

GLP-1 Receptor (Glucagon-Like Peptide-1 Receptor)

The **GLP-1 receptor** is a G protein-coupled receptor (GPCR) primarily expressed on pancreatic beta cells, but also found in the brain, heart, gastrointestinal tract, and kidneys.

Physiological Role

GLP-1 receptors are activated by **glucagon-like peptide-1 (GLP-1)**, an incretin hormone secreted by the intestinal L-cells in response to food intake.

Key Actions

- Stimulates insulin secretion (glucose-dependent)
- Inhibits glucagon release
- Delays gastric emptying
- Reduces appetite via central nervous system pathways
- Enhances beta-cell survival and function

Therapeutic Relevance

GLP-1 Receptor Agonists (GLP-1 RAs)

Synthetic agents that mimic the action of endogenous GLP-1 by binding and activating the GLP-1 receptor. Common drugs include:

- **Semaglutide** (Ozempic®, Wegovy®)
- **Liraglutide** (Victoza®, Saxenda®)
- **Dulaglutide** (Trulicity®)
- **Exenatide** (Byetta®, Bydureon®)

Clinical Uses

- Type 2 Diabetes Mellitus
- Obesity and weight management
- Cardiovascular risk reduction (certain agents)
- Investigational uses: Alzheimer's disease, Idiopathic Intracranial Hypertension (IIH), Parkinson's disease

Central Nervous System Effects

GLP-1 receptors in the brain (especially hypothalamus and brainstem) influence:

- Satiety and food intake regulation
- Reward and addiction circuits
- Neuroinflammation and neurodegenerative processes

References

- Nauck MA, Meier JJ. "Incretin hormones: Their role in health and disease." Diabetes Obes Metab. 2018.
- Drucker DJ. "Mechanisms of Action and Therapeutic Application of GLP-1." Cell Metab. 2018.

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