The physiological functions of amylin

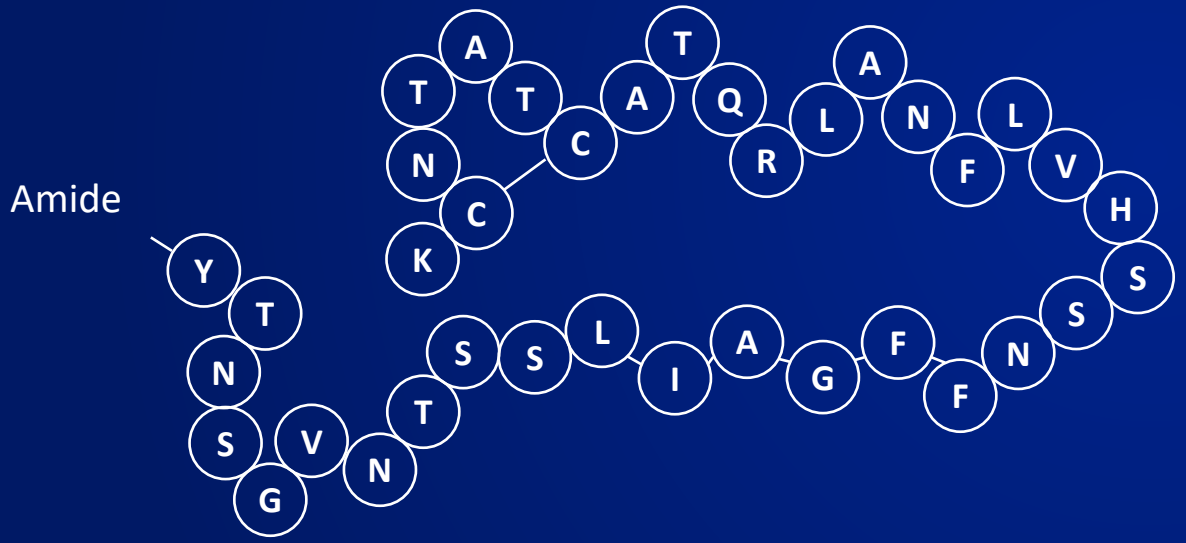
Interactive learning module

Start →

Please note that the data in the following slides is based wholly on pre-clinical data
Last updated: April 2025

Introduction

Amylin is a **37-amino-acid peptide hormone**



Amylin is **co-stored** and **co-secreted** with **insulin** from **pancreatic β-cells** in response to food intake

Hay DL, et al. *Pharmacol Rev* 2015;67:564–600; Lutz TA. *Appetite* 2022;172:105965; Hayden MR, et al. *JOP. J Pancreas* 2005;6:287–302

