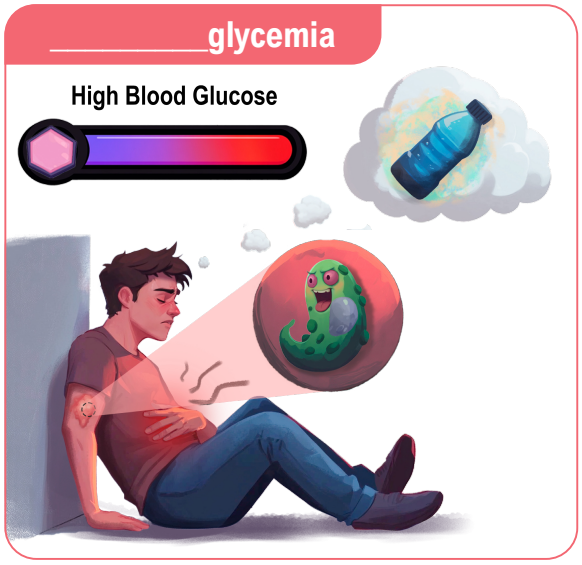
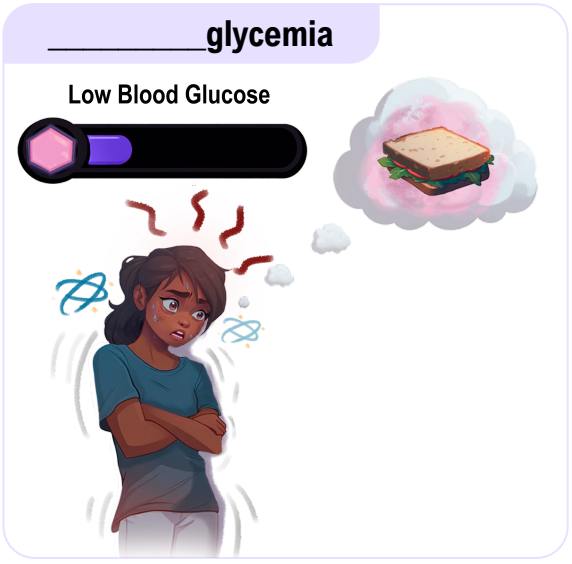
TOPIC: BLOOD GLUCOSE REGULATION

Blood Glucose Regulation

- Blood glucose levels must be kept within a specific narrow range to avoid serious health issues.
  - **Hyperglycemia:** condition where blood glucose is too _____.
  - **Hypoglycemia:** condition where blood glucose is too _____.
- The body maintains glucose balance via _____ (chemical messengers).
  - Proper diet, physical activity, & medications can also help with glucose balance.





PRACTICE

Which of the following situations might cause someone to experience hypoglycemia?

a) An imbalance of hormones that regulate blood glucose.

b) Intense exercise and then not eating anything for a few hours.

c) Having depleted glycogen stores.

d) All of the above.

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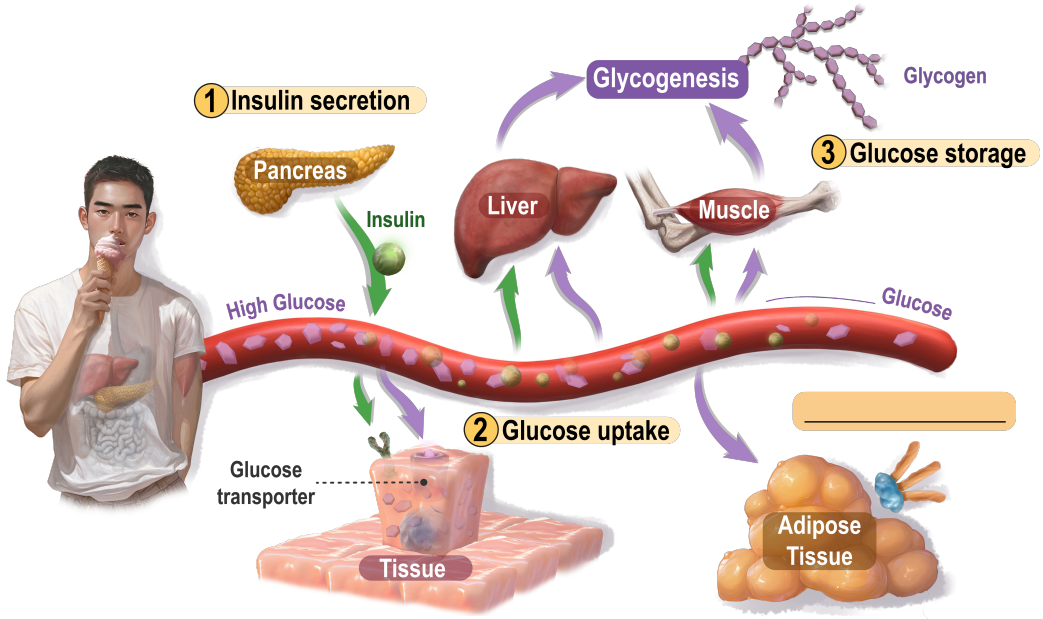
Insulin Decreases Blood Glucose Levels

