



Al-Mustaqbal University College Pharmacy Department – Fifth Class



Practical Clinical Chemistry

Estimation of Glucose



Second Lec.

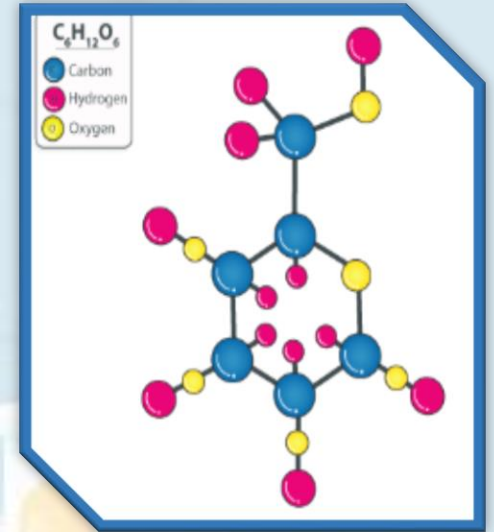
Asst. Lec. ZAINAB GHALEB

Determination of Blood Glucose Level

- ❑ **Glucose** is the main sugar that the body makes from the food in the diet. It is **carried** through the **bloodstream** to provide energy to **all cells in the body**.
- ❑ **Glucose** is a **simple sugar (a monosaccharide)**. The body produces it from **protein, fat** and in largest part, **carbohydrate**.
- ❑ **Ingested glucose** is **absorbed** directly into the **blood** from the **intestine** and results in a **rapid increase** in blood glucose.

Pathways in Glucose Metabolism

- ✓ **Glycolysis**: conversion of **Glucose** to **Pyruvate** or lactate to Production **Energy**.
- ✓ **Glycogenesis**: conversion of **Glucose** to **Glycogen** to Storage.
- ✓ **Glycogenolysis**: breakdown of **Glycogen** to **Glucose** for use as Energy.
- ✓ **Gluconeogenesis**: conversion of **Non-Carbohydrate** source such as (amino acids, glycerol, pyruvate and lactate) to glucose.