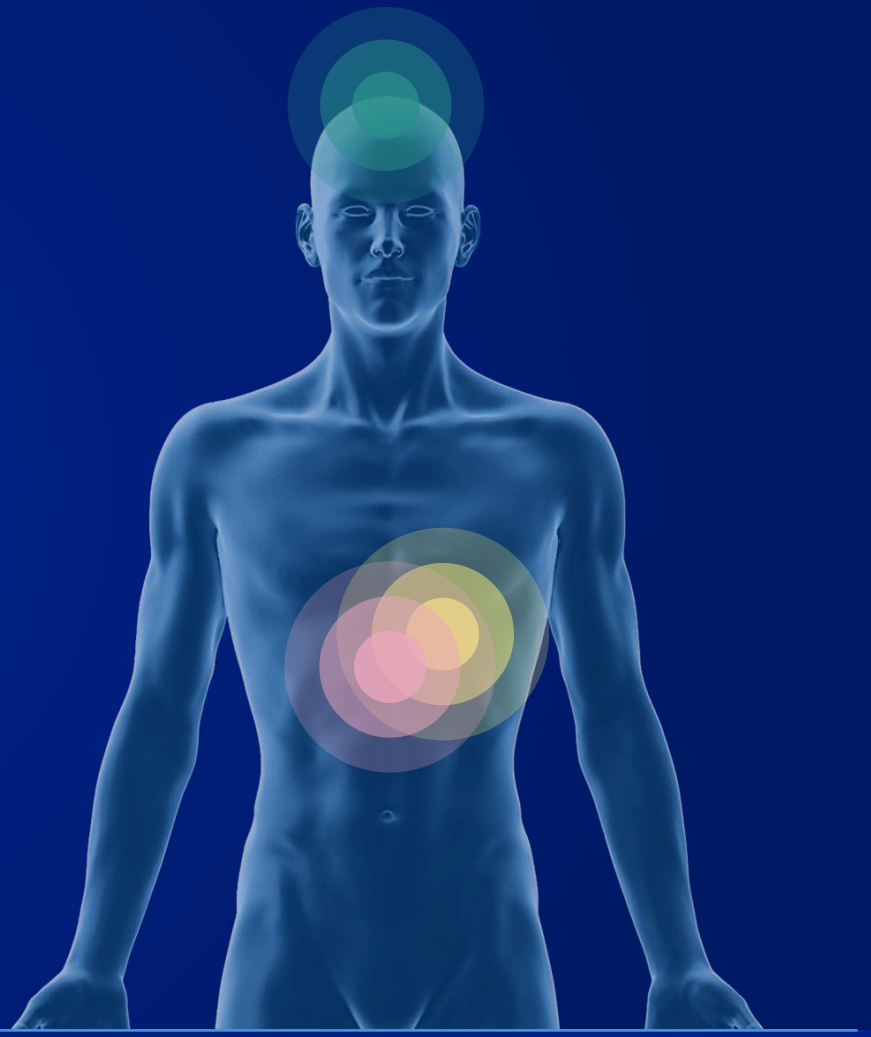
Introduction

Amylin has a number of
important physiological roles

Appetite regulation

Gastric emptying

Glucose homeostasis



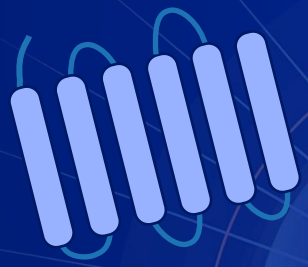
Hay DL, et al. *Pharmacol Rev* 2015;67:564–600; Lutz TA. *Appetite* 2022;172:105965

Amylin receptors

Amylin receptors are part of the large superfamily of cell surface **G protein-coupled receptors (GPCRs)**

Amylin receptors consist of:

Calcitonin receptors (CtRs)



+

RAMPs (Receptor Activating Modifying Proteins)

Alter calcitonin receptor pharmacology from **calcitonin-preferring** to **amylin-preferring**

Amylin receptors

RAMPs

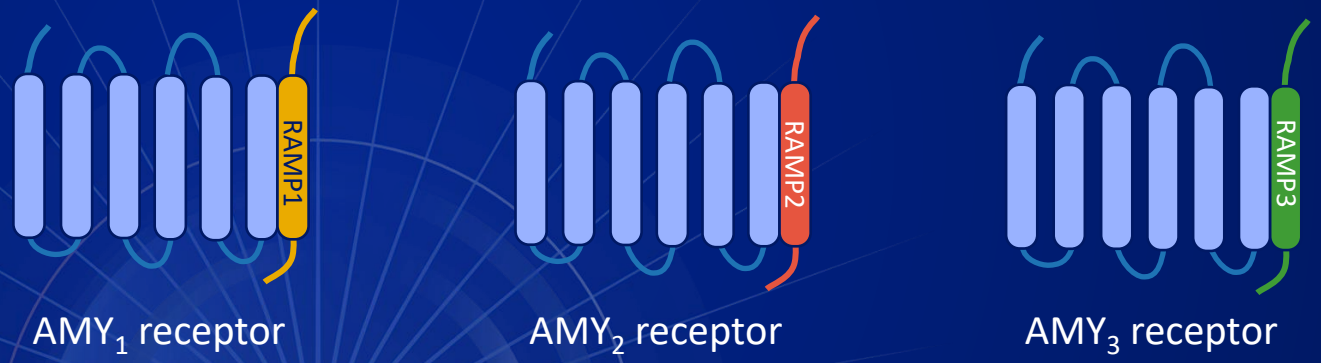
AMY_1, amylin receptor 1; AMY_2, amylin receptor 2; AMY_3, amylin receptor 3; CtR, calcitonin receptor; GPCR, G protein-coupled receptor; RAMP, Receptor Activating Modifying Protein

Hay DL et al. *Pharmacol Rev* 2015;67:564–600; Bower RL & Hay DL. *Br J Pharmacol* 2016;173:1883–98; Mathiesen DS et al. *Front Endocrinol* 2021;11:617400

Amylin receptors

Amylin receptors are part of the large **superfamily of cell surface G protein-coupled receptors (GPCRs)**

1 of 3 different RAMPs
associate with the **calcitonin receptor**
to form three distinct amylin receptors



Amylin receptors **RAMPs**

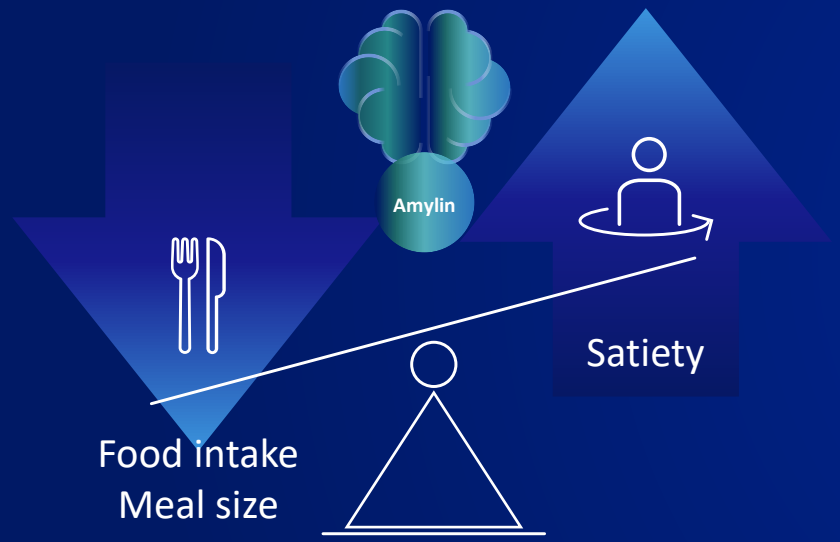
AMY_1, amylin receptor 1; AMY_2, amylin receptor 2; AMY_3, amylin receptor 3; CtR, calcitonin receptor; GPCR, G protein-coupled receptor; RAMP, Receptor Activating Modifying Protein

