# Amylin

## Biology of secretion

START

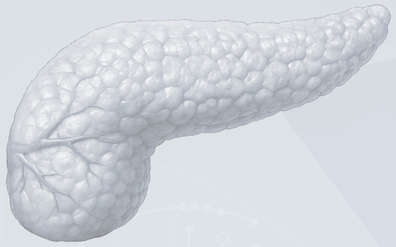


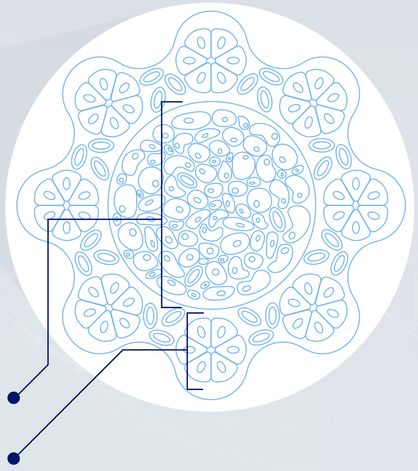
Date of preparation: October 2025

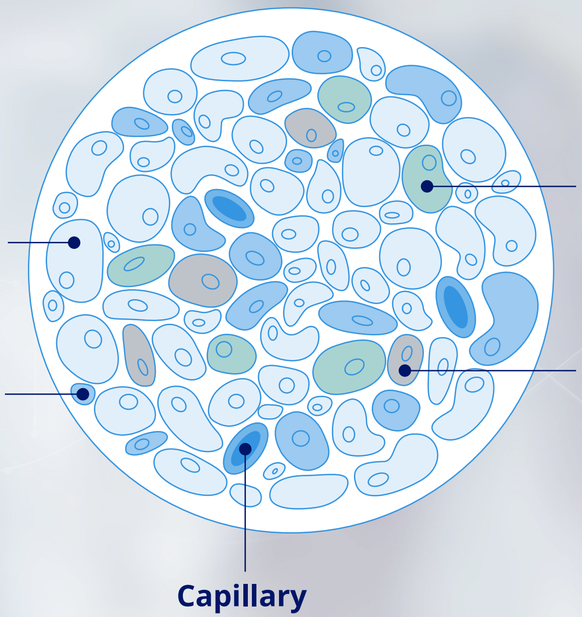
# Where is amylin produced?

Amylin is primarily produced in pancreatic β cells located within the islets of Langerhans[1]

**Pancreas**






NEXT

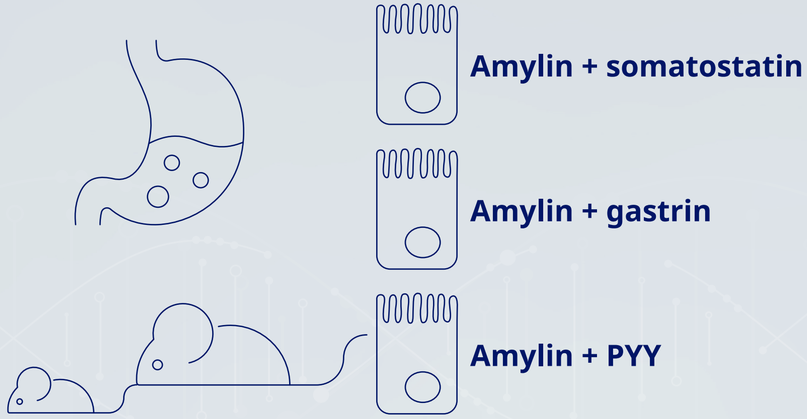


REFERENCES

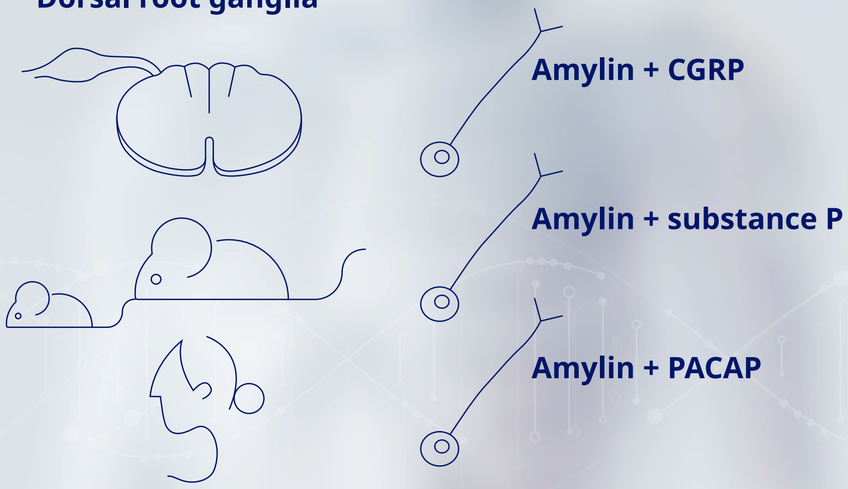
# Where is amylin produced?

