

GLP-1 receptor agonists

Injectable (and, for one member, oral) incretin mimetics that lower glucose only when it is already high, slow gastric emptying and suppress appetite centrally - the same mechanism that made this class the engine of the modern medical weight-loss market, and that carries a shared boxed warning for thyroid C-cell tumors seen in rodents.

Online guide: <https://www.medguideglobal.com/pharmacology/endocrine-and-metabolic/glp1-receptor-agonists>

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Quick revision

One Liner: GLP-1 receptor agonists mimic a gut hormone that lowers glucose only while glucose is high, slows stomach emptying and reduces appetite centrally - the last two effects are why this class now anchors both diabetes care and medical weight loss, and why every member carries the same rodent-derived thyroid C-cell tumor warning.

1. GLP-1 receptor agonists activate the GLP-1 receptor to stimulate glucose-dependent insulin secretion, suppress inappropriately high glucagon, slow gastric emptying and increase satiety. [8][5]
2. Because insulin release is glucose-dependent, hypoglycemia is uncommon with this class used alone, but risk rises meaningfully when it is combined with insulin or a sulfonylurea. [7]
3. Semaglutide, liraglutide, dulaglutide, exenatide and tirzepatide are all subcutaneous injections; semaglutide is also available as an oral tablet (Rybelsus), the only oral member of the class. [1][2]
4. Tirzepatide (Mounjaro) is a dual GIP/GLP-1 receptor agonist rather than a GLP-1-only agent, though it is grouped with this class for teaching purposes because of its shared incretin mechanism and indications. [7]
5. All members carry a boxed warning for thyroid C-cell tumors seen in rodents and are contraindicated in a personal or family history of medullary thyroid carcinoma or MEN 2. [1][5][7][8]
6. The same drugs used for type 2 diabetes are marketed under separate brand names at higher doses for chronic weight management - semaglutide as Wegovy, liraglutide as Saxenda, tirzepatide as Zepbound - reflecting a genuinely dual clinical role. [4][7]
7. Gastrointestinal adverse effects, chiefly nausea and vomiting, are the dose-limiting toxicity across the class and the main reason for dose titration schedules and discontinuation. [5][8]
8. Acute pancreatitis and gallbladder disease (cholelithiasis, cholecystitis) are recognised class-wide risks, and semaglutide and dulaglutide have FDA-approved cardiovascular risk-reduction indications in adults with established cardiovascular disease. [1][5]

Overview

1. GLP-1 receptor agonists are synthetic analogs of glucagon-like peptide-1, an incretin hormone the gut releases after eating. The defining pharmacological idea is glucose-dependence: these drugs stimulate insulin secretion from pancreatic islets and suppress glucagon release only when glucose is already elevated, which is the mechanistic reason hypoglycemia is uncommon when the class is used without insulin or a sulfonylurea. A second, clinically dominant effect is slowed gastric emptying and centrally mediated appetite suppression, and it is this second effect that has turned a diabetes drug class into the basis of the current medical weight-loss market. [8][5]
2. The class now spans five generic drugs marketed under multiple brand names for different indications. Semaglutide is sold as Ozempic (injectable, diabetes), Wegovy (injectable, weight management) and Rybelsus (oral tablet, diabetes) - the only oral member of the class. Liraglutide is sold as Victoza (diabetes) and Saxenda (weight management, at a higher daily dose). Dulaglutide (Trulicity) and exenatide (Byetta, and an extended-release form) are diabetes-only in the products reviewed here. Tirzepatide is sold as Mounjaro for type 2 diabetes and as Zepbound for weight management, and it is mechanistically distinct from the other four: it activates both the GIP and GLP-1

receptors rather than GLP-1 alone, though it is taught alongside this class because of its shared incretin logic and overlapping indications. [1][2][3][4][5][6][7]

3. Every member of the class carries the same boxed warning: in rodent studies, GLP-1 receptor agonists caused dose-dependent and treatment-duration-dependent thyroid C-cell tumors, and it is unknown whether this occurs in humans. The FDA's response was not to wait for human confirmation but to contraindicate the entire class in patients with a personal or family history of medullary thyroid carcinoma or Multiple Endocrine Neoplasia syndrome type 2, and the label does not recommend routine calcitonin monitoring as a way of screening for the human-relevance question the rodent data leaves open. [1][5][7][8]