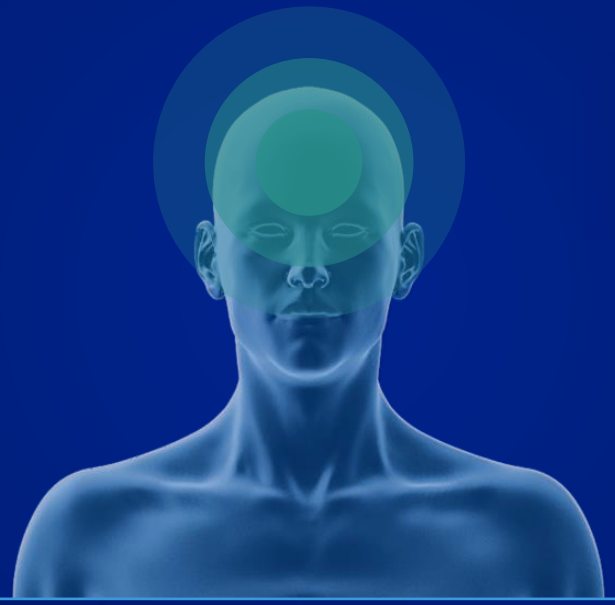
Hay DL et al. *Pharmacol Rev* 2015;67:564–600; Bower RL & Hay DL. *Br J Pharmacol* 2016;173:1883–98; Mathiesen DS et al. *Front Endocrinol* 2021;11:617400

Next

Amylin and appetite regulation

Amylin receptors, found on **nutrient sensitive neurons** in the **area postrema** in the **hindbrain**, play a major role in amylin's regulation of appetite





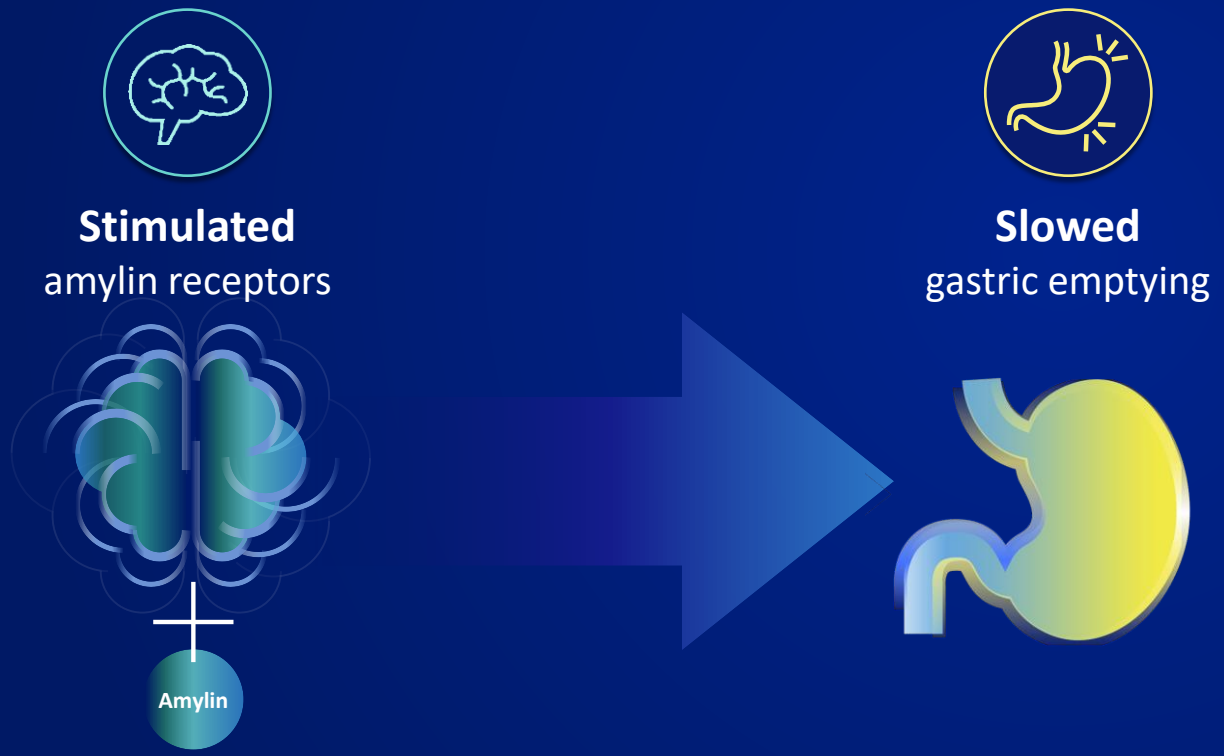
The hypothalamus, another region of the brain which expresses amylin receptors, is an important site for regulating **energy homeostasis**