Studies in rodents and humans have demonstrated that amylin, along with other peptide hormones, is produced in endocrine cells of the stomach and sensory neurons in the dorsal root ganglia[2–4]

**Stomach**




**Dorsal root ganglia**




Although the physiological role of amylin in these areas is unclear, amylin may act in a paracrine and/or autocrine manner to locally regulate the function of these organs or cells[2,4]

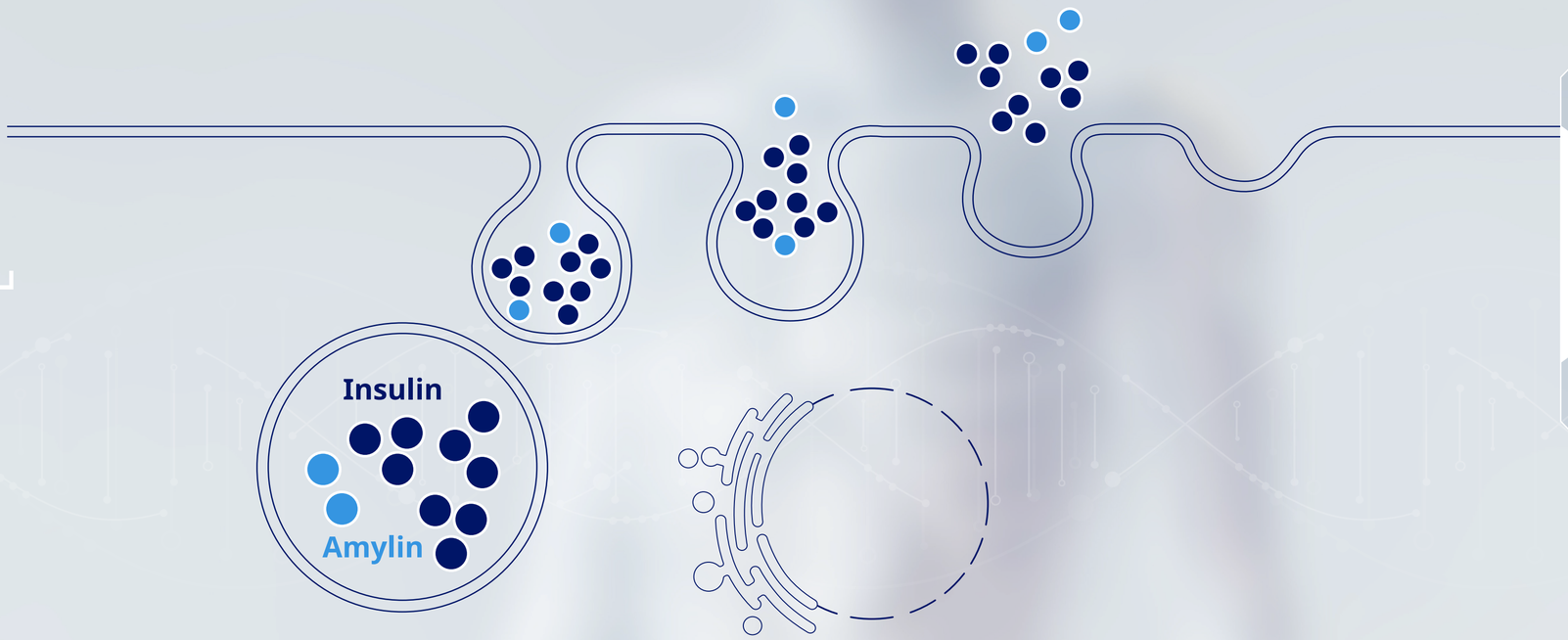
NEXT



REFERENCES

# Nutrient-stimulated secretion of amylin

In humans, secretory granules of β cells contain up to 150 proteins, of which amylin and insulin are co-located in their dense core[5–7]
When stimulated, β cells can secrete 5–10% of their content per hour[5]

