Trends in Endocrinology & Metabolism | Hormone of the Month

Secretin

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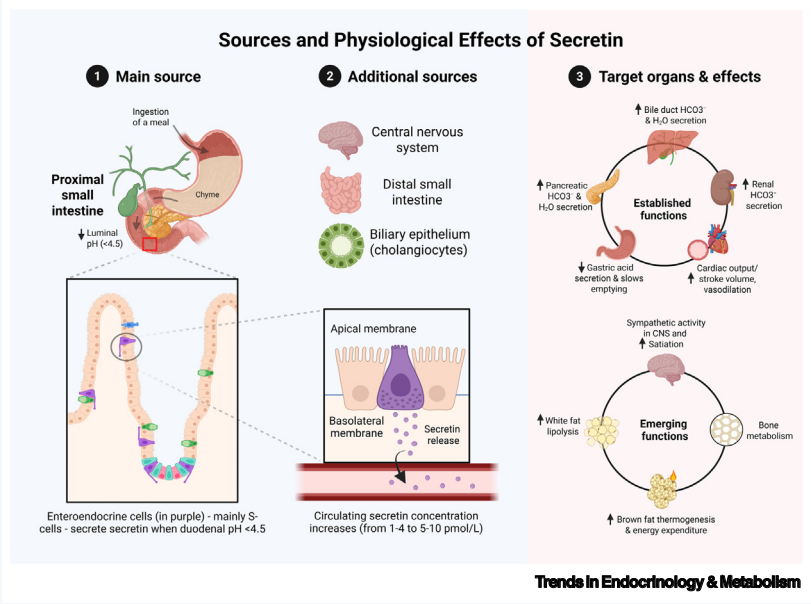
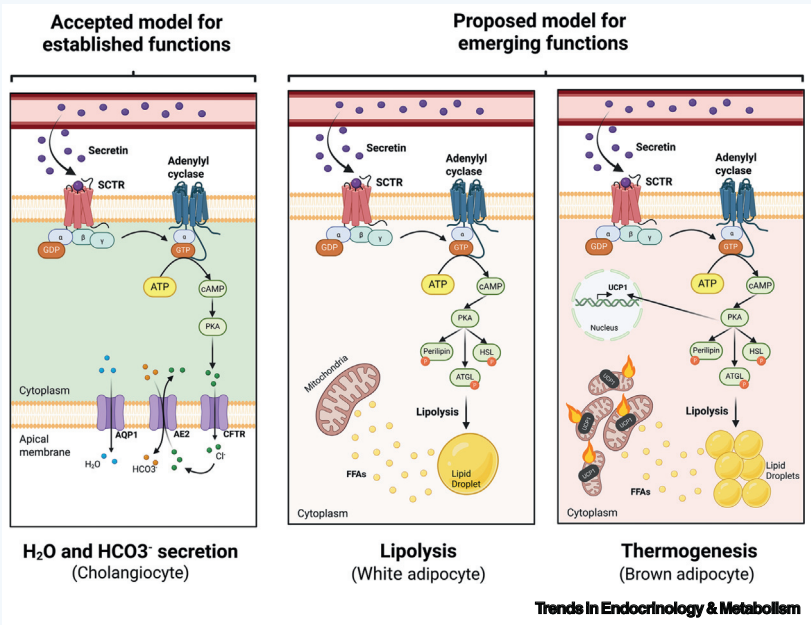


Secretin, one of the first described hormones, is a 27-amino-acid peptide predominantly secreted by S cells in the proximal small intestine—mainly the duodenum—as well as by other enteroendocrine and extraintestinal cells. Its secretion is primarily stimulated by luminal acid, such that the decrease in duodenal pH following gastric emptying after a meal can increase plasma secretin concentrations by two to fivefold. Unlike other gut hormones, it is unclear whether obesity or metabolic status alters circulating secretin levels.



Secretin acts via the secretin receptor, exerting its pleiotropic biological effects on the bile ducts, pancreas, kidneys, stomach, and small intestine, and regulating bicarbonate secretion, water balance, gastric emptying, and intestinal motility. Its main physiological role is the neutralization of gastric acid in the duodenum. However, emerging evidence also suggests important roles in appetite regulation, energy metabolism, and bone homeostasis. The physiological significance of these latter effects in humans, however, remains incompletely understood.

SIGNALLING FACTS:

Secretin belongs to the glucagon, glucose-dependent insulinotropic polypeptide, and vasoactive intestinal polypeptide superfamily.

Secretin is synthesized from its inactive precursor, prosecretin, which is activated by proteolytic cleavage.

Secretin exerts its biological effects via the secretin receptor (SCTR), a transmembrane G-protein-coupled receptor, which activates adenylate cyclase, leading to increased intracellular cAMP levels in target cells.

SCTRs are widely distributed, being expressed in the bile ducts, pancreas, kidneys, stomach, gut, central nervous system (CNS), and other peripheral tissues, such as adipose tissue.

Secretin degradation occurs predominantly via renal and tissue uptake, but the precise enzymatic pathways and molecular mechanisms mediating it are not completely understood.

PHYSIOLOGICAL ROLE:

The main stimulant of secretin release after a meal is hydrochloric acid (HCl), but it is also induced by nonacid substances such as bile salts and digestive products of fat.

Most studies report human circulating secretin concentrations of 1–4 pmol/L in the fasted state, often increasing up to 5–10 pmol/L after a meal.

Established physiological actions of secretin include the stimulation of exocrine secretion of water and bicarbonate by the bile ducts, pancreas, and/or kidneys, as well as the inhibition of gastric acid secretion and emptying.

Emerging data have demonstrated secretin as a pleiotropic regulator of energy homeostatic functions through the control of appetite (inducing satiation) and sympathetic activity in the CNS, including increased thermogenesis (by activating brown adipose tissue) and lipolysis in adipose tissue.

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Declaration of interests

The authors declare no competing interests.

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