4. Gastrointestinal adverse effects, particularly nausea and vomiting, are the practical limit on how quickly any of these drugs can be titrated, and dose-escalation schedules exist largely to manage them rather than for glycemic reasons. Acute pancreatitis, including fatal and non-fatal haemorrhagic or necrotising pancreatitis, has been reported across the class, and gallbladder disease is a separate, distinct risk tied to the rapid weight loss the class can produce. [1][5][8]

Classification and drug examples

Intro: The class is best organised by molecule, since dosing schedule, route, and which brand carries the diabetes versus the weight-management indication differ drug by drug even though the core mechanism is shared.

1. Name: Semaglutide

1. Note: The only member available as both an injectable and an oral tablet, and - per the ADA Standards of Care - one of the agents in this class producing the largest HbA1c reductions among the major glucose-lowering drug classes.

Name: Semaglutide

1. Ozempic
2. Wegovy
3. Rybelsus

Route: Subcutaneous injection (Ozempic, Wegovy) or oral tablet (Rybelsus)

Note: Ozempic is FDA-approved for type 2 diabetes and to reduce major adverse cardiovascular events in adults with established cardiovascular disease; Wegovy is the higher-dose formulation approved for chronic weight management; Rybelsus is the oral tablet for type 2 diabetes. [1][2] [1][2][8][9]

2. Name: Liraglutide

2. Note: Once-daily injection, sold under different brand names and doses for diabetes versus weight management.

Name: Liraglutide

1. Victoza
2. Saxenda

Route: Subcutaneous injection, once daily

Note: Victoza is approved for type 2 diabetes and cardiovascular risk reduction; Saxenda is the higher-dose formulation approved for chronic weight management in adults and in adolescents 12 years and older with obesity. [3][4] [3][4]

3. Name: Dulaglutide

3. Note: Once-weekly injection with an FDA-approved cardiovascular risk-reduction indication.

Name: Dulaglutide

Trulicity

Route: Subcutaneous injection, once weekly

Note: Approved for type 2 diabetes in adults and pediatric patients 10 years and older, and to reduce cardiovascular event risk in adults with established cardiovascular disease or multiple cardiovascular risk factors. [5] [5]

4. Name: Exenatide

4. Note: The original GLP-1 receptor agonist, first approved in a twice-daily formulation and later reformulated for once-weekly dosing.

Name: Exenatide

Byetta

Route: Subcutaneous injection, twice daily before meals

Note: Indicated as an adjunct to diet and exercise for glycemic control in adults with type 2 diabetes; not approved for a weight-management indication in the label reviewed here. [6] [6]

5. Name: Tirzepatide (dual GIP/GLP-1 receptor agonist)

5. Note: Mechanistically distinct from the other four - it activates the GIP receptor as well as the GLP-1 receptor - but taught alongside this class because it shares the incretin-based glucose-dependent mechanism and the diabetes/weight-management brand split.

Name: Tirzepatide

1. Mounjaro

2. Zepbound

Route: Subcutaneous injection, once weekly

Note: Mounjaro is approved for type 2 diabetes in adults and pediatric patients 10 years and older and to reduce cardiovascular event risk in high-risk diabetic adults; the weight-management indication is marketed as Zepbound rather than under the Mounjaro name. [7] [7]

Mechanism of action

Summary: GLP-1 is an incretin hormone released from intestinal L-cells after a meal. It binds the GLP-1 receptor on pancreatic beta cells to potentiate glucose-stimulated insulin secretion, on alpha cells to suppress glucagon release when glucose is high, and on receptors outside the pancreas - the stomach and the brain's appetite centres - to slow gastric emptying and increase satiety. GLP-1 receptor agonists are synthetic analogs engineered to resist the rapid degradation native GLP-1 undergoes, extending the same signal from minutes to hours or a full week depending on the molecule. Tirzepatide adds activation of the GIP receptor to this same glucose-dependent logic, which is thought to contribute to its larger glycemic and weight effects relative to GLP-1-only agents.