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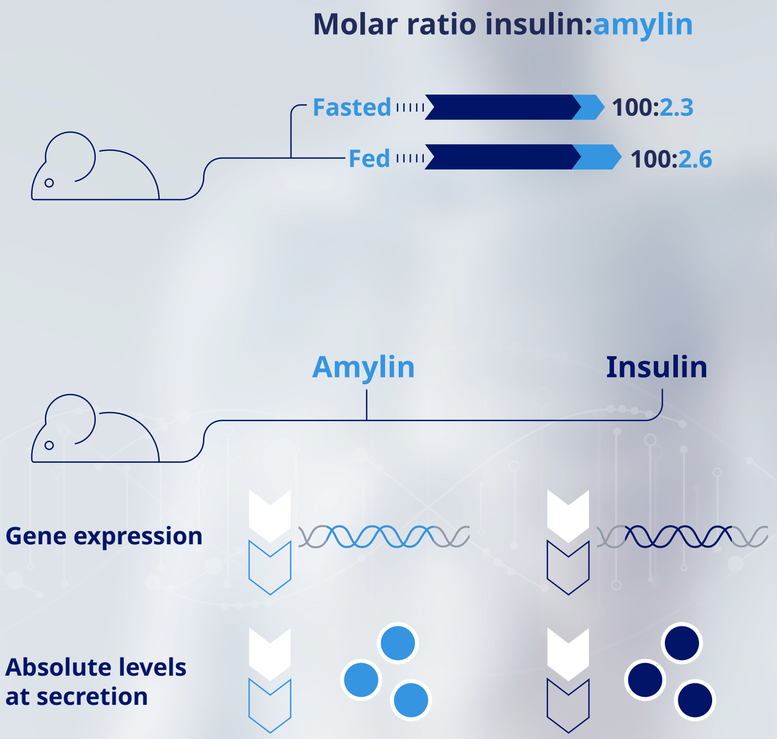
REFERENCES

# Nutrient-stimulated secretion of amylin

In rats, the relative amount of amylin and insulin secreted from β cells is consistent when stimulated, regardless of physiological condition[8]

However, the gene expression of amylin and insulin plus the absolute amount of secreted hormones are significantly reduced during fasting in a coordinated manner[8]

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BACK

# Nutrient-stimulated secretion of amylin


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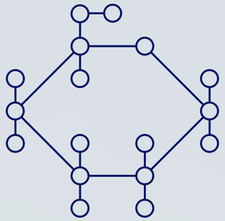

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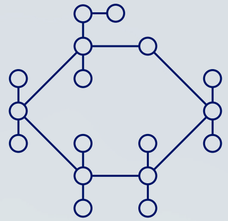
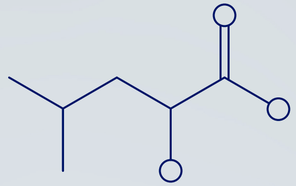
**Glucose** is the primary stimulus for amylin and insulin secretion[5,7–10]

# Nutrient-stimulated secretion of amylin





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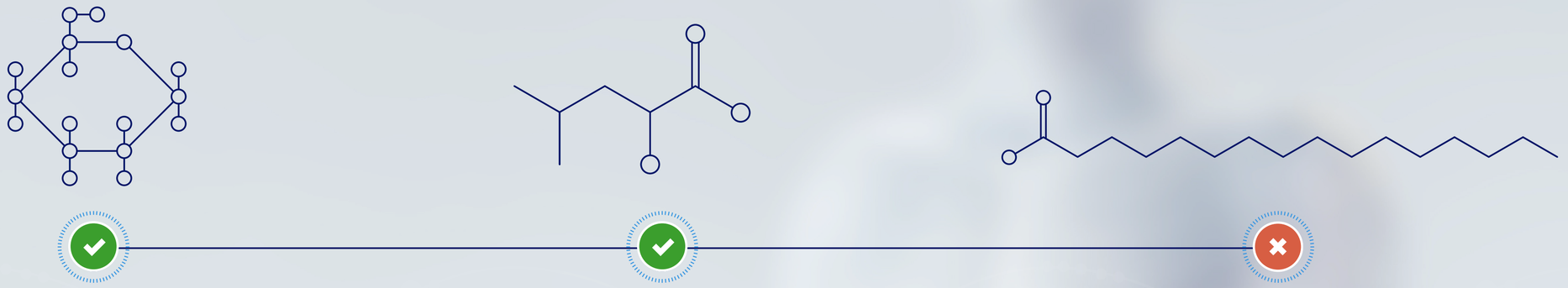
**Glucose** is the primary stimulus for amylin and insulin secretion[5,7–10]

**Amino acids** such as glutamine, leucine, arginine, and glycine may directly induce secretion from β cells via increased metabolism and non-metabolic processes, regardless of glucose availability[7–10]

Few amino acids may indirectly stimulate secretion via α- or β-cell communication,[10] and amino acids can also potentiate glucose-stimulated secretion[8,9]

# Nutrient-stimulated secretion of amylin



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**Fatty acids** cannot stimulate amylin and insulin secretion in the absence of glucose, but can potentiate glucose-stimulated secretion via metabolic processes or GPCR-mediated signaling[10]

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GPCR, G protein-coupled receptor.



