

# Reaching Your Blood Glucose Goals: Type 2 Diabetes and Fixed-Ratio Combination Injectables

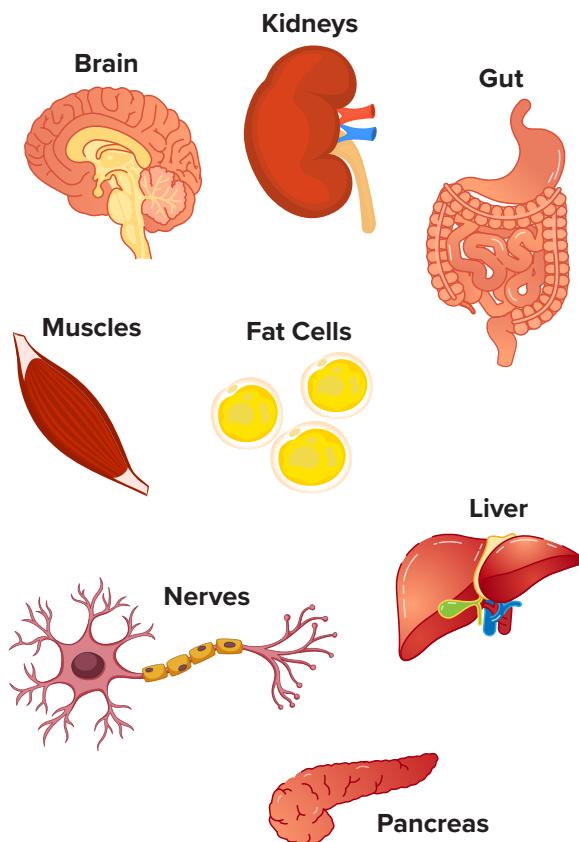


## What is type 2 diabetes?

Diabetes is a long-term condition that causes high levels of sugar (glucose) in the blood. In type 2 diabetes, the body has problems making enough insulin or using insulin effectively. Insulin is a hormone that lowers blood glucose levels.

## Which parts of the body are involved in type 2 diabetes?

At least 8 parts of the body can cause blood glucose to rise in different ways, including:



## Why is it important to reach target blood glucose levels?

Keeping blood glucose at target levels can help people with diabetes live long and healthy lives. Because several parts of the body play a role in type 2 diabetes, many types of health problems can occur if blood glucose levels are above target for a long time. For example, high blood glucose levels can harm the heart, kidneys, nerves, eyes, and feet. These problems may develop slowly over time, and, if unchecked, some can lead to disability and even death. This is why it's important to take action early and keep your blood glucose levels in a safe range.

## What management strategies are available for type 2 diabetes?

People with type 2 diabetes can manage their blood glucose levels with healthy lifestyle changes and medicines. Lifestyle changes include self-management education and support, medical nutrition therapy, regular exercise, counseling programs to help people who use tobacco products stop smoking, and psychosocial support.



Tables 1 and 2 list available treatment options (noninsulin and insulin) to lower blood glucose levels. Each treatment has benefits and risks. It is important to work with your healthcare team to choose a treatment plan that best fits your goals and lifestyle.

**TABLE 1. Noninsulin Treatment Options for Type 2 Diabetes**

Type of Medicine	Generic Name	Brand Name
Alpha-glucosidase inhibitors	Acarbose	Precose
	Miglitol	Glyset
Amylin mimetics	Pramlintide	Symlin
Biguanides	Metformin	Fortamet, Glucophage, Glucophage XR, Glumetza, and Riomet
Bile acid sequestrants	Colesevelam	Welchol
Dopamine-2 agonists	Bromocriptine	Cycloset and Parlodel
DPP-4 inhibitors	Alogliptin	Nesina
	Linagliptin	Tradjenta
	Saxagliptin	Onglyza
	Sitagliptin	Januvia
DPP-4 inhibitors + SGLT2 inhibitors	Empagliflozin and linagliptin	Glyxambi
	Ertugliflozin and sitagliptin	Steglujan
GLP-1 receptor agonists	Dulaglutide	Trulicity
	Exenatide	Bydureon and Byetta
	Liraglutide	Victoza
	Lixisenatide	Adlyxin
	Semaglutide	Ozempic and Rybelsus
Meglitinides (glinides)	Nateglinide	Starlix
	Repaglinide	Prandin
SGLT2 inhibitors	Canagliflozin	Invokana
	Dapagliflozin	Farxiga
	Empagliflozin	Jardiance
	Ertugliflozin	Steglatro
Sulfonylureas (second generation)	Glimepiride	Amaryl
	Glipizide	Glucotrol and Glucotrol XL
	Glyburide	DiaBeta, Glynase PresTab, and Micronase
Sulfonylureas + biguanides	Glipizide + metformin	Metaglip
Thiazolidinediones	Pioglitazone	Actos
	Rosiglitazone	Avandia
Thiazolidinediones + biguanides	Rosiglitazone + metformin	Avandamet
Thiazolidinediones + sulfonylureas	Rosiglitazone + glimepiride	Avandaryl
Triple-combination therapies	Trijardy XR	Empagliflozin, linagliptin, and metformin

DPP-4 = dipeptidyl peptidase-4; GLP-1 = glucagon-like peptide-1; SGLT2 = sodium-glucose co-transporter 2.

