



Incretin-Based Drugs

Updated: January 3, 2018.

OVERVIEW

The incretins are gastrointestinal polypeptide hormones that act to modulate insulin secretion from pancreatic beta cells. These hormones include glucagon-like peptide-1 (GLP-1) and gastric inhibitory peptide (GIP), and they are secreted from the upper gastrointestinal tract in response to feeding. They act on the pancreas, causing insulin release even before blood glucose levels are elevated. Both hormones are polypeptides that are rapidly cleared from the serum by the enzyme dipeptidyl peptidase-4 (DPP-4). The incretin pathway provides several potential targets for therapy of type 2 diabetes, the main ones being DPP-4 inhibitors and GLP-1 analogues. These incretin-based hypoglycemic agents are relatively new and they have not been implicated as common causes of drug induced liver injury. These two groups of incretin-based drugs are quite different in chemical structure, pharmacology and safety profile and are discussed separately.

Drug Class: [Antidiabetic Agents](#)

Drugs in the Subclass, Incretin-Based Drugs:

- Dipeptidyl Peptidase-4 (DPP-4) Inhibitors
 - Alogliptin
 - Linagliptin
 - Saxagliptin
 - Sitagliptin
- Glucagon-Like Peptide-1 (GLP-1) Analogues
 - Albiglutide
 - Dulaglutide
 - Exenatide
 - Liraglutide
 - Lixisenatide
 - Semaglutide