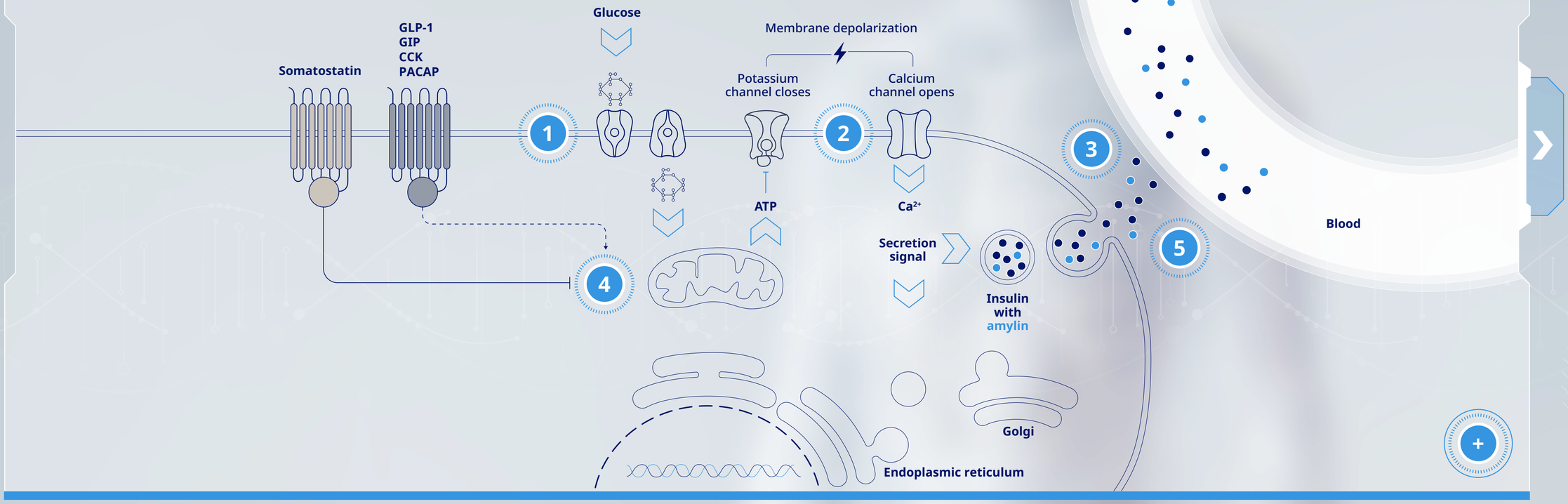
REFERENCES

BACK

# Mechanisms of β-cell secretion

After glucose uptake in β cells, amylin and insulin are secreted via "triggering (steps 1, 2 and 3)" and “amplifying (steps 4 and 5)” pathways[5,7,10]

*Please click on the blue buttons for more information*



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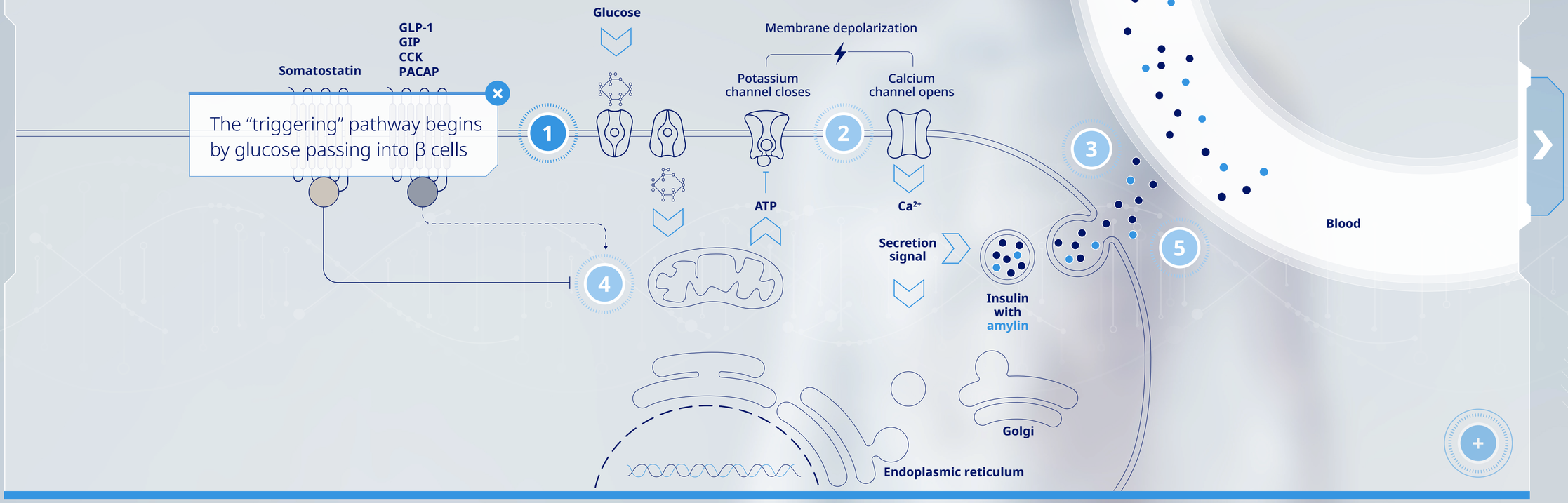

