

**Tishk International University**  
**Faculty of Applied Science**  
**Nutrition and Dietetics Department**



# Blood Sugar Measurement

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**Human Biology Lab / 5<sup>th</sup> Lab**  
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# Outline

- **Blood sugar**
- **Maintenance of blood sugar**
- **Hyperglycemia**
- **Hypoglycemia**
- **Diabetes**
- **Blood Sugar measurement**

# Objectives

- Understanding the basics of blood sugar
- Understanding the homeostasis of blood sugar
- Understanding the differences between type 1 and type 2 diabetes Mellitus
- Ability to measure blood sugar

- **Blood glucose** refers to the amount of sugar (glucose) present in the bloodstream.

Glucose is a type of sugar that comes from the food we eat and is an important source of energy for the body's cells.

- **Fasting blood glucose (after at least 8 hours without eating):**

 70–100 mg/d

- **Postprandial (2 hours after eating):**

 Less than 140 mg/dL (7.8 mmol/L)

- **Random (any time of day):**

 Usually less than 140 mg/dL

- **In healthy individuals, blood sugar rises to about 120–140 mg/dL after eating and returns to around 90 mg/dL within 2–3 hours.**

Too much or too little glucose in the blood can be a sign of a serious medical condition.

- High blood glucose levels (**hyperglycemia**) may be a sign of diabetes, a disorder that can cause serious, long-term health conditions.
- **Hypoglycemia** - Levels below the normal range
- The maintenance of glucose level in blood within narrow limits is very efficiently regulated system.
- This is important , because it is essential to have continuous supply of glucose to the brain, and other organs and preventing the body from damaging effect of high blood sugar

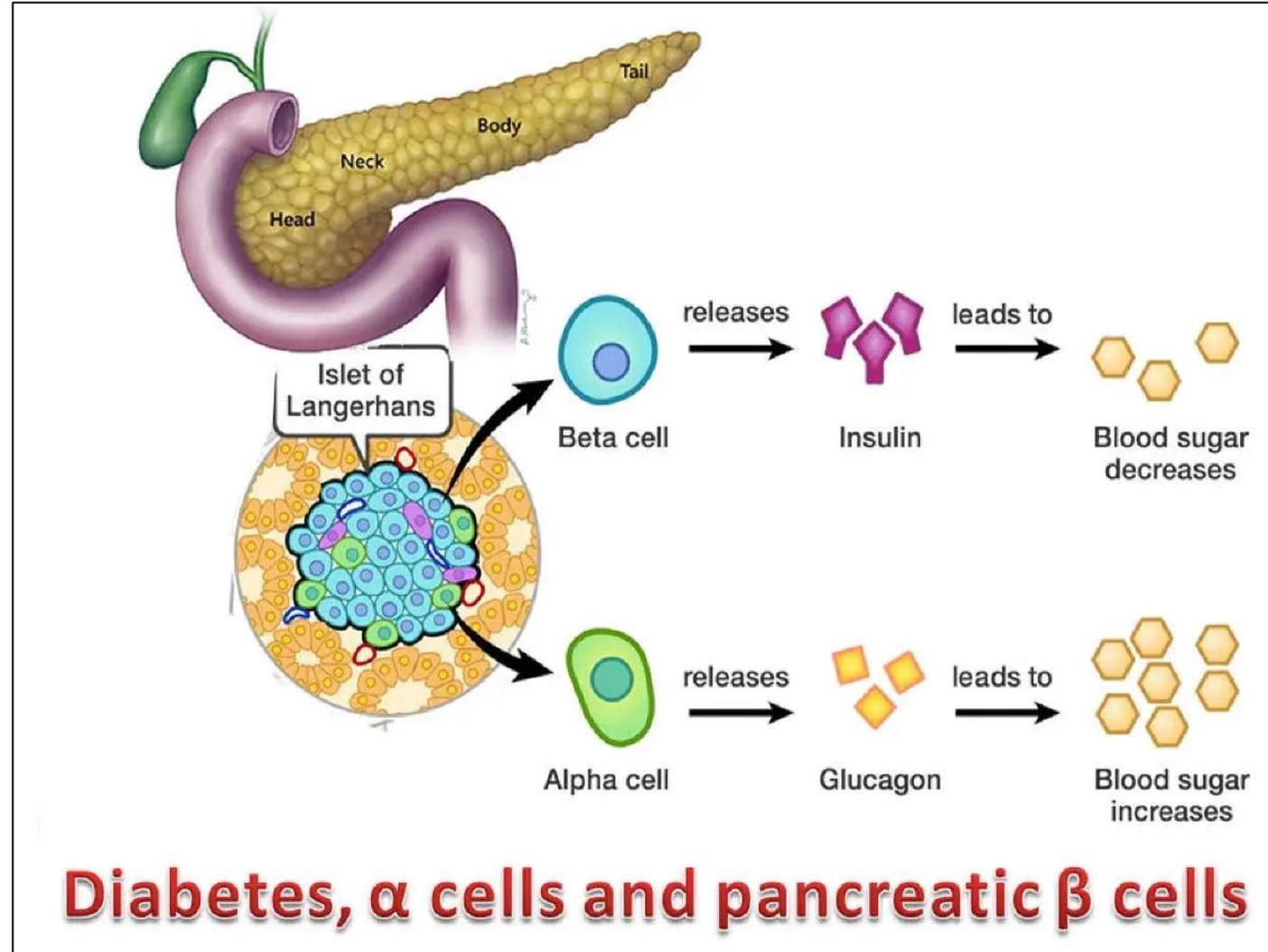
# This homeostasis of blood glucose level