**TABLE 2. Insulin Treatment Options for Type 2 Diabetes**

Type of Insulin	Generic Name	Brand Name
Rapid acting	Aspart	Fiasp and NovoLog
	Glulisine	Apidra
	Inhaled insulin	Afrezza
	Lispro	Humalog
	Lispro follow-on product	Admelog
Short acting	Human regular	Humulin R, Humulin R U-500, and Novolin R
Intermediate acting	Human NPH	Humulin N and Novolin N
Concentrated human regular insulin	U-500 human regular insulin	Humulin
Long acting	Degludec	Tresiba
	Detemir	Levemir
	Glargine	Lantus, Semglee, and Toujeo
	Glargine follow-on product	Basaglar
Premixed insulin products	Aspart 70/30	Novolog Mix 70/30
	Lispro 50/50	Humalog Mix 50/50
	Lispro 75/25	Humalog Mix 75/25
	NPH/regular 70/30	Novolin 70/30 InnoLet
Premixed insulin/GLP-1 receptor agonist products	Degludec/liraglutide	Xultophy 100/3.6
	Glargine/lixisenatide	Soliqua 100/33

NPH = neutral protamine hagedorn.

## What are fixed-ratio combination injectables?

Fixed-ratio combination injectables include 2 different treatments for diabetes: insulin and medicines called glucagon-like peptide-1 (GLP-1) receptor agonists. The 2 types of medicines work together to lower glucose levels in your blood:

- **Insulin** allows glucose to leave your blood and enter your cells (especially between meals and overnight)

- **GLP-1 receptor agonists** help lower blood glucose levels after a meal; they also slow the movement of food from your stomach (gastric emptying) and can help prevent weight gain

### Why combine insulin and GLP-1 receptor agonists?

The fixed-ratio combination offers more benefits than either medicine alone. The combination may help you reach your blood glucose goals because it:

- Makes treatment easier—only 1 daily injection with a pen device is needed
- Targets many different parts of your body
- Needs less frequent blood glucose monitoring than some other medicines
- Lowers the risk of weight gain and low blood glucose levels (hypoglycemia)
- Lessens unwanted side effects of each treatment—the risks of weight gain (with insulin) and gastrointestinal symptoms (with GLP-1 receptor agonists), mainly nausea, are lowered

### Why should I consider a fixed-ratio combination injectable?

You may want to start a fixed-ratio combination injectable if your blood glucose levels are not well managed with your current medicines. Also, if you are already taking both medicines separately, you may find it easier to do just 1 injection.

### What fixed-ratio combination injectables are available?

Two fixed-ratio combination injectables are currently available:

- Insulin degludec and liraglutide injection (Xultophy 100/3.6)
- Insulin glargine and lixisenatide injection (Soliqua 100/33)

The medicines in each combination injectable work together to act on your fasting blood glucose (FPG) and after-meal (postprandial) blood glucose (PPG).

### Why are FPG and PPG important?

FPG and PPG help you monitor your blood glucose levels:

- **FPG** measures your blood glucose levels when you have not eaten for 8 hours; it is usually measured in the morning or when you wake up
- **PPG** measures your blood glucose levels 1 or 2 hours after eating and tells you how well your mealtime insulin is working

### How safe are the fixed-ratio combination injectables?

Common side effects are listed in Table 3. Rare, more serious side effects can occur. For more information, please refer to the full prescribing information for both fixed-ratio combination injectables, including the boxed

**TABLE 3. Fixed-Ratio Combination Injectables**

<b>Generic name</b>	Insulin degludec and liraglutide injection	Insulin glargine and lixisenatide injection
<b>Brand name</b>	Xultophy 100/3.6	Soliqua 100/33
<b>Pronunciation</b>	“ZUL-to-fye”	“Sol-eek-WAA”
<b>Insulin</b>	Insulin degludec (100 U/mL)	Insulin glargine (100 U/mL)
<b>GLP-1 receptor agonist</b>	Liraglutide (3.6 mg/mL) (long acting)	Lixisenatide (33 µg/mL) (short acting)
<b>Form</b>	Prefilled, disposable pen	
<b>Injection site</b>	Under the skin (subcutaneous) in thigh, upper arm, or abdomen	
<b>How is it taken?</b>	Once daily at the same time each day, with or without food	Once daily within the hour before the first meal of the day
<b>Most common side effects</b>	Stuffy or runny nose, sore throat, headache, nausea, diarrhea, higher levels of lipase (an enzyme that helps digest dietary fats) in the blood, and upper respiratory tract infection	Stuffy or runny nose, sore throat, headache, nausea, diarrhea, hypoglycemia, and upper respiratory tract infection

warning for the insulin degludec/liraglutide combination. Your healthcare provider or diabetes care and education specialist will discuss possible side effects with you.

Some people with other medical conditions in addition to type 2 diabetes may not be able to take treatments with GLP-1 receptor agonists. Make sure to tell your healthcare provider or diabetes care and education specialist about all other medical conditions and any medicines that you take.

## How do I decide which treatment is best for me?

Together, you and your healthcare team can choose the best treatment for your type 2 diabetes. The choice depends on several factors, such as your specific needs, recent/current blood glucose levels, and your overall health. If you decide to start a fixed-ratio combination injectable, your healthcare provider or diabetes care and education specialist will show you how to take the injections and answer any questions you may have.