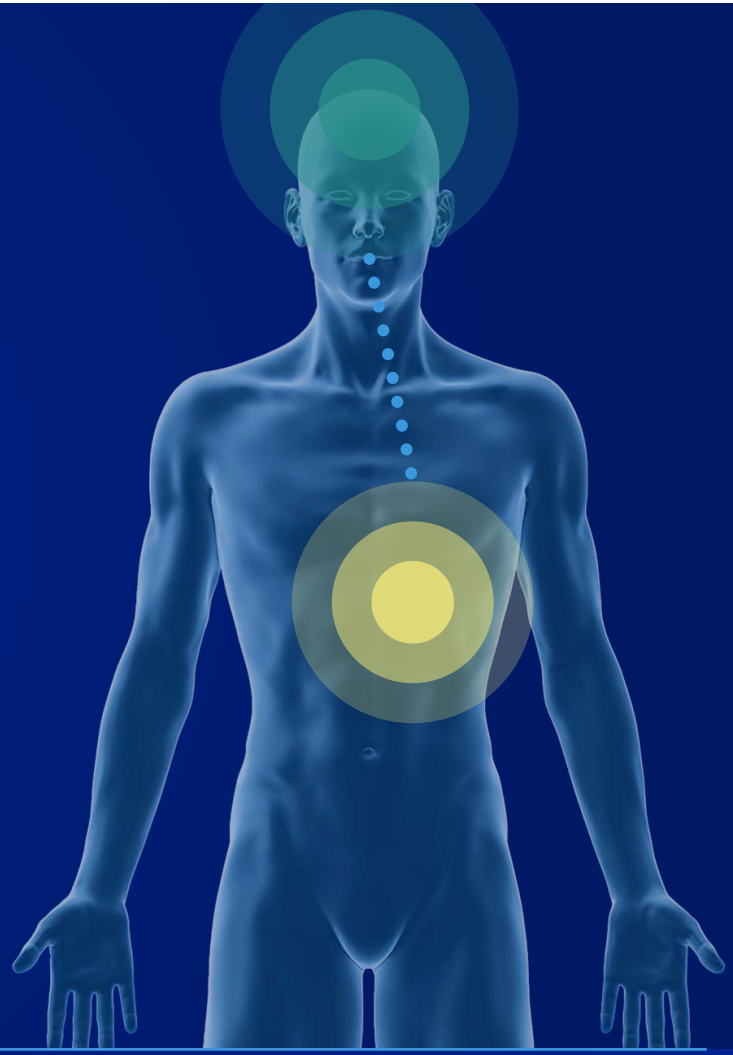
Amylin's appetite regulation **The hypothalamus**

Boccia L, et al. *Peptides* 2020;132:170366; Boyle CN, et al. *Mol Metab* 2018;8:203–10; Braegger FE, et al. *Eur J Neurosci* 2014;40:3055–66

Amylin and gastric emptying

Amylin has a direct influence on the **area postrema, transmitting signals to the gut via vagal efferent fibers** to **slow the rate of gastric emptying**