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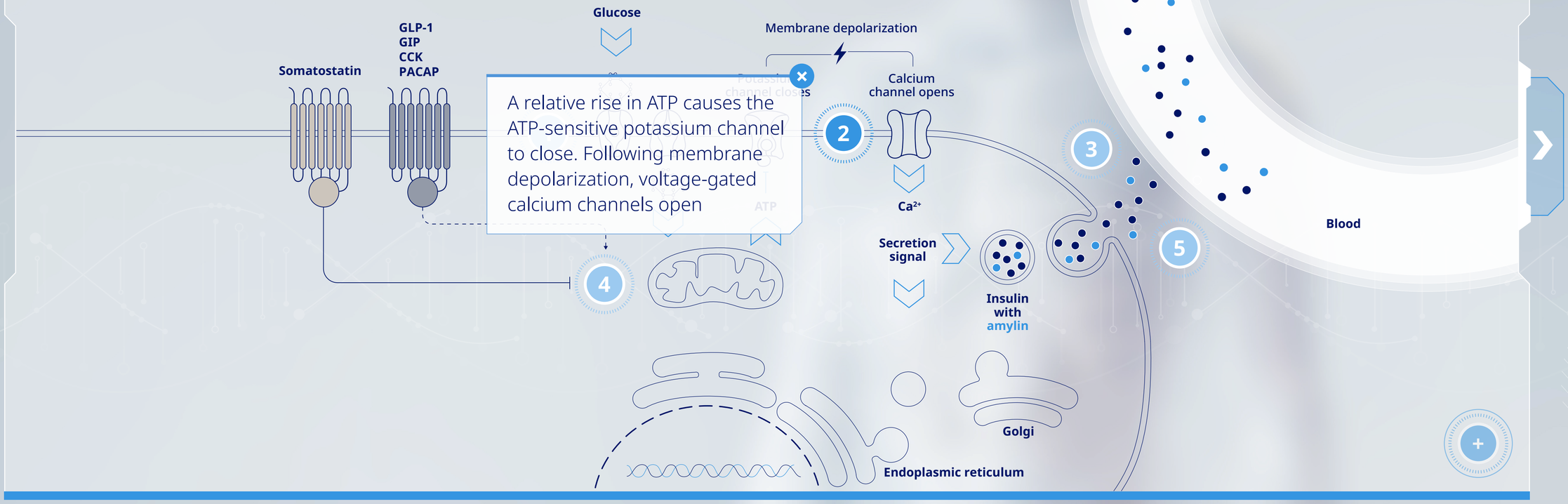

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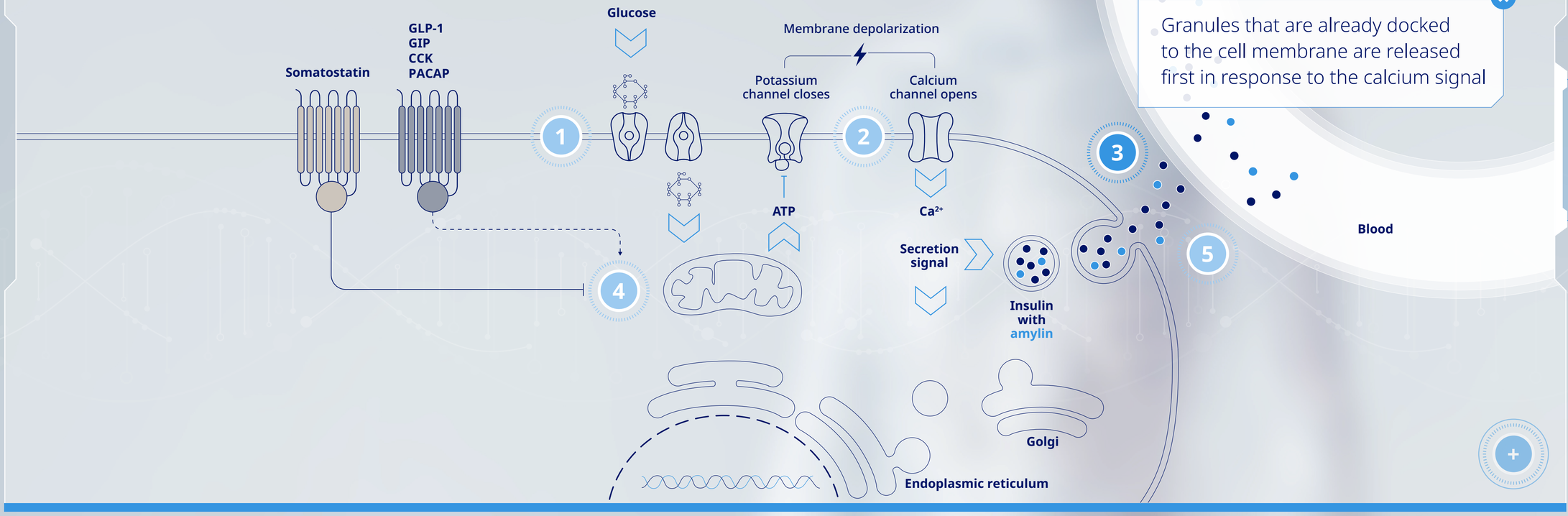