- This homeostasis of blood glucose level is maintained by the balance between glucose entering and leaving the blood.
- This balance is managed by hormones – mainly

1. Insulin

2. Glucagon

Which re secreted by pancreatic **beta** and **alpha** cells respectively

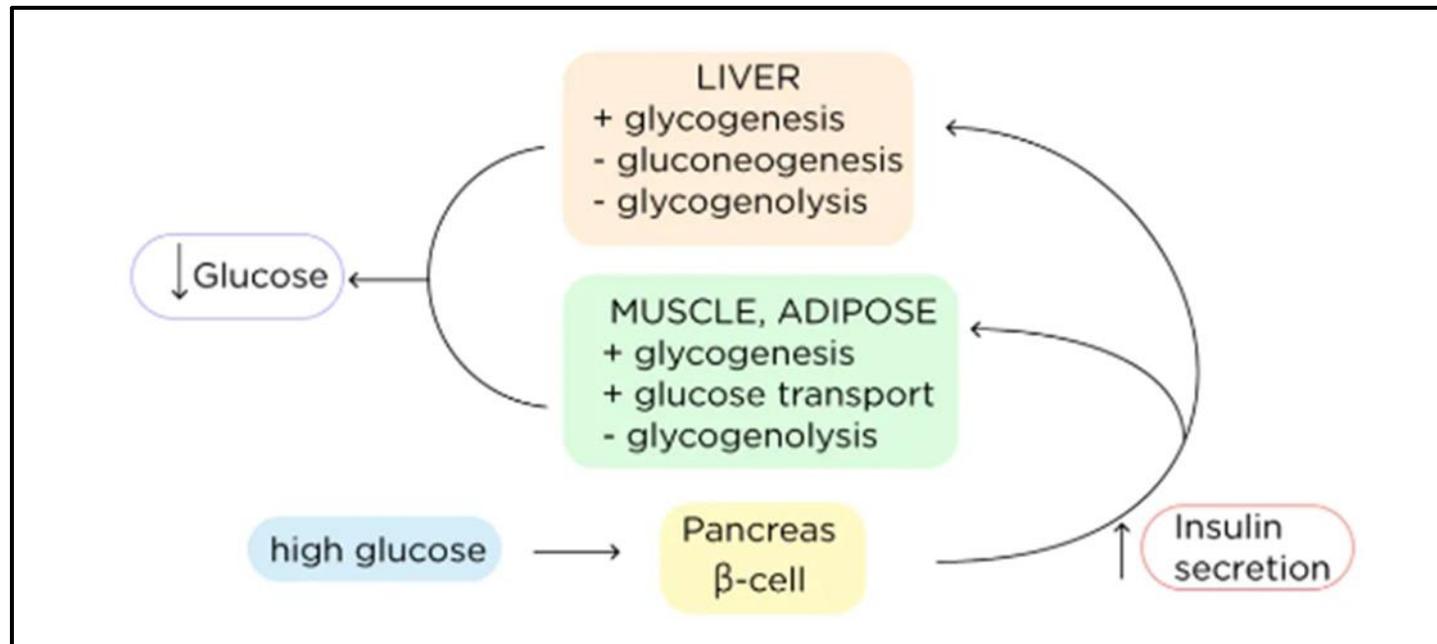


# When glucose increases in blood stimulate Insulin(hypoglycemic hormone)



Hypoglycemic hormone – insulin which stimulate

1. Utilization of glucose by tissues for energy
2. Glycogenesis – Synthesis of glycogen from glucose)
3. Prevent of gluconeogenesis
4. Lipogenesis – conversion of glucose to fat