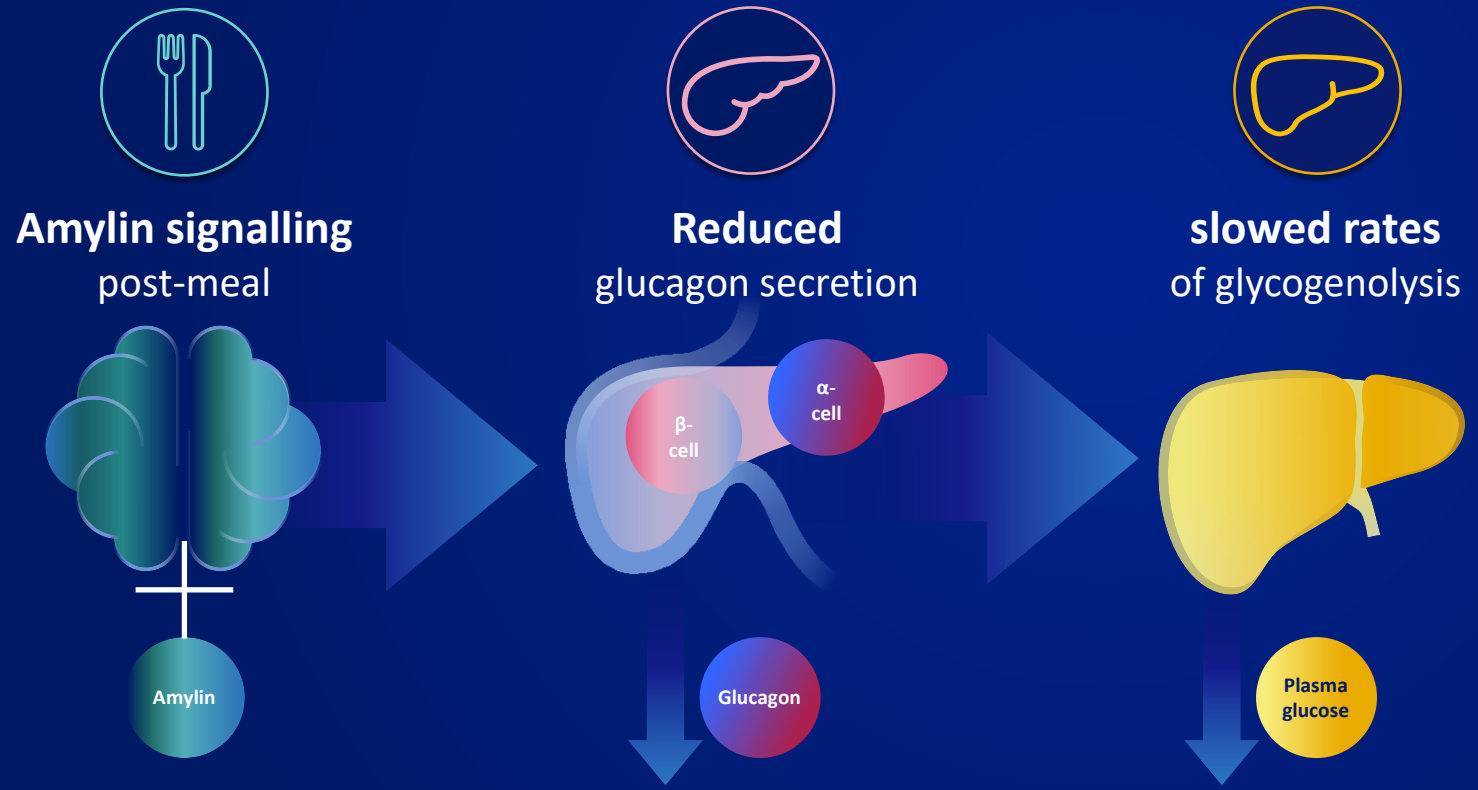


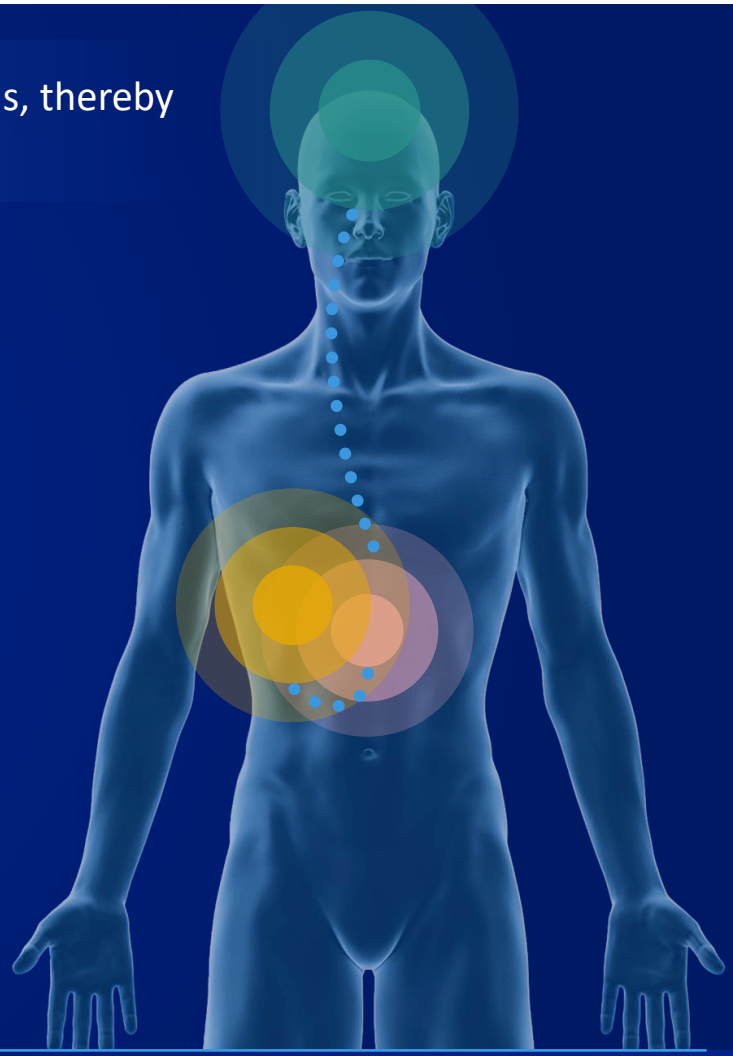


Hay DL, et al. *Pharmacol Rev* 2015;67:564–600; Lutz TA. *Appetite* 2022;172:105965; Boccia L, et al. *Peptides* 2020;132:170366

Amylin and glucagon regulation

Amylin inhibits nutrient-stimulated (i.e. postprandial) secretion of glucagon from the pancreas, thereby lowering circulating levels of glucose by slowing glycogenolysis in the liver





Young A. Adv *Pharmacol* 2005;52:151–71; Body Talk: the endocrine system (https://www.pharmacy-network.co.uk/clinical/605105-body-talk-endocrine/insulin-and-glucagon-755805#) Accessed: Jan 2025

Next

Amylin signalling in the brain

Many amylin receptors are found across **different regions of the brain**, including the **area postrema** and **hypothalamus**

Amylin **signals through different receptors** in the brain to:

reduce
food intake

increase
satiety

slow
gastric emptying

inhibit
glucagon secretion

Boccia L, et al. *Peptides* 2020;132:170366; Boyle CN, et al. *Mol Metab* 2018;8:203–10; Braegger FE, et al. *Eur J Neurosci* 2014;40:3055–66

Quiz

This quiz is optional. You will not earn any CEU accreditation points for participating.

