.

Materials & Equipment

- • Glucose reagent kit (GOD-POD method)
- • Spectrophotometer or colorimeter (505 nm)
- • Test tubes and pipettes
- • Centrifuge
- • Blood samples (fasting and post-glucose)
- • Stopwatch, distilled water


GLUCOSE KIT
L1 Glucose Reagent
(GOD/POD Method)
For Invitro use only.
Not for medicinal use.
Store at 2 - 8°C.
Do not freeze.
150 ml
M.L.No.: 623
Lot :
Mfd.:
Exp.:
Mfd. by : Coral Clinical Systems
A Division of Tulip Diagnostics (P) Ltd.
Bldg. 'D', Plot No. M-46, Phase III B,
Verna Industrial Estate, Goa - 403 722 India
Coral Clinical Systems
8 906010 977719
2 x 150 ml
Cat. No. :1102112150
M. L. No. : 623
Lot :
Mfd. :
Exp. :
M.R.P.₹ :
(Incl. of all Taxes)
GLUCOSE KIT
GOD / POD Method
L1 GLUCOSE REAGENT 2 x 150 ml
S GLUCOSE STANDARD (100 mg/dl) 5 ml
Store at 2 - 8°C (Do not freeze)
QA APPROVED
CE
GLUCOSE KIT
Glucose Standard (100 mg/dl)
5 ml
Mfd. by : Coral Clinical Systems
A Division of Tulip Diagnostics (P) Ltd.
Bldg. 'D', Plot No. M-46, Phase III B,
Verna Industrial Estate, Goa - 403 722 India

Test Preparation

- Fasting for 8–14 hours (only water allowed).
- Avoid smoking, caffeine, and strenuous exercise.
- Preferably performed in the morning after overnight fasting.

Test Procedure

- 1. Collect fasting blood sample (0 min).
- 2. Give 75 g glucose in 300 mL water orally (1 g/kg for children).
- 3. Collect blood samples at 30, 60, 90, and 120 minutes.
- 4. Centrifuge and separate serum.
- 5. Run test using GOD-POD method.
- 6. Record absorbance at 505 nm and calculate glucose level.

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Collect **fasting blood sample** (0 min).

2

Give 75 g glucose in 300 **mL water orally** (1 g/kg for children).

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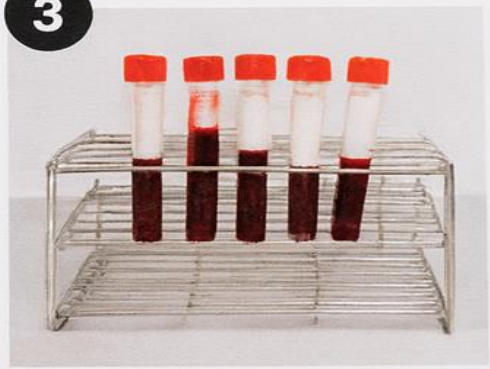

Collect blood samples at 30, 60, 90 and **120 minutes.**

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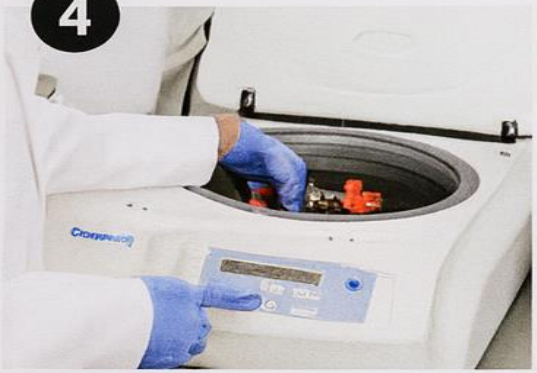


Centrifuge and **separate serum.**

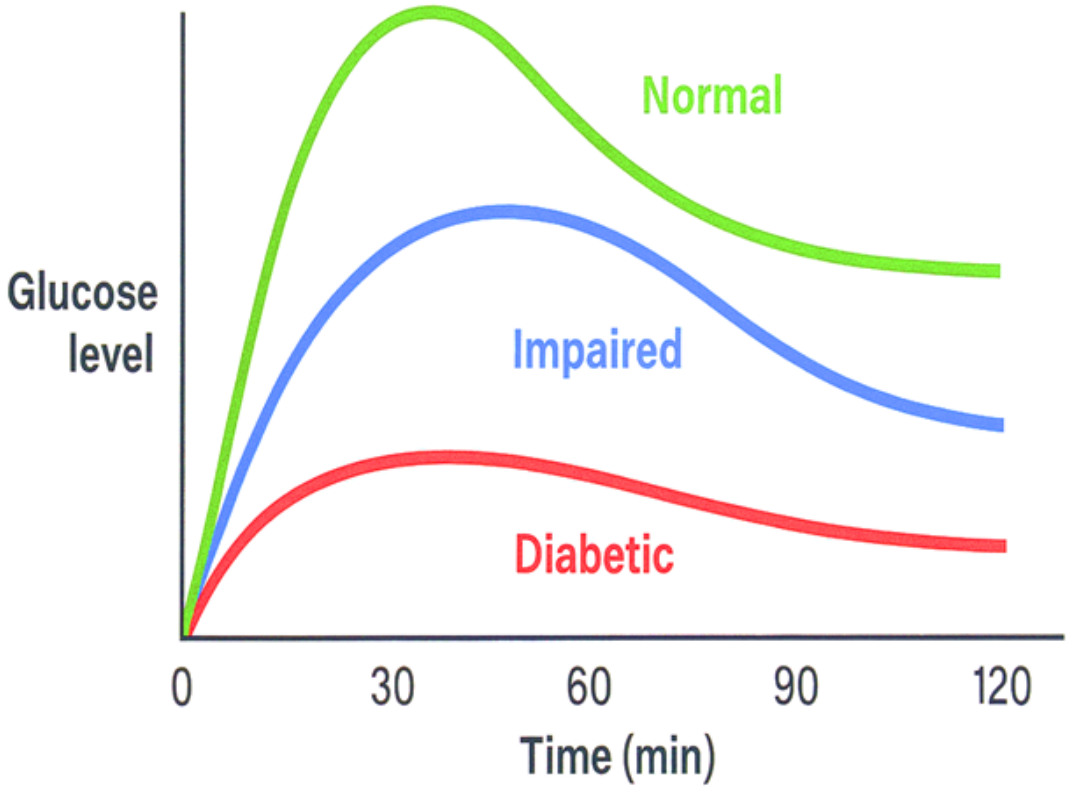
5

Run test using **GOD-POD method.**

5

Record absorbance at 505 nm and calculate glucose level.

GTT Graph Interpretation



Normal: glucose rises moderately, returns to baseline within 2 hours.

Impaired: glucose rises higher, returns slowly.

Diabetic: glucose rises sharply and remains elevated.

Expected Results

Fasting:

Normal:	70–100 mg/dL	Prediabetic:
Diabetic:	≥126	≥126

2-hour Post-glucose:

Normal:	<140 mg/dL	Impaired:
Nmpıal:	140–199	140–199
Diabetic:	≥200	≥200

Clinical Applications

- Early detection of diabetes mellitus.
- Evaluation of insulin resistance.
- Monitoring of gestational diabetes.
- Research and epidemiological studies.

Thank you

Any question?