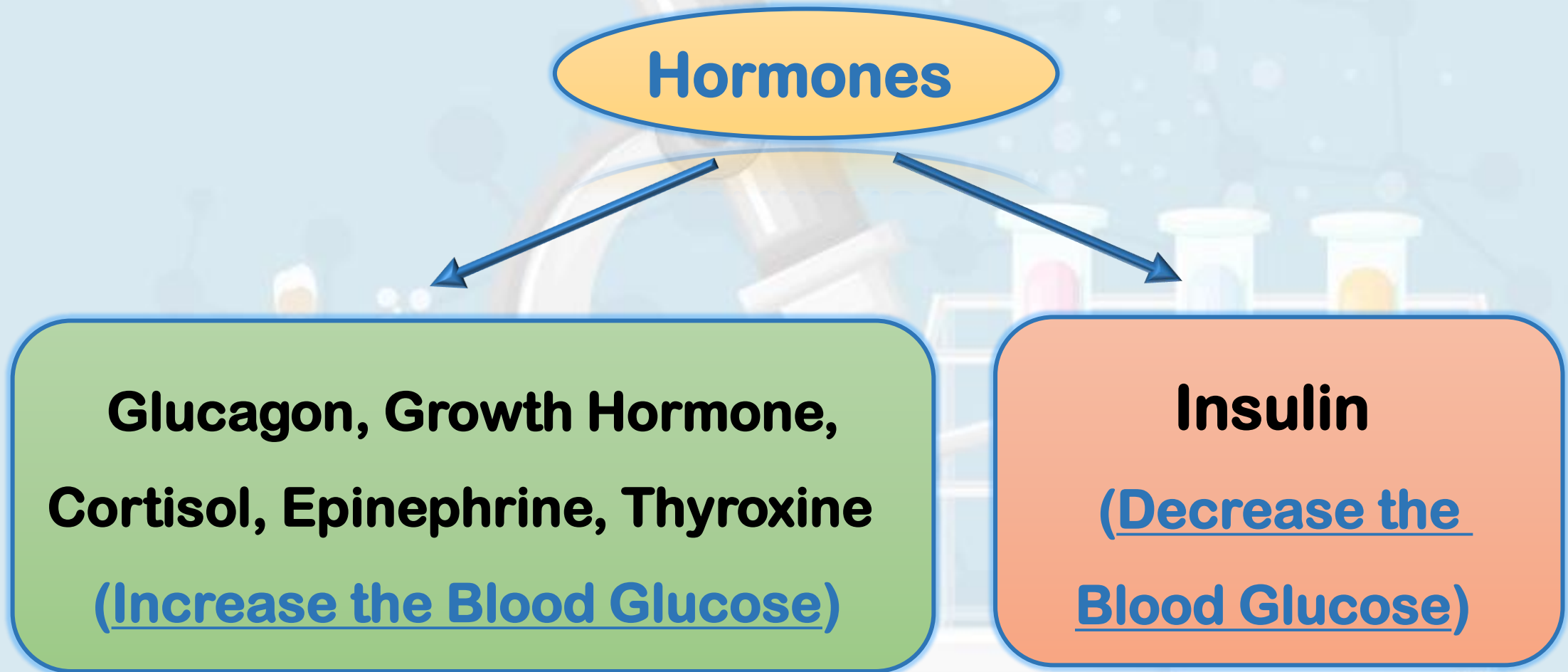


Regulation of Blood Glucose Level

- The **Liver, Pancreas** and other **Endocrine glands** are all involved in **controlling** the Blood Glucose Concentrations within a **narrow range**.
- During a brief fast, **Glucose** is supplied to the ECF from the Liver through Glycogenolysis.
- When the fasting period is Longer than 1 day, **Glucose** is synthesized from other sources (**pyruvate, lactate, glycerol and amino acids**) through Gluconeogenesis.



- The glucose level in the blood is **maintained** by **diet uptake** and **regulatory hormones** such as:



Normal Value:

- The Normal Value of Glucose as (**Fasting Blood Sugar**) **FBS** is must be between:

Newborn:

1.67 – 5 mmol/l

Or

30 – 90 mg/dl

Children, Adult

3.89 – 5.83 mmol/l

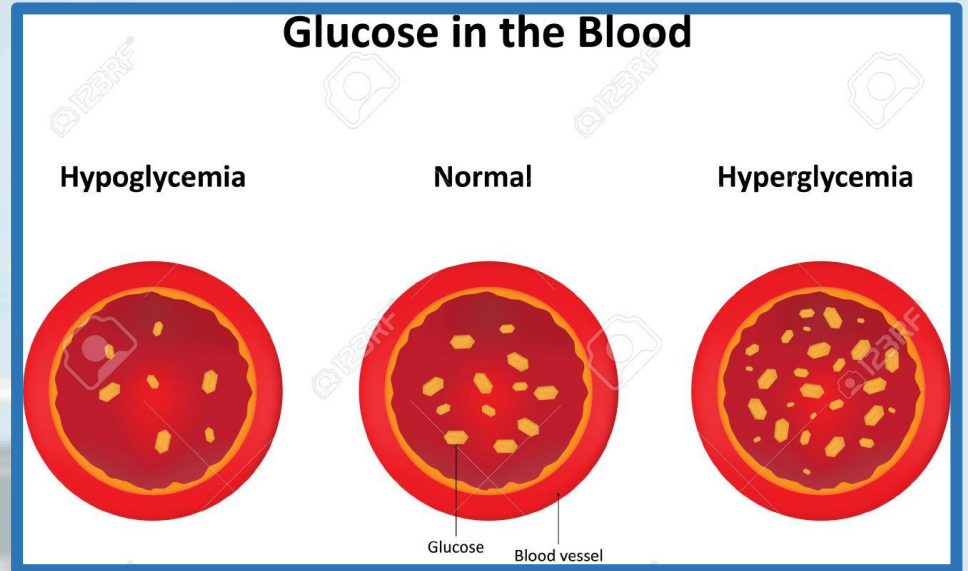
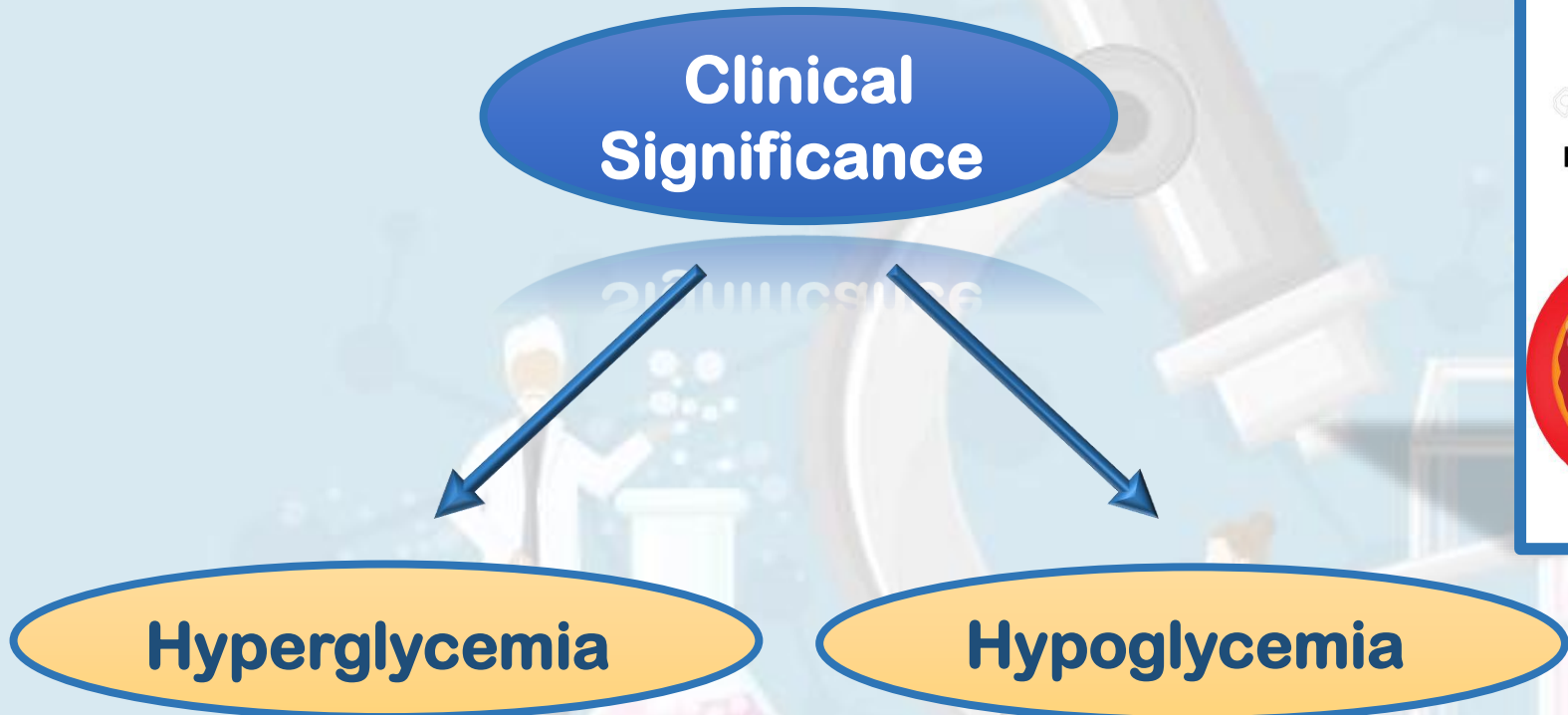
Or

70 – 105 mg/dl

- After **Two hours** of meal Glucose level must be **less** than **140 mg/dl.**

Clinical Significance

❑ Disease states involving carbohydrates are split into:



HYPOGLYCEMIA SYMPTOMS



SWEATING



PALLOR



IRRITABILITY



HUNGER



LACK OF
COORDINATION



SLEEPINESS

HYPERGLYCEMIA SYMPTOMS



DRY MOUTH



INCREASED
THIRST



WEAKNESS



HEADACHE



BLURRED
VISION



FREQUENT
URINATION

Hyperglycemia:

➤ Increase the level of **Glucose** more than the normal value usually **110 mg/dl or more**.