Target: The GLP-1 receptor on pancreatic islet cells, gastric tissue and central appetite-regulating neurons; tirzepatide additionally targets the GIP receptor

Cidal Static: Not applicable - a hormone-receptor agonist effect, not a cytotoxic or cytostatic one

Kill Kinetics: Glucose-lowering and satiety effects build over the dose-titration period (typically weeks) and are lost once the drug is stopped

1. Step: 1

1. Title: Meal-related glucose rise stimulates endogenous incretin release

1. Detail: In a person without diabetes, glucose absorbed after a meal triggers intestinal L-cells to release native GLP-1, which the drug class is designed to mimic pharmacologically. [8]

2. Step: 2

2. Title: The drug binds the GLP-1 receptor on pancreatic beta cells

2. Detail: Receptor binding potentiates glucose-stimulated insulin secretion - the effect is glucose-dependent, so the drug amplifies insulin release when glucose is elevated but not when it is normal or low. [8][5]

3. Step: 3

3. Title: GLP-1 receptor activation on alpha cells suppresses glucagon

3. Detail: Inappropriately elevated glucagon, a hallmark of type 2 diabetes, is reduced in a similarly glucose-dependent manner, lowering hepatic glucose output. [8]

4. Step: 4

4. Title: GLP-1 receptor activation slows gastric emptying

4. Detail: Delayed gastric emptying blunts the postprandial glucose spike and is the mechanism behind the class's prominent early nausea. [8]

5. Step: 5

5. Title: Central GLP-1 receptor activation increases satiety and reduces appetite

5. Detail: Action on appetite-regulating centres reduces caloric intake, which is the mechanistic basis for the class's

weight-loss indication and the reason higher doses are marketed specifically for weight management. [4][8]

6. Step: 6

6. Title: Tirzepatide adds GIP receptor co-activation to the same glucose-dependent framework

6. Detail: Dual incretin receptor activation is associated with larger HbA1c and weight reductions than GLP-1 receptor activation alone in the comparative data available for this class. [7]

Major clinical uses

1. Drug: Semaglutide

1. Organism: Not applicable

1. Indication: Type 2 diabetes (Ozempic, Rybelsus); cardiovascular risk reduction and chronic kidney disease risk reduction in adults with type 2 diabetes and established cardiovascular disease (Ozempic); chronic weight management (Wegovy)

1. Line: adjunct to diet and exercise; second-line or add-on in most diabetes protocols

1. Note: The only class member available as an oral tablet (Rybelsus), alongside its injectable forms. [1][2]

2. Drug: Liraglutide

2. Organism: Not applicable

2. Indication: Type 2 diabetes and cardiovascular risk reduction (Victoza); chronic weight management in adults and adolescents 12 years and older with obesity (Saxenda)

2. Line: adjunct to diet and exercise

2. Note: The same molecule at different maximum doses under two brand names for two distinct indications. [3][4]

3. Drug: Dulaglutide

3. Organism: Not applicable

3. Indication: Type 2 diabetes in adults and pediatric patients 10 years and older; cardiovascular event risk reduction in adults with established cardiovascular disease or multiple cardiovascular risk factors

3. Line: adjunct to diet and exercise

3. Note: Once-weekly dosing. [5]

4. Drug: Exenatide

4. Organism: Not applicable

4. Indication: Type 2 diabetes

4. Line: adjunct to diet and exercise

4. Note: Twice-daily dosing before meals; the original member of the class, now less commonly prescribed than the once-weekly and oral options. [6]

5. Drug: Tirzepatide

5. Organism: Not applicable

5. Indication: Type 2 diabetes and cardiovascular event risk reduction in high-risk adults (Mounjaro); chronic weight management (Zepbound)

5. Line: adjunct to diet and exercise

5. Note: Dual GIP/GLP-1 receptor agonist; the weight-management brand name (Zepbound) differs from the diabetes brand name (Mounjaro), unlike semaglutide and liraglutide's naming pattern. [7]

Pharmacokinetics

1. Drug: Semaglutide

1. Route: Subcutaneous injection, once weekly; oral tablet, once daily

1. Absorption: Slow subcutaneous absorption gives a once-weekly injectable profile; the oral tablet requires a specific fasting/co-formulation protocol for adequate absorption