Your responses will not be stored, tracked, or analyzed by Novo Nordisk

Next

Test your knowledge

1. Which are the three main effects of amylin?

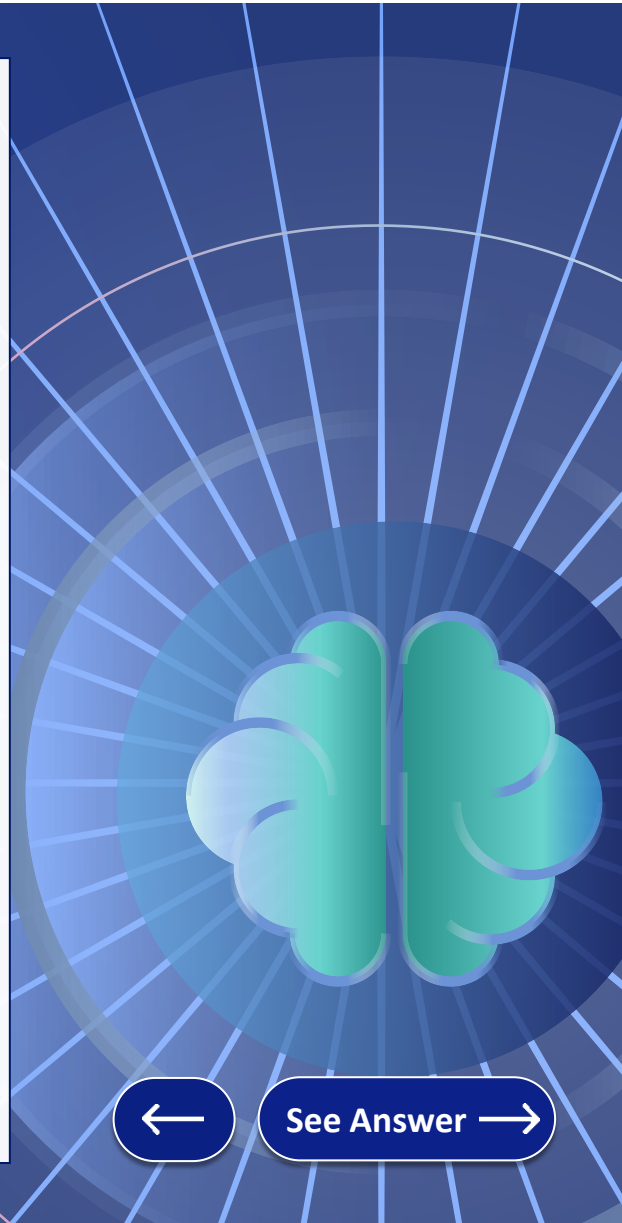
A. Regulates appetite

B. Increases respiration rate

C. Detects toxins

D. Slows gastric emptying

E. Inhibits glucagon secretion



See Answer

Test your knowledge

1. Which are the three main effects of amylin?

✓	**A.**	**Regulates appetite**
X	B.	Increases respiration rate
X	C.	Detects toxins
✓	**D.**	**Slows gastric emptying**
✓	**E.**	**Inhibits glucagon secretion**