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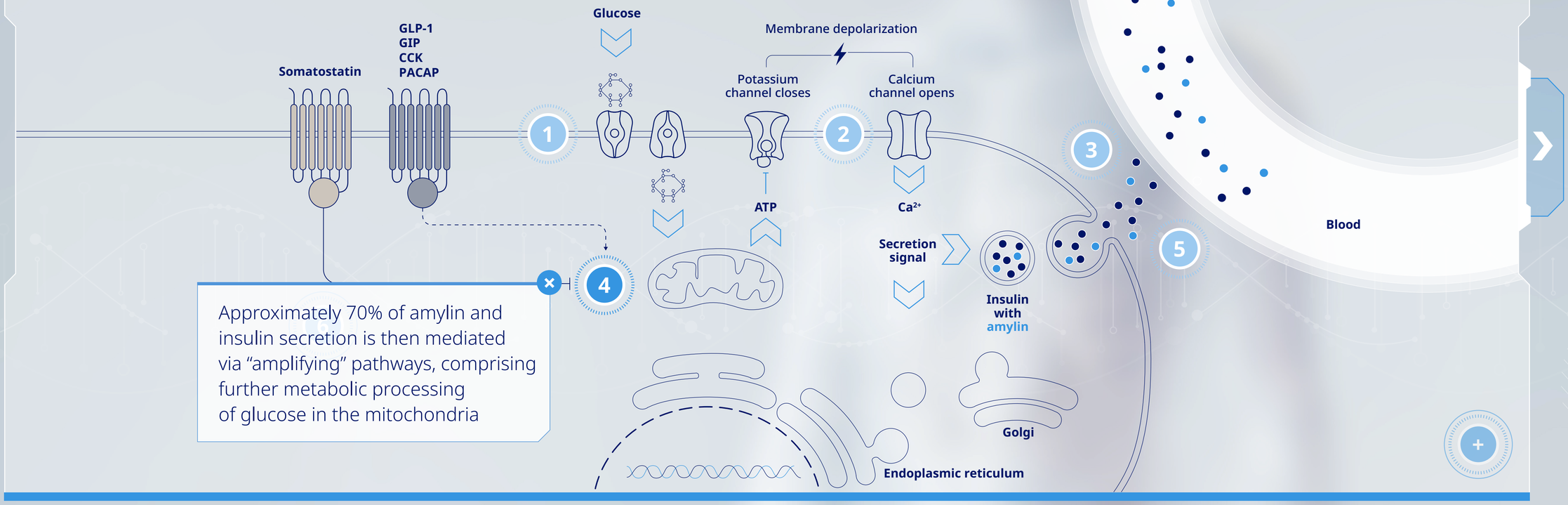