1. Csf Penetration: See prescribing reference

1. Metabolism: Proteolytic cleavage and beta-oxidation, similar to endogenous peptide metabolism

1. Elimination: Primarily via metabolism; minimal renal/hepatic clearance of intact drug
1. Dose Adjust: No dedicated renal or hepatic dose-adjustment schedule in the semaglutide labelling reviewed [1]
2. Drug: Liraglutide
2. Route: Subcutaneous injection, once daily
2. Absorption: Slow subcutaneous absorption supports once-daily dosing
2. Csf Penetration: See prescribing reference
2. Metabolism: Endogenous proteolytic degradation
2. Elimination: No single organ is the primary route of elimination
2. Dose Adjust: The liraglutide label sets out no dedicated renal or hepatic dose-adjustment step [3]
3. Drug: Dulaglutide
3. Route: Subcutaneous injection, once weekly
3. Absorption: Slow subcutaneous absorption supports once-weekly dosing
3. Csf Penetration: See prescribing reference
3. Metabolism: Proteolytic degradation into constituent amino acids
3. Elimination: General protein catabolism pathways
3. Dose Adjust: Dulaglutide's own labelling likewise sets out no dedicated renal or hepatic adjustment step [5]
4. Drug: Exenatide
4. Route: Subcutaneous injection, twice daily
4. Absorption: Peak concentration reached within about 2 hours of subcutaneous injection
4. Csf Penetration: See prescribing reference
4. Metabolism: Primarily proteolytic degradation
4. Elimination: Renal clearance is significant; the only member of this group with an end-stage renal disease caution in the material reviewed
4. Dose Adjust: Not recommended in severe renal impairment or end-stage renal disease [6][8]
5. Drug: Tirzepatide
5. Route: Subcutaneous injection, once weekly
5. Absorption: Slow subcutaneous absorption supports once-weekly dosing
5. Csf Penetration: See prescribing reference
5. Metabolism: Proteolytic cleavage and beta-oxidation
5. Elimination: No single organ is the primary route of elimination
5. Dose Adjust: No dedicated renal or hepatic dose adjustment required in the labelling reviewed [7]
1. This page gives no dose regimens by design. Titration schedules exist mainly to limit gastrointestinal side effects rather than for a pharmacokinetic reason, and the exact schedule for each product belongs in a current prescribing reference.
2. Exenatide is the outlier in this class for renal handling: unlike the others, meaningful renal clearance means it is not recommended in severe renal impairment or end-stage renal disease, a caution not carried by semaglutide, liraglutide, dulaglutide or tirzepatide in the labelling reviewed. [6][8]
3. Once-weekly dosing (semaglutide injection, dulaglutide, tirzepatide) versus once-daily (liraglutide) versus twice-daily (exenatide) versus oral once-daily (semaglutide tablet) is a real adherence-relevant distinction within an otherwise mechanistically similar class. [1][3][5][6][7][2]

Adverse effects

1. Effect: Nausea, vomiting and diarrhea
1. Detail: The most commonly reported adverse reactions across the class, dose-related, and the reason for gradual dose titration; reported in roughly 32-41% of dulaglutide-treated patients for gastrointestinal complaints combined, versus about 21% on placebo. [5][8]
2. Effect: Decreased appetite and abdominal discomfort