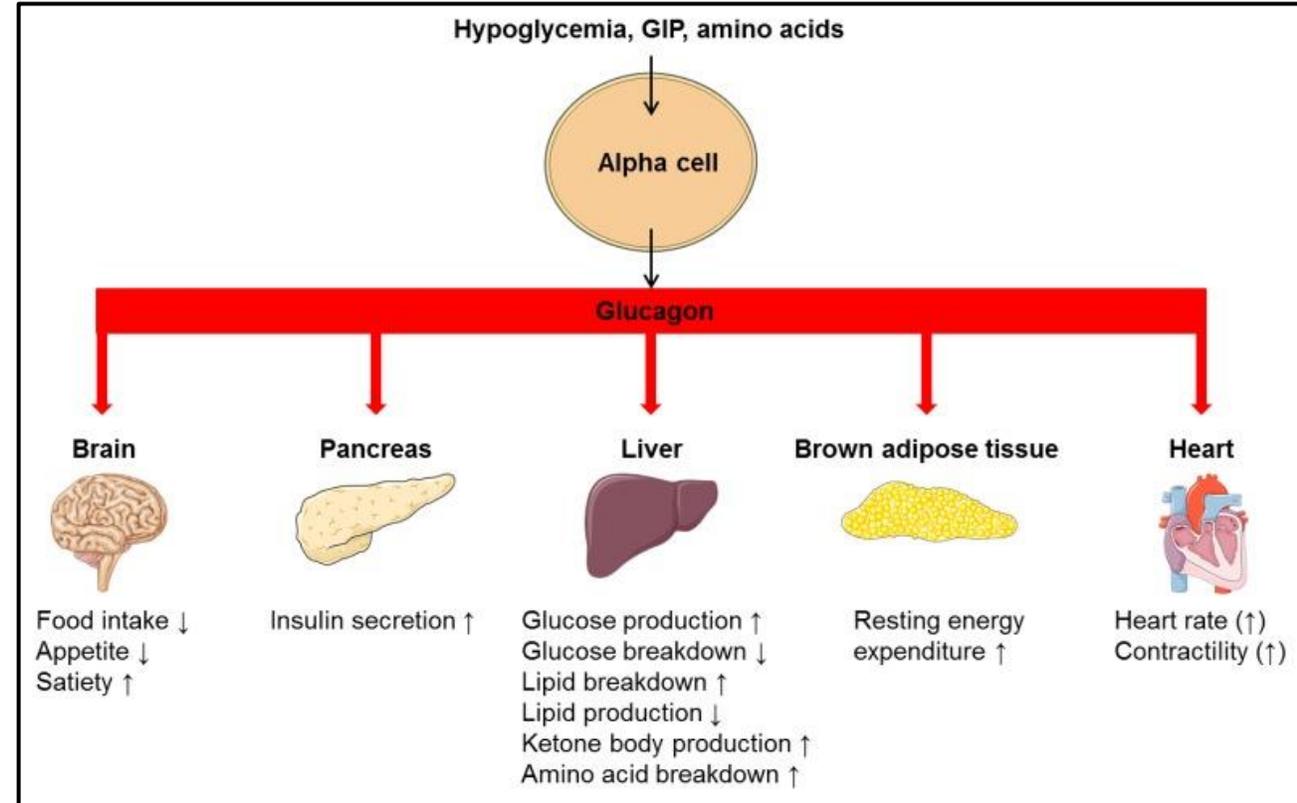


Depletion of glucose stimulate

Secretion of Glucagon(hyperglycemic hormone) by alpha cells which stimulate

1. Glycogenolysis (breakdown of glycogen to glucose)
2. Gluconeogenesis
3. Promotes **lipolysis** – breakdown of fat into fatty acids