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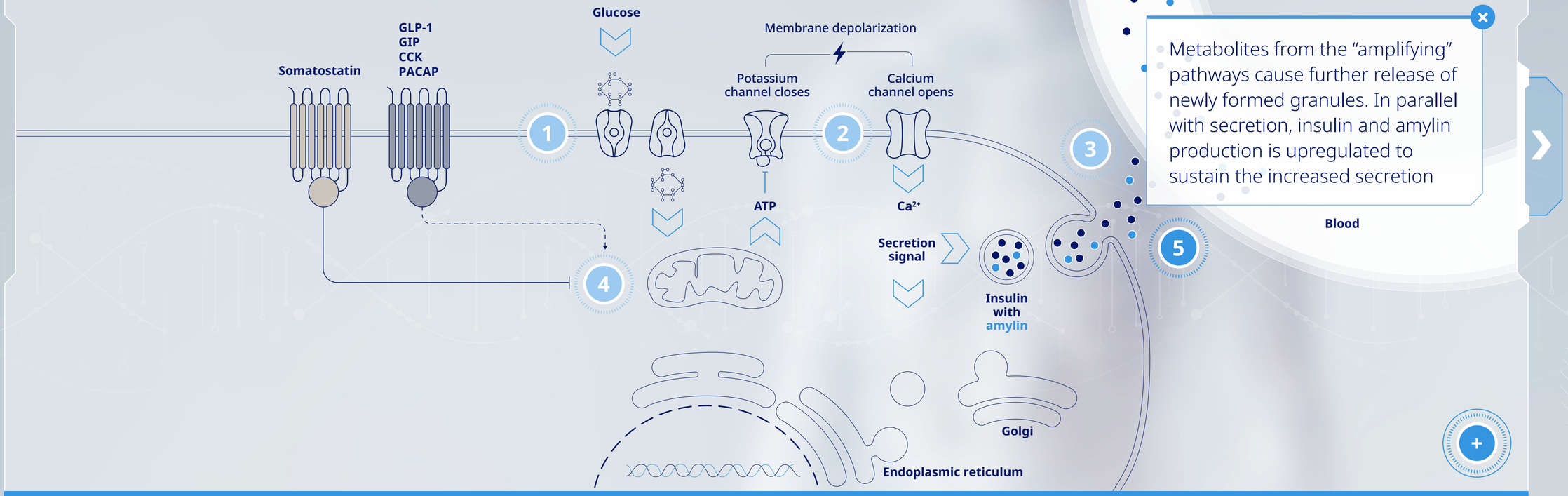
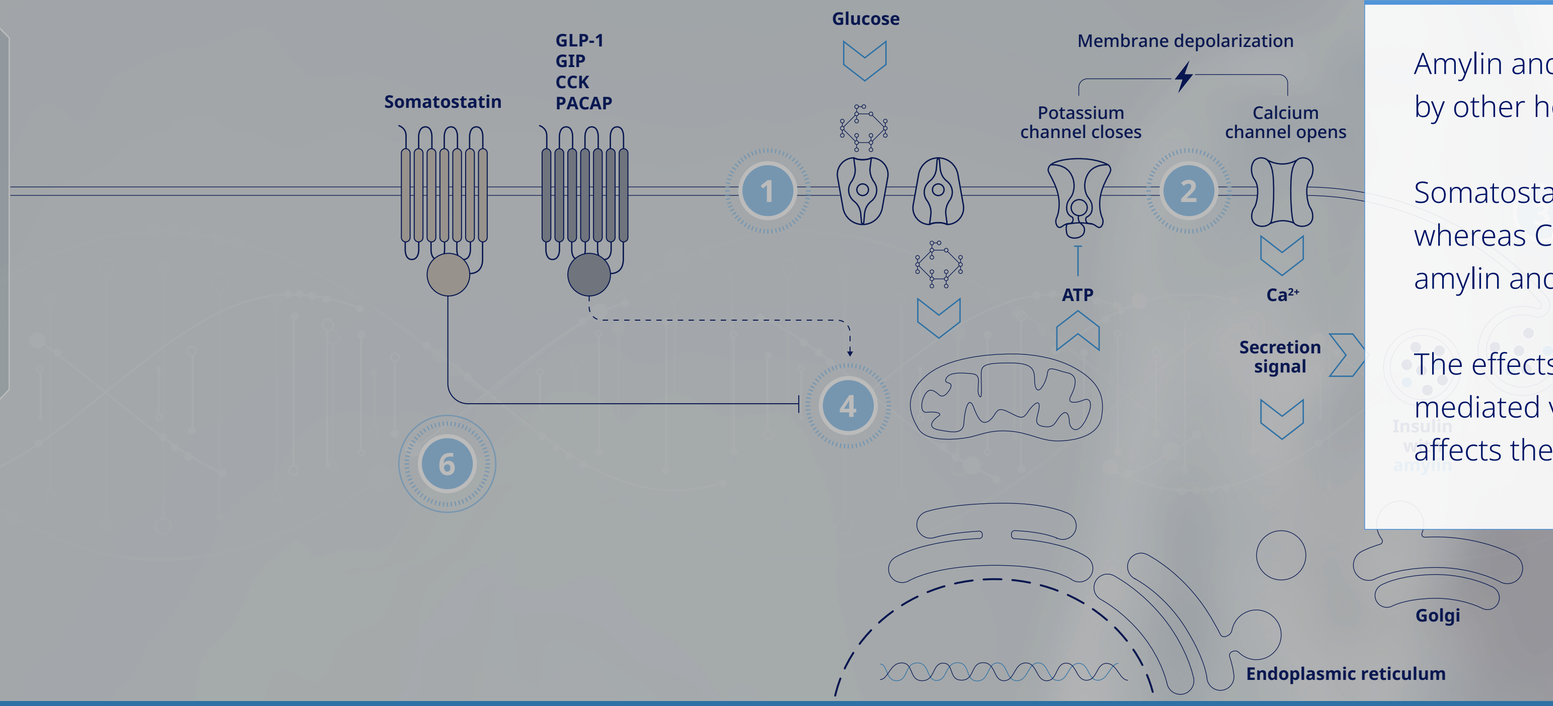