Next

Test your knowledge

2. Which area of the brain plays a major role in amylin's regulation of appetite?

A. Cerebellum

B. Corpus callosum

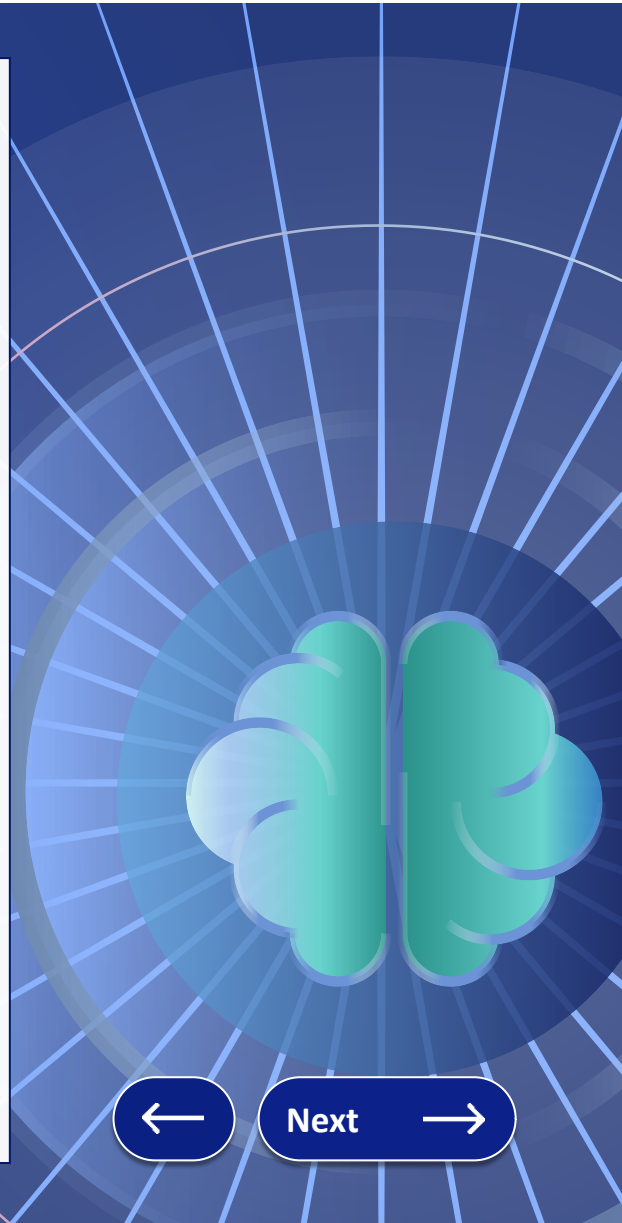
C. Area postrema

See Answer

Test your knowledge

2. Which area of the brain plays a major role in amylin's regulation of appetite?

X	A.	Cerebellum
X	B.	Corpus callosum
✓	**C.**	**Area postrema**



Next

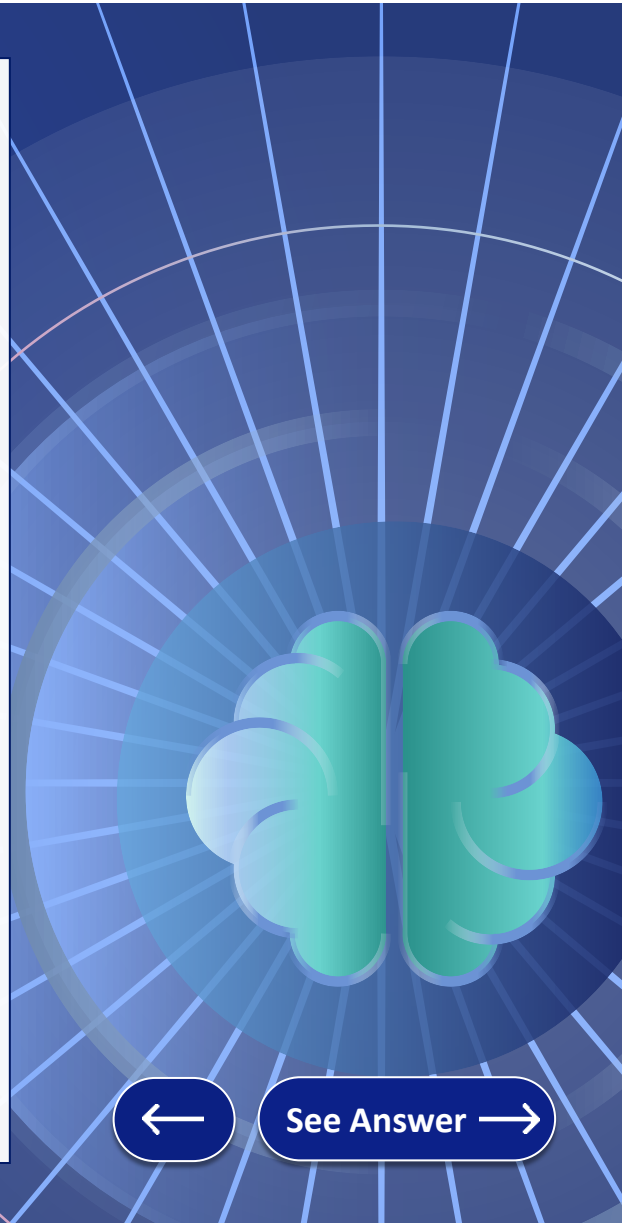
Test your knowledge

3. Which cell type secretes amylin?

A. Pancreatic α-cells

B. Pancreatic β-cells

C. Intestinal L-cells



See Answer

Test your knowledge

3. Which cell type secretes amylin?

✗	A.	Pancreatic α-cells
✓	**B.**	**Pancreatic β-cells**
✗	C.	Intestinal L-cells

Next

Test your knowledge

4. Which of the following statements are true?

A. Amylin slows gastric emptying

B. Amylin stimulates secretion of insulin

C. Amylin is co-secreted with insulin

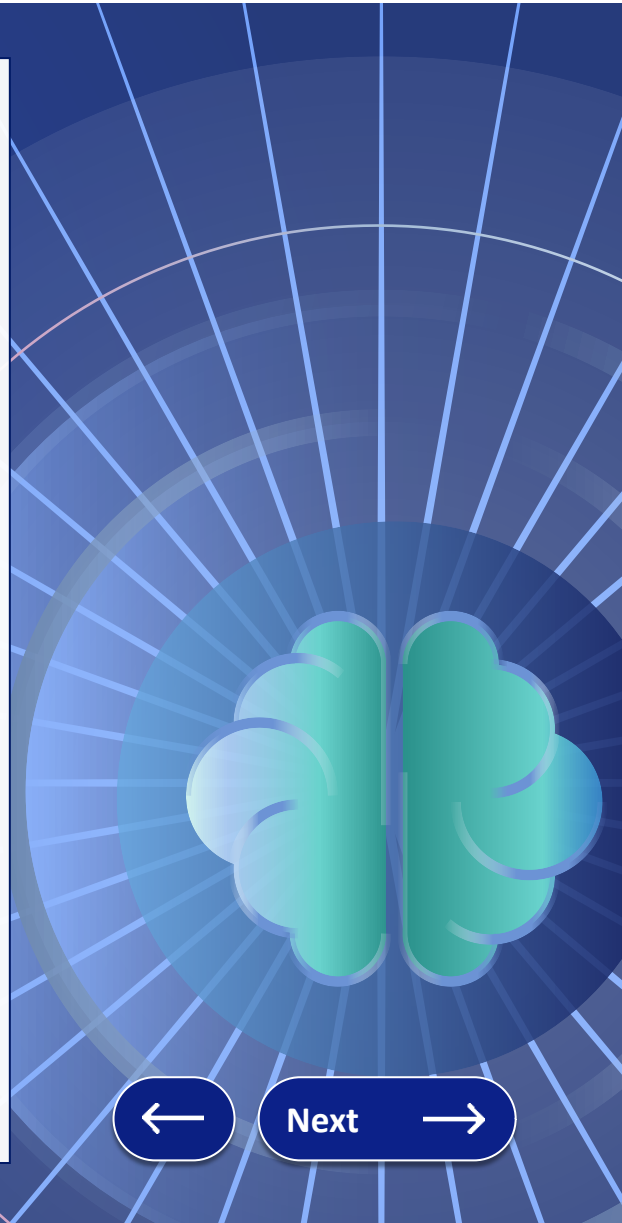
D. Amylin inhibits secretion of glucagon

See Answer

Test your knowledge

4. Which of the following statements are true?