1. **Diabetes mellitus.**

2. **Acromegaly.**

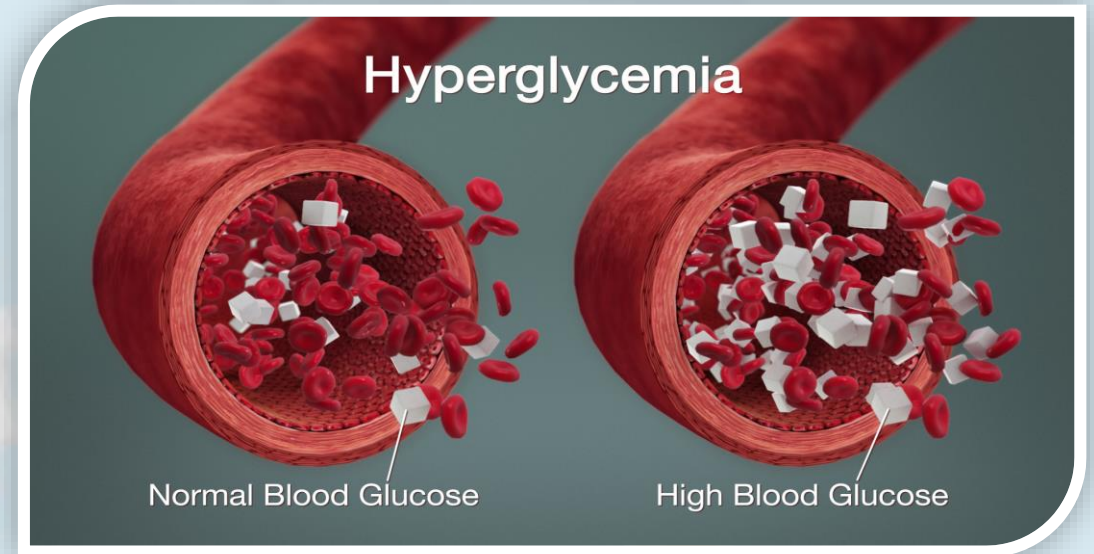
3. **Acute stress.**

4. **Adrenal hyperactivity (Cushing's syndrome).**

5. **Hyperthyroidism.**

6. **Pancreatic cancer or pancreatitis.**

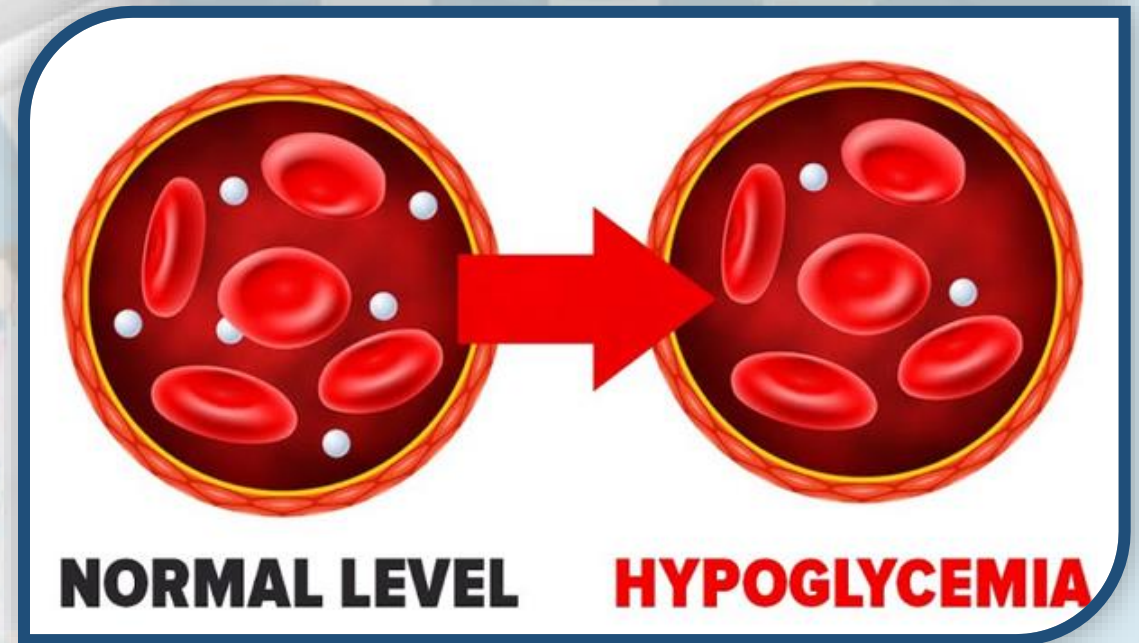
7. **Drugs: e.g. corticosteroids.**

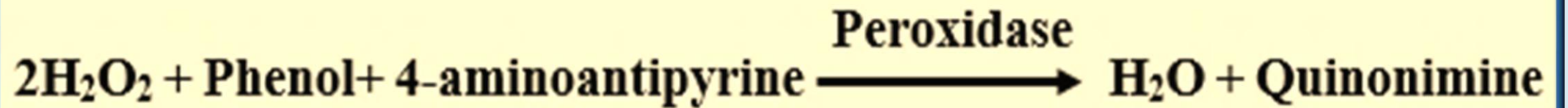
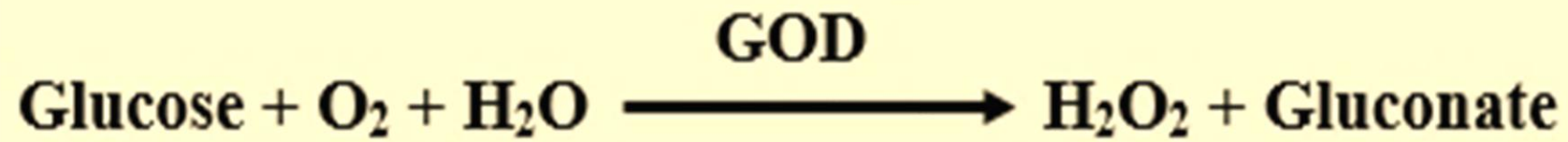


Hypoglycemia:

➤ Decrease the level of **Glucose** less than the normal value usually **40 mg/dl or less.**

1. As a result of Over – Dosage of Insulin.
2. Starvation.
3. Strenuous Exercise.
4. Liver diseases.
5. Hypopituitarism.
6. Hypothyroidism.
7. Addison's disease.





