



GLP-1 Receptor Agonists: Incretin-Based Medicine for Type 2 Diabetes

WHAT IS TYPE 2 DIABETES?

When you have type 2 diabetes, your blood glucose (sugar) levels are higher than normal. The glucose in your blood comes mainly from the food you eat, and a small amount comes from your liver. It's normal for glucose levels to rise after a meal. But with diabetes, levels can go too high.

Your body uses glucose for energy with the help of insulin, a hormone made by your pancreas. You can develop type 2 diabetes when your body

- Doesn't make enough insulin
- Doesn't use insulin the way it should

Middle-aged and older people are more likely to develop type 2 diabetes. Being overweight and inactive can also increase your risk for type 2 diabetes.

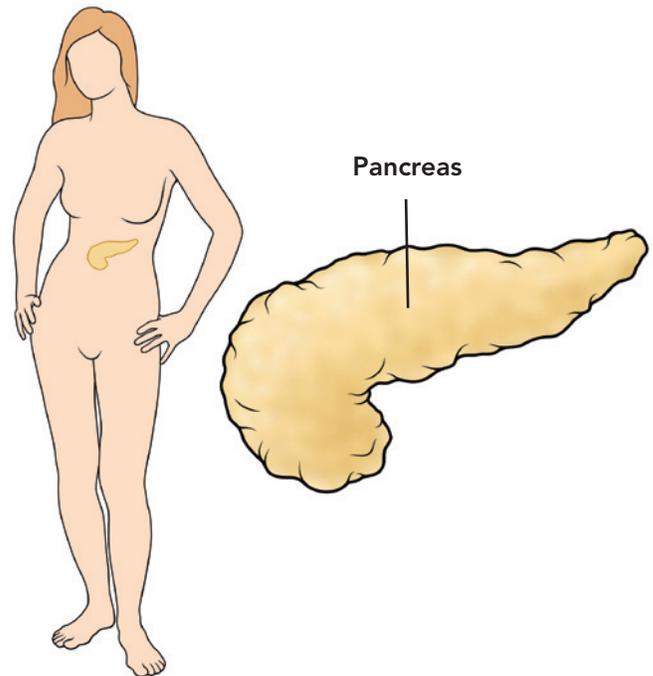
High blood glucose levels over time can lead to serious health problems, such as eye and nerve damage, heart attacks, strokes, and kidney disease. But you can prevent or delay health problems by keeping your blood glucose, blood pressure, and cholesterol levels on target. Meal planning, exercise, and medicines (if needed) can help you stay healthy.

DID YOU KNOW?

Another type of incretin-based medicine, called a DPP-4 inhibitor, works in a slightly different way to achieve the same effect on blood glucose levels.

WHAT IS INCRETIN-BASED MEDICINE?

Incretin-based medicine is a type of medicine for type 2 diabetes. This type of medicine is based on the action of hormones called incretins, which help control how the pancreas works. One type of incretin, called GLP-1, causes your pancreas to produce more insulin after you eat and helps keep blood glucose levels in the normal range.



WHAT ARE GLP-1 RECEPTOR AGONIST MEDICINES?

GLP-1 receptor agonist medicines, also called incretin mimetics, are a type of incretin-based medicine. These medicines (exenatide and liraglutide) copy, or mimic, the action of GLP-1 made by your body. The effects of GLP-1 only last for a few minutes, but GLP-1 receptor agonists last about 10 hours.

GLP-1 receptor agonists come as a liquid, which you inject under the skin on your stomach, thigh, or upper arm. Depending on which medicine you use, you inject it either once or twice daily, or once weekly. GLP-1 receptor agonists are used alone or along with other diabetes medicines.

WHAT ARE THE BENEFITS OF GLP-1 RECEPTOR AGONIST MEDICINES?

They help keep your blood glucose from going too high by

- Increasing the insulin made by your pancreas
- Decreasing glucagon, a hormone that releases glucose from your liver
- Helping you feel full after a meal, which means that you eat less
- Slowing the emptying of the stomach's contents into the intestines, which lowers blood glucose levels after a meal

WHAT ARE THE SIDE EFFECTS AND DISADVANTAGES OF GLP-1 RECEPTOR AGONIST MEDICINES?

GLP-1 receptor agonists don't cause low blood glucose, a condition called hypoglycemia. But you're at risk for low blood glucose if you also take diabetes pills or insulin that may cause hypoglycemia. Low blood glucose can make you feel hungry, dizzy, nervous, shaky, or confused. You can learn what to eat or drink to bring your blood glucose level back up to normal.

Exenatide and liraglutide can cause nausea, vomiting, diarrhea, headache, weakness, or dizziness. Some side effects are warning signs of serious conditions. For example, nausea and vomiting with abdominal pain could be pancreatitis (inflammation of the pancreas). Ask your doctor which signs to watch for and what to do if those signs happen.

HOW WILL I KNOW WHICH DIABETES MEDICINES ARE BEST FOR ME?

Talk with your doctor about your diabetes medicines. Ask if there are other medicines that can help you, or if you should use more than one medicine. Tell your doctor about any side effects you have from your medicines. Be sure to tell your doctor about your other health conditions and whether you are pregnant or planning to become pregnant. Then your doctor can make the best choice of medicine for you.

Questions to ask your doctor

- What else can I do to keep my blood glucose levels under control?
- How often should I have check-ups?
- What side effects can happen with my medicines?
- What should I do if I forget to take my diabetes medicine?
- Should I see a diabetes educator?
- Should I see an endocrinologist for my diabetes care?

RESOURCES

- Find-an-Endocrinologist: www.hormone.org or call 1-800-HORMONE (1-800-467-6663)
- Find a diabetes educator (American Association of Diabetes Educators): www.diabeteseducator.org/DiabetesEducation/Find.html
- Hormone Health Network information about diabetes: www.hormone.org/diabetes
- National Institutes of Health:
 - National Diabetes Information Clearinghouse: www.diabetes.niddk.gov or call 1-800-860-8747
 - National Diabetes Education Program: ndep.nih.gov
 - MedlinePlus (about diabetes): www.nlm.nih.gov/medlineplus/diabetes.html
 - MedlinePlus (about medicines): www.nlm.nih.gov/medlineplus/druginformation.html
- The American Diabetes Association: www.diabetes.org or call 1-800-DIABETES (800-342-2383)

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The Hormone Health Network offers free, online resources based on the most advanced clinical and scientific knowledge from The Endocrine Society (www.endo-society.org). The Network's goal is to move patients from educated to engaged, from informed to active partners in their health care. This fact sheet is also available in Spanish at www.hormone.org/Spanish.

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