2. Detail: Consistent with the class's central and gastric mechanism; usually attenuates with continued treatment and slower titration. [7]
3. Effect: Injection site reactions
3. Detail: Reported more frequently with exenatide than with the other injectable members in comparative data. [8]
1. Effect: Thyroid C-cell tumors (boxed warning)
1. Detail: Seen in rodent studies across the class at clinically relevant exposures; human relevance is unknown, and the FDA does not recommend routine calcitonin or thyroid ultrasound monitoring as a screening strategy.
1. Action: Contraindicated in a personal or family history of medullary thyroid carcinoma or MEN 2; patients are counselled to report symptoms such as a neck mass, dysphagia, dyspnea or persistent hoarseness. [1][5][7][8]
2. Effect: Acute pancreatitis
2. Detail: Fatal and non-fatal haemorrhagic or necrotising pancreatitis has been observed in patients treated with GLP-1 receptor agonists across the class.
2. Action: Discontinue promptly if pancreatitis is suspected (persistent severe abdominal pain, often radiating to the back, with or without vomiting) and do not restart if confirmed. [1]
3. Effect: Gallbladder disease
3. Detail: Cholelithiasis and cholecystitis are reported class-wide; one liraglutide-specific figure reports gallbladder-related events in about 3.1% of treated patients versus 1.9% on placebo, and cholelithiasis in up to 1.5% of semaglutide-treated patients at the lowest studied dose.
3. Action: New right-upper-quadrant pain, fever or jaundice during treatment warrants prompt evaluation. [1][8]
4. Effect: Hypoglycemia in combination therapy
4. Detail: Uncommon with a GLP-1 receptor agonist alone because of the glucose-dependent mechanism, but risk rises meaningfully when combined with insulin or an insulin secretagogue such as a sulfonylurea.
4. Action: A lower dose of the concomitant insulin or secretagogue is often needed when adding a GLP-1 receptor agonist. [7]
5. Effect: Acute kidney injury
5. Detail: Reported with tirzepatide, generally in the setting of dehydration from gastrointestinal adverse reactions such as vomiting or diarrhea.
5. Action: Fluid status is assessed if significant gastrointestinal symptoms develop during treatment. [7]
6. Effect: Hypersensitivity reactions
6. Detail: Serious hypersensitivity reactions, including anaphylaxis and angioedema, are described in the labelling of multiple members of the class.
6. Action: Discontinue and seek urgent care for signs of a serious allergic reaction. [7]
1. Drug: Semaglutide (Ozempic)
1. Effect: The only member with a labelled indication for reducing the risk of kidney function decline and kidney failure in adults with type 2 diabetes and chronic kidney disease, alongside its cardiovascular risk-reduction indication. [1]
2. Drug: Exenatide (Byetta)
2. Effect: Meaningful renal clearance means it is not recommended in severe renal impairment or end-stage renal disease, a caution not shared by the other members reviewed here. [6][8]
3. Drug: Tirzepatide (Mounjaro)
3. Effect: Dual GIP/GLP-1 mechanism is associated with the largest glycemic and weight effect sizes described in the comparative literature for this class, alongside the same class-wide gastrointestinal and thyroid risks. [7]

Contraindications, precautions and interactions

1. Personal or family history of medullary thyroid carcinoma, or Multiple Endocrine Neoplasia syndrome type 2 - contraindicated for every member of this class. [1][5][7]
2. Known serious hypersensitivity to the specific drug or its excipients. [1][5][7]
1. A personal history of pancreatitis is a caution raised in comparative reviews of this class, given the class-wide

pancreatitis signal, even though it is not a labelled absolute contraindication for every member. [8]

2. Severe gastrointestinal disease, including gastroparesis, is a relevant caution given the class's gastric-emptying-slowing mechanism. [8]

3. Diabetic retinopathy can worsen transiently with rapid glycemic improvement on this class, so patients with a history of retinopathy are monitored during treatment. [8]

4. Pregnancy is a caution flagged in comparative reviews of this class pending adequate human safety data. [8]

1. With: Insulin or insulin secretagogues (e.g. sulfonylureas)

1. Effect: Additive glucose-lowering effect raises hypoglycemia risk; a lower dose of the secretagogue or insulin is often needed. [7]

2. With: Oral medications requiring rapid gastric absorption

2. Effect: Delayed gastric emptying can alter the absorption of concomitant oral drugs, which is part of why the oral semaglutide tablet has its own specific administration instructions. [2]

Comparison tables

Title: One mechanism family, five different molecules and dosing schedules

Caption: All five share the glucose-dependent incretin mechanism and the thyroid C-cell boxed warning, but differ in route, dosing frequency, and which brand name carries the weight-management indication.