CHEMICAL FORMULAS AND STRUCTURES

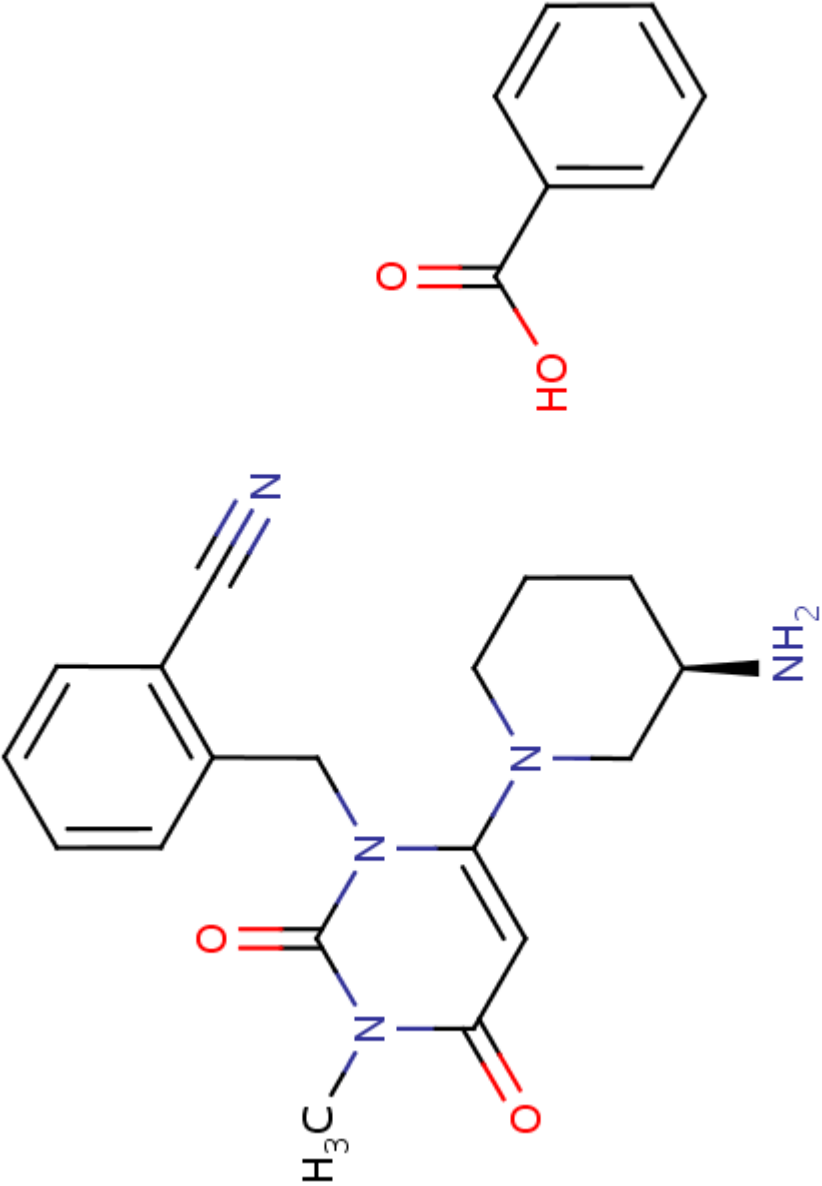
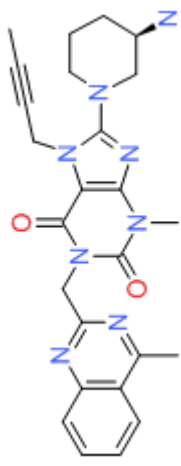
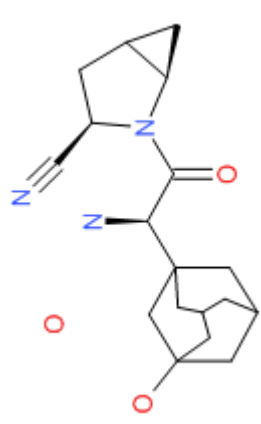
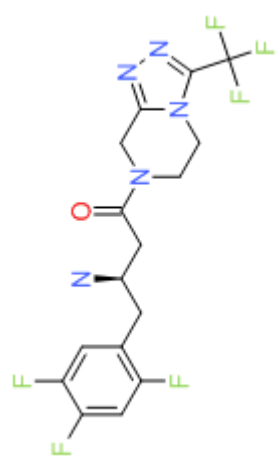
DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Alogliptin	850649-62-6	C ₁₈ -H ₂₁ -N ₅ -O ₂ .C ₇ -H ₆ -O ₂	 <p>The image displays the chemical structure of Alogliptin. It features a central pyridinone ring system. One nitrogen atom of the pyridinone is substituted with a methyl group (H₃C). The 2-position of the pyridinone ring is connected via a methylene group to a benzene ring, which has a nitrile group (-C≡N) at the 3-position. The 4-position of the pyridinone ring is connected via a methylene group to a piperidine ring. The piperidine ring has an amino group (-NH₂) at the 2-position. Additionally, a separate benzoic acid molecule is shown, consisting of a benzene ring attached to a carboxylic acid group (-COOH).</p>

Table continued from previous page.

Linagliptin	668270-12-0	C25-H28-N8-O2	 <p>The structure of Linagliptin features a central pyrimidinone ring system. It is substituted with a methyl group at the 2-position, a 4-pyridylmethyl group at the 4-position, and a 4-piperidinylmethyl group at the 6-position. A propargyl group is attached to the 5-position of the pyrimidinone ring.</p>
Saxagliptin	945667-22-1	C18-H25-N3-O2.H2O	 <p>The structure of Saxagliptin is a bicyclic molecule consisting of a bicyclo[2.2.1]heptane core fused to a five-membered ring containing a nitrogen atom and a carbonyl group. It has a nitrile group and a hydroxyl group attached to the bicyclic system.</p>
Sitagliptin	486460-32-6	C16-H15-F6-N5-O	 <p>The structure of Sitagliptin features a central piperazine ring. It is substituted with a 2,4,6-trifluorophenylmethyl group at the 2-position, a 2-(trifluoromethyl)imidazol-5-ylmethyl group at the 4-position, and a propyl chain at the 1-position. The propyl chain is further substituted with a hydroxyl group and a carbonyl group.</p>