✓	**A.**	**Amylin slows gastric emptying**
X	B.	Amylin stimulates secretion of insulin
✓	**C.**	**Amylin is co-secreted with insulin**
✓	**D.**	**Amylin inhibits secretion of glucagon**

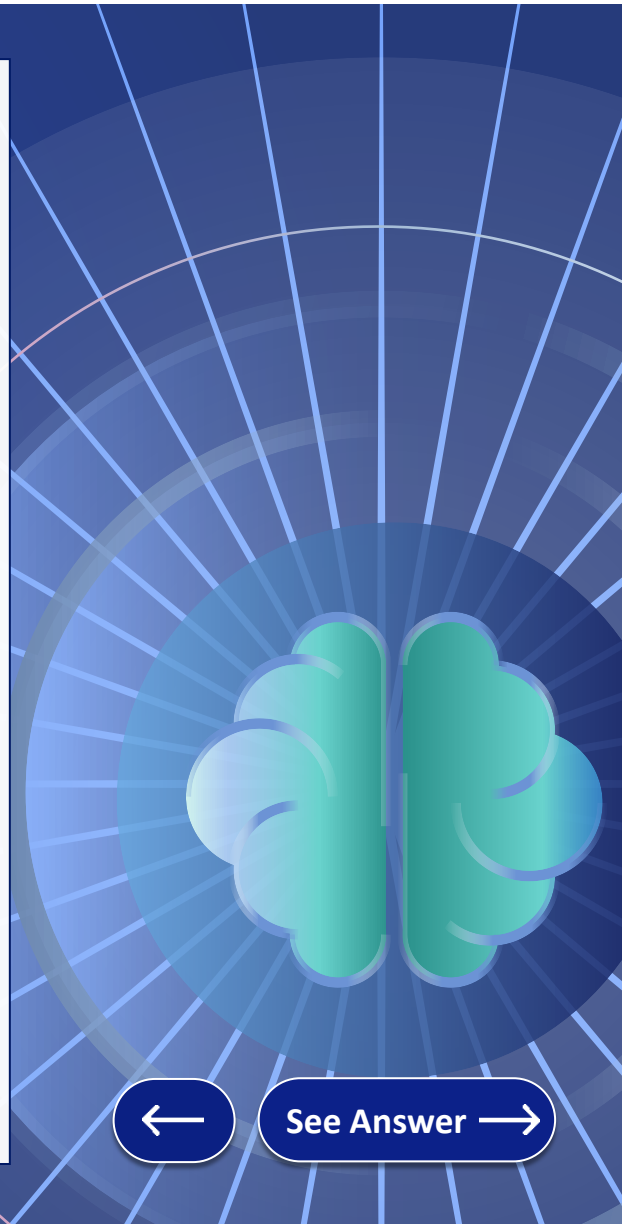


Next

Test your knowledge

5. How does amylin affect glucose metabolism?

A.	Amylin inhibits secretion of glucagon, therefore suppressing glycogen to glucose conversion
B.	Amylin inhibits secretion of glucagon, therefore increasing levels of postprandial glucose in circulation
C.	Amylin increases secretion of glucagon, therefore decreasing levels of postprandial glucose in circulation



See Answer

Test your knowledge

5. How does amylin affect glucose metabolism?

✓	**A.**	**Amylin inhibits secretion of glucagon, therefore suppressing glycogen to glucose conversion**
X	B.	Amylin inhibits secretion of glucagon, therefore increasing levels of postprandial glucose in circulation
X	C.	Amylin increases secretion of glucagon, therefore decreasing levels of postprandial glucose in circulation

Module complete

Back to Start

Last updated: April 2025