**Overall body effect** Increases **blood glucose** and **fatty acids** in the blood (Maintains energy during fasting)



# • Glucose homeostasis – Putting it all together

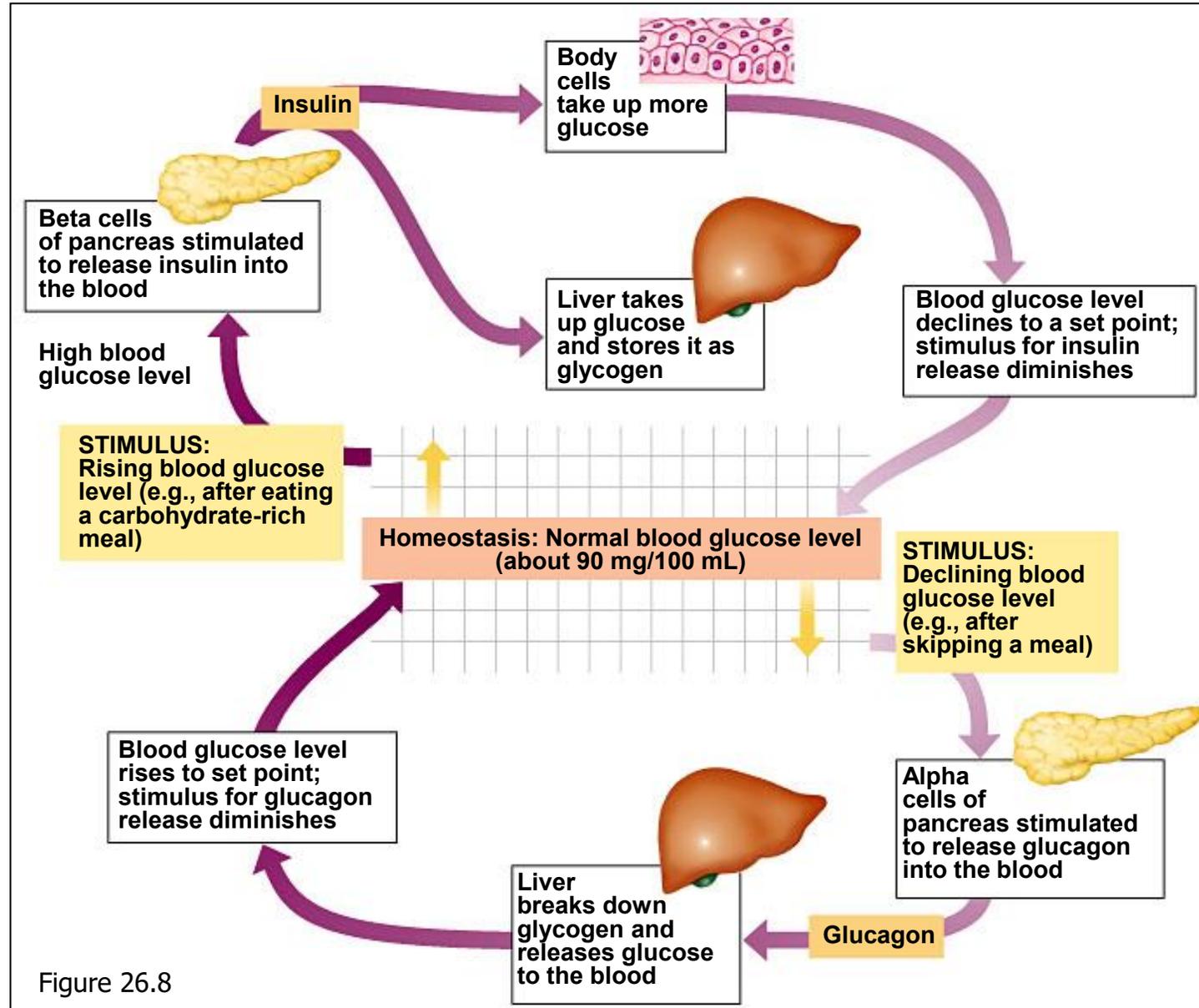


Figure 26.8

# Hypoglycemia Condition

- Blood glucose level of 80 or less
- Most calls for diabetic emergency
- Signs and symptoms:
  - Hunger
  - Nervousness or shakiness
  - Perspiration
  - Dizziness or light-headedness
  - Sleepiness or weakness
  - Confusion
  - Difficulty speaking
  - Unresponsiveness



# Hyperglycemia Condition

Symptoms of diabetes and high blood sugar include:

- Feeling very thirsty (polydipsia).
- Frequent urination (polyuria).
- Fatigue.
- Feeling very hungry (polyphagia).
- Unexplained weight loss.
- Blurred vision.
- Slow healing of cuts or sores.

# Glucometer or glucose meter



# OPERATION STEPS

Step 1



Insert Test Strip

Step 2



Take Blood Sample

Step 3



Apply Blood

Step 4



Result in Seconds



# References

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