1. Key: drug

1. Label: Drug

2. Key: route_frequency

2. Label: Route and frequency

3. Key: weight_brand

3. Label: Weight-management brand

4. Key: distinguishing

4. Label: Distinguishing feature

1. Drug: Semaglutide

1. Route Frequency: Weekly injection or daily oral tablet

1. Weight Brand: Wegovy

1. Distinguishing: Only class member with an oral formulation (Rybelsus) [1][2]

2. Drug: Liraglutide

2. Route Frequency: Daily injection

2. Weight Brand: Saxenda

2. Distinguishing: Weight-management brand approved down to age 12 [4]

3. Drug: Dulaglutide

3. Route Frequency: Weekly injection

3. Weight Brand: None labelled in the material reviewed

3. Distinguishing: Has its own cardiovascular risk-reduction indication [5]

4. Drug: Exenatide

4. Route Frequency: Twice-daily injection

4. Weight Brand: None labelled in the material reviewed

4. Distinguishing: The original GLP-1 receptor agonist; meaningful renal clearance [6]

5. Drug: Tirzepatide

5. Route Frequency: Weekly injection

5. Weight Brand: Zepbound (different brand name from the diabetes product Mounjaro)

5. Distinguishing: Dual GIP/GLP-1 receptor agonist, not GLP-1-only [7]

High-yield exam pearls

1. Pearl: The insulin and glucagon effects of this class are glucose-dependent - that single word is why hypoglycemia is uncommon on monotherapy but rises with add-on insulin or a sulfonylurea.
 1. Why: It is the mechanistic distinction examiners use to separate this class from sulfonylureas, which stimulate insulin regardless of glucose level. [8][5]
2. Pearl: Tirzepatide is not a pure GLP-1 receptor agonist - it also activates the GIP receptor.
 2. Why: A question that lists tirzepatide among 'GLP-1 receptor agonists' without noting the dual mechanism is testing whether the distinction was learned. [7]
3. Pearl: Rybelsus is oral semaglutide; Ozempic and Wegovy are injectable semaglutide at different doses for different indications.
 3. Why: Same molecule, three brand names, three different products - a classic exam trap for confusing brand with drug identity. [1][2][8]
4. Pearl: The thyroid C-cell tumor boxed warning is based entirely on rodent data; human relevance is explicitly stated as unknown, and calcitonin monitoring is not recommended.
 4. Why: Distinguishes a precautionary regulatory contraindication from a confirmed human risk, similar in spirit to how other boxed warnings can extend beyond directly demonstrated human harm. [1][8]
5. Pearl: Exenatide is the class member to avoid in severe renal impairment because of its meaningful renal clearance - the other four do not carry that same caution in the labelling reviewed.
 5. Why: A common single-best-answer distractor pattern: which GLP-1 receptor agonist is renally cleared enough to matter. [6][8]

Common exam traps

1. Trap: Assuming all GLP-1 receptor agonists cause hypoglycemia at the same rate as sulfonylureas.
 1. Correction: The glucose-dependent mechanism keeps hypoglycemia uncommon on monotherapy; risk rises specifically when combined with insulin or an insulin secretagogue, not from the GLP-1 receptor agonist acting alone. [7]
2. Trap: Treating Ozempic, Wegovy and Rybelsus as three different drugs.
 2. Correction: All three are semaglutide; they differ in route (injectable vs oral) and dose/indication (diabetes vs weight management), not in active molecule. [1][2][8]
3. Trap: Classifying tirzepatide as mechanistically identical to semaglutide, liraglutide, dulaglutide and exenatide.
 3. Correction: Tirzepatide is a dual GIP/GLP-1 receptor agonist; the other four act on the GLP-1 receptor alone, and the dual mechanism is associated with larger effect sizes in comparative data. [7]
4. Trap: Assuming the thyroid C-cell tumor risk has been directly demonstrated in humans.
 4. Correction: The label states the finding is from rodent studies and that human relevance is unknown; the contraindication is a precautionary regulatory response, not confirmation of human carcinogenicity. [1][8]

Self-test questions

1. Question: Why is hypoglycemia uncommon when a GLP-1 receptor agonist is used alone?
 1. The drugs block glucose absorption in the gut
 2. Insulin secretion and glucagon suppression are glucose-dependent, so the effect fades as glucose normalizes
 3. The drugs have no effect on insulin at all
 4. They are metabolized before reaching the pancreas
1. Explanation: GLP-1 receptor agonists potentiate insulin secretion and suppress glucagon only when glucose is elevated, which is why hypoglycemia is uncommon on monotherapy but rises when combined with insulin or a sulfonylurea. [8][5]