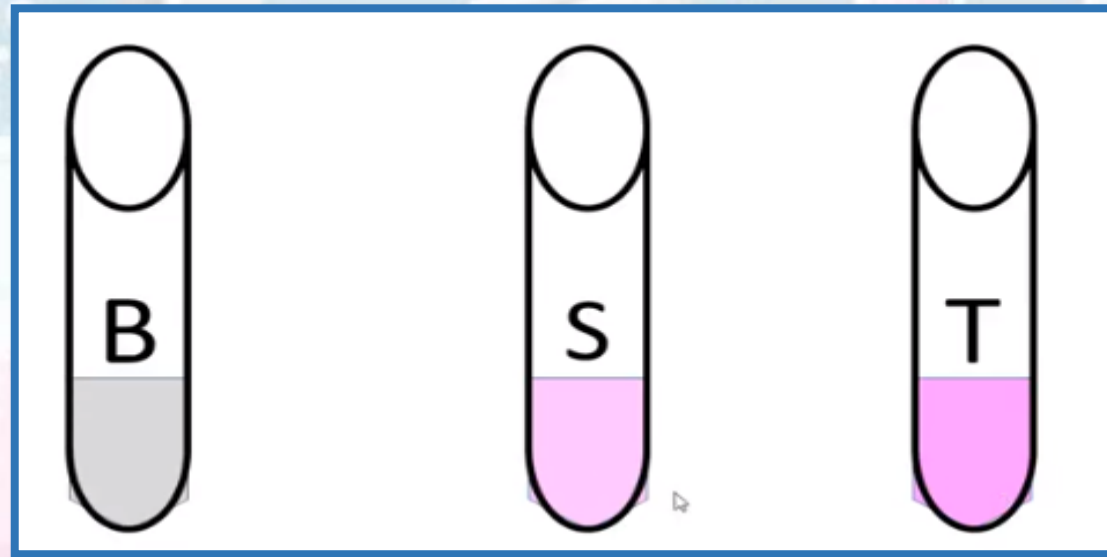
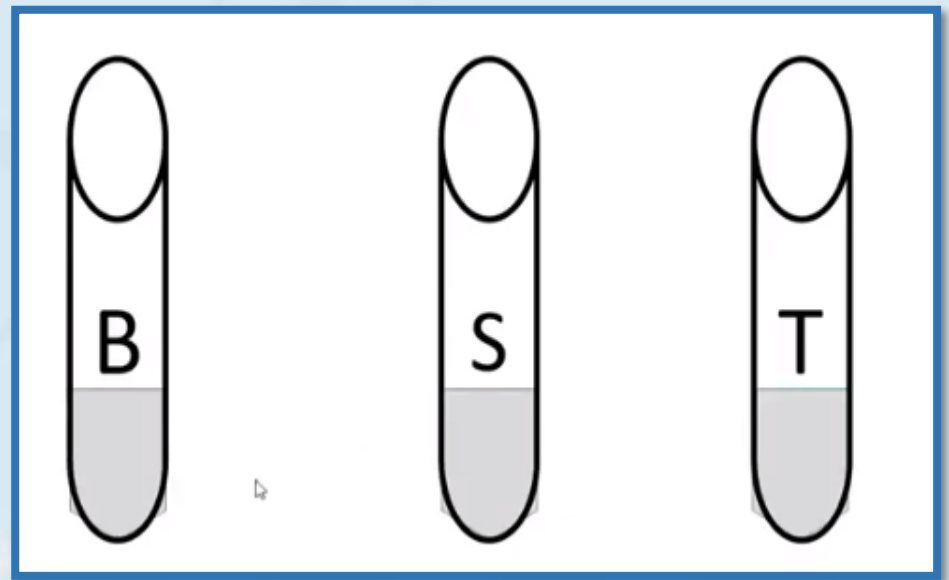
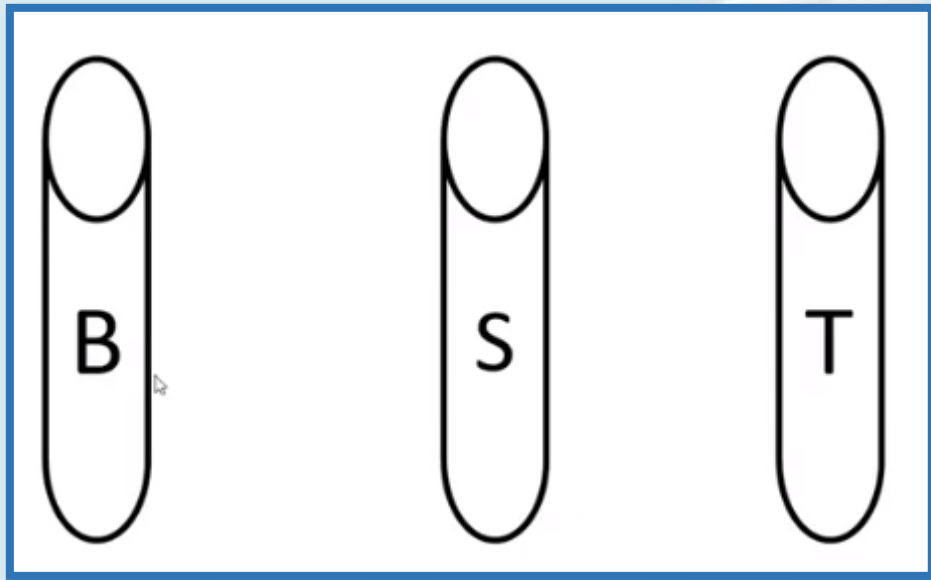
**Pink Color
or Rose Color**