◆ **Insulin:** hormone that _____ blood glucose after eating by stimulating 2 events:

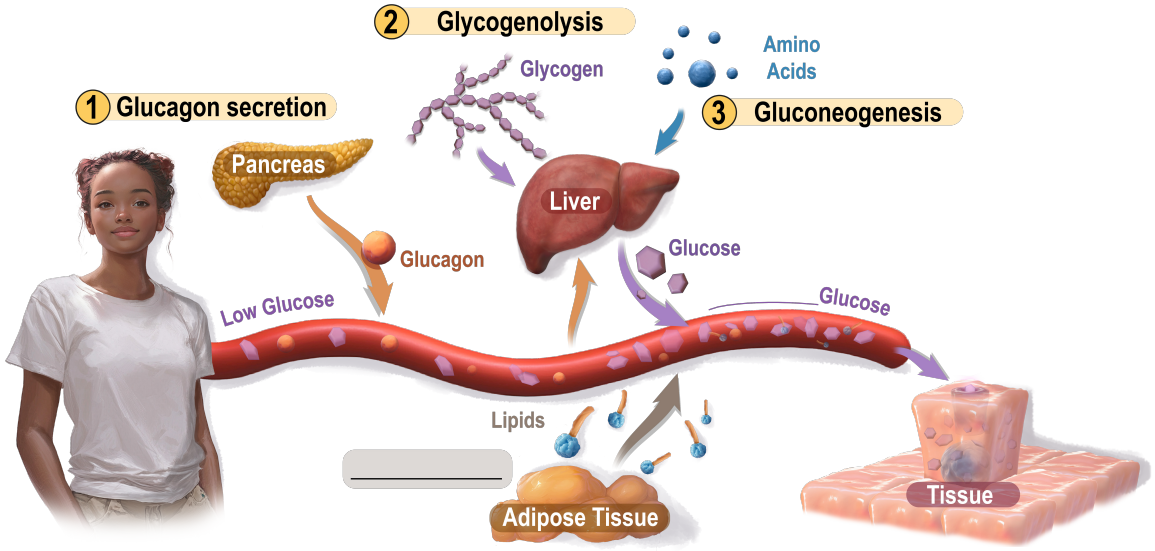
1. Expression of glucose transporters, causing blood glucose to be _____ by cells.
2. **Glycogenesis:** generation of _____ in the liver & skeletal muscle by combining excess glucose.



Glucagon Increases Blood Glucose Levels

◆ **Glucagon:** hormone that _____ blood glucose between meals or when fasting by stimulating 2 events:

1. **Glycogenolysis:** the _____-_____ of glycogen, releasing *glucose* into the blood.
2. **Gluconeogenesis:** *generates* _____ from _____-carbohydrate sources (e.g. protein).



NOTE: These hormones also *increase* blood glucose: epinephrine, norepinephrine, cortisol, & growth hormone.

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EXAMPLE

Identify whether the following statements apply to insulin (I), glucagon (G), or both (B):

- A protein that is released by the pancreas _____
- Released during hyperglycemia _____
- Released during hypoglycemia _____
- Is a hormone _____
- Directs cells to take up glucose from the blood, & glycogen production (glycogenesis) _____
- Triggers the breakdown of glycogen (glycogenolysis), causing glucose to be released into the blood _____

PRACTICE

Which of the following symptoms would a person experience if they could not produce glucagon?

a) Hyperglycemia after eating a meal containing carbohydrates.
b) Faintness & fatigue when they haven't eaten for an extended period.
c) They would not be able to store glucose in the skeletal muscle or liver as glycogen.
d) All of the above.

PRACTICE

When blood glucose levels get too high, the hormone _____ is released by an organ called the _____.

a) Insulin; pancreas.
b) Insulin; gallbladder.
c) Glucagon; pancreas.
d) Epinephrine; gallbladder.

PRACTICE

Which of the following hormones is not directly involved in blood glucose regulation?

a) Insulin.
b) Cortisol.
c) Norepinephrine.
d) Thyroxine.