Metabolites from the “amplifying” pathways cause further release of newly formed granules. In parallel with secretion, insulin and amylin production is upregulated to sustain the increased secretion

# Mechanisms of β-cell secretion

After glucose uptake in β cells, amylin and insulin are secreted via “triggering” and “amplifying” pathways[5,7,10]




Amylin and insulin secretion is also affected by other hormones and factors[7,9,10]

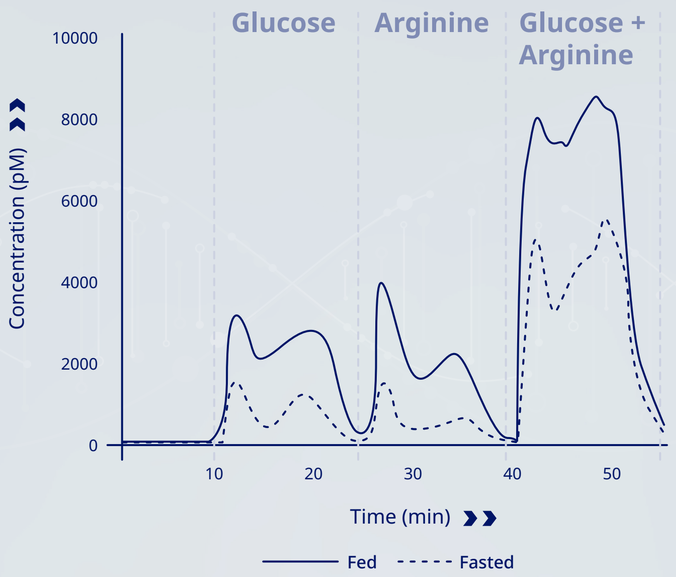
Somatostatin inhibits amylin and insulin secretion,[9] whereas CCK, PACAP, GLP-1, and GIP stimulate amylin and insulin secretion[7,10]

The effects of incretins and other hormones are mediated via GPCR-mediated signaling that affects the “amplifying” pathways[7,10]

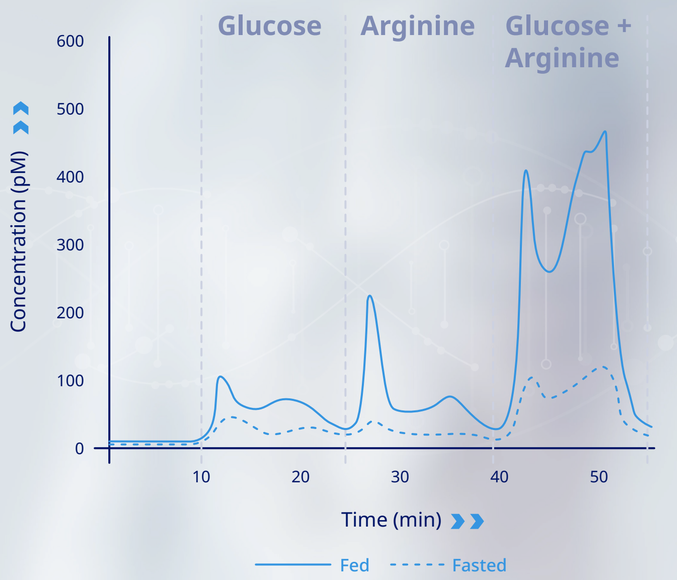
# Mechanisms of β-cell secretion

Amylin and insulin are secreted in a distinct biphasic, oscillating pattern,[7,11] representing the “triggering” and “amplifying” pathways[5,7,10]

**Insulin[8]**




**Amylin[8]**






REFERENCES

## References

ATP, adenosine triphosphate; $Ca^{2+}$, calcium ion; CCK, cholecytokine; CGRP, calcitonin gene-related protein; GIP, glucose-dependent insulinotropic polypeptide; GLP-1, glucagon-like peptide-1; GPCR, G-protein-coupled receptor; PACAP, pituitary adenylate cyclase-activating polypeptide; PYY, peptide tyrosine tyrosine.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