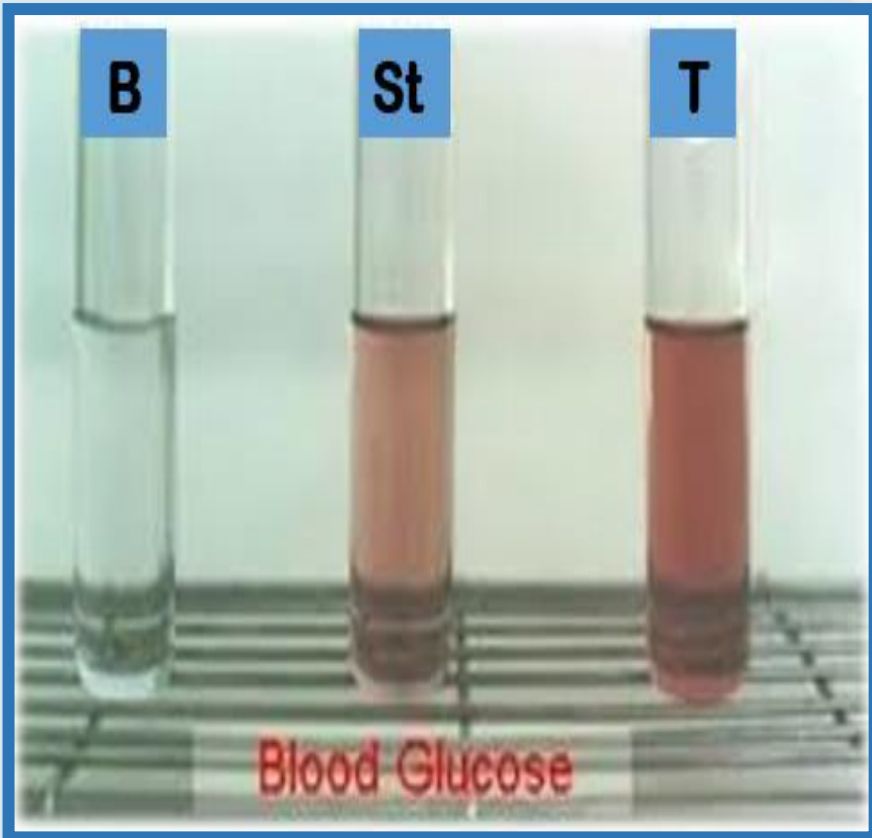
Procedure

- In this test (**Glucose test**) Wavelength used is **500 nm**. Sample used is **Serum**.

Solutions	Blank	Standard	Sample
Reagent	1 ml	1 ml	1 ml
Standard	-	10 μ l	-
Sample	-	-	10 μ l

- Mix thoroughly and incubate the tube for **10 min** at room temperature (16-25°C), or for **5 min** at **37 °C**.
- Measure the absorbance of the standard and sample at **500 nm**.
- The color is stable at least for **2 hours**.





Calculations

- The **Glucose Concentration** in the **Sample** is calculated by using the following equation:



$$C_{\text{sample}} = \frac{\text{Absorbance of Sample}}{\text{Absorbance of Standard}} \times \text{Standard conc.}$$

- The Concentration of the **Standard** is:

5.55 mmol/l

Or

100 mg/dl



**THANK
YOU!**