2. Question: Which GLP-1 receptor agonist is available as an oral tablet?

1. Liraglutide
2. Dulaglutide
3. Semaglutide
4. Exenatide

2. Explanation: Semaglutide is marketed as the oral tablet Rybelsus in addition to the injectable products Ozempic and Wegovy; it is the only class member with an oral formulation. [2]

3. Question: What distinguishes tirzepatide's mechanism from the other drugs in this class?

1. It is a sulfonylurea
2. It activates the GIP receptor in addition to the GLP-1 receptor
3. It has no incretin activity
4. It works only in type 1 diabetes

3. Explanation: Tirzepatide is a dual GIP/GLP-1 receptor agonist, distinguishing it mechanistically from the GLP-1-only agents semaglutide, liraglutide, dulaglutide and exenatide. [7]

4. Question: What is the basis of the thyroid C-cell tumor boxed warning shared by this class?

1. Confirmed cases of medullary thyroid carcinoma in large human trials
2. Dose-dependent thyroid C-cell tumors observed in rodent studies, with unknown human relevance
3. Routine calcitonin monitoring showing elevated levels in most patients
4. A single case report in one patient

4. Explanation: The boxed warning is based on rodent data showing dose- and duration-dependent thyroid C-cell tumors; the label states human relevance is unknown, and routine calcitonin monitoring is not recommended. [1][8]

5. Question: Which class member carries a specific caution against use in severe renal impairment or end-stage renal disease?

1. Semaglutide
2. Liraglutide
3. Exenatide
4. Dulaglutide

5. Explanation: Exenatide has meaningful renal clearance and is not recommended in severe renal impairment or end-stage renal disease, a caution not shared by the other members reviewed here. [6][8]

6. Question: Semaglutide and liraglutide are each marketed under a diabetes brand name and a separate weight-management brand name. Which pairing is correct?

1. Ozempic for weight management, Wegovy for diabetes
2. Victoza for weight management, Saxenda for diabetes
3. Ozempic for diabetes, Wegovy for weight management; Victoza for diabetes, Saxenda for weight management
4. Both drugs use the same brand name for both indications

6. Explanation: Ozempic (semaglutide) and Victoza (liraglutide) are the diabetes-indicated products; Wegovy (semaglutide) and Saxenda (liraglutide) are the higher-dose weight-management products. [1][4][3]

Frequently asked questions

1. Question: Are GLP-1 receptor agonists diabetes drugs or weight-loss drugs?

1. Answer: Both, genuinely. Semaglutide, liraglutide and tirzepatide are each FDA-approved for type 2 diabetes under one brand name and for chronic weight management under a separate brand name and typically a higher dose. Dulaglutide and exenatide, in the labelling reviewed here, are approved for diabetes only. [1][4][3][5][6][7]

2. Question: Why do these drugs cause so much nausea when starting treatment?

2. Answer: The same slowed gastric emptying that helps with satiety and post-meal glucose control also causes nausea, especially early in treatment or after a dose increase. This is why every product in the class uses a gradual dose-titration schedule rather than starting at the target dose. [8][5]

3. Question: Is the thyroid tumor warning a reason to avoid this class entirely?

3. Answer: No - it is a labelled contraindication specifically for people with a personal or family history of medullary thyroid carcinoma or MEN 2, based on rodent findings whose relevance to humans is explicitly stated as unknown. For patients without that specific history, the treating clinician weighs it alongside the drug's other benefits and risks rather than avoiding the class outright. [1][8]

4. Question: Is tirzepatide really a GLP-1 receptor agonist?

4. Answer: Only partly. Tirzepatide activates both the GIP receptor and the GLP-1 receptor, so it is more precisely a dual GIP/GLP-1 receptor agonist. It is grouped with this class here because it shares the glucose-dependent incretin logic and the same diabetes/weight-management brand-name pattern as the GLP-1-only agents. [7]

References

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