




TYPE 2 MEDICATIONS




Drug Class	How It Works	Brand and Generic Names	Manufacturers	Usual Starting Dose	Max Daily Dose	Side Effects and Special Considerations
LONG-ACTING SECRETAGOGUES	<p>Sulfonylureas: The first three types of oral diabetes medications listed here—the sulfonylureas, the meglitinides and the phenylalanine derivatives—act by causing the pancreas to secrete more insulin. Because of this action of increasing insulin production, which in turn has the potential to cause hypoglycemia (low blood glucose), these three types of drugs are also called hypoglycemic agents or insulin secretagogues.</p> 	AMARYL (glimepiride)	Aventis	1 mg to 2 mg once a day, taken with the first meal.	8 mg	All sulfonylureas can cause hypoglycemia and weight gain. May cause sun sensitivity. Sulfonylureas are not approved for use during pregnancy or lactation.
		DIABINESE (chlorpropamide)	Pfizer	100 mg to 250 mg	750 mg	Diabinese is very long-acting (72 hours). Caution advised for use by the elderly and those with kidney disease. Diabinese may cause a flushing (reddened face) reaction with alcohol use. May cause low blood sodium problems.
		DIABETA (glyburide)	Aventis	2.5 mg or 5 mg a day, taken at the first meal of the day. For those more sensitive to hypoglycemic agents, the recommended dose is 1.25 mg.	20 mg. Doses of 15 mg or more should be divided and given twice a day before meals.	N/A
		MICRONASE (glyburide)	Pharmacia & Upjohn	2.5 mg or 5 mg a day, taken at the first meal of the day. For those more sensitive to hypoglycemic agents, the recommended dose is 1.25 mg.	20 mg. Doses of 15 mg or more should be divided and given twice a day before meals.	N/A
		GLYNASE (glyburide)	Aventis	2.5 to 5.0 mg a day, taken at the first meal of the day. For those more sensitive to hypoglycemic agents, the recommended dose is 1.25 mg.	12 mg. Doses of more than 6 mg a day should be divided and given twice a day before meals.	N/A
		GLUCOTROL (glipizide)	Pfizer	5 mg a day, taken before the first meal of the day. For the elderly and those with liver disease, the recommended dose is 2.5 mg.	40 mg	Take 30 minutes before a meal for greater effectiveness.
		GLUCOTROL XL extended-release tablets (glipizide)	Pfizer	5 mg a day, taken at the first meal of the day.	20 mg	May be taken with a meal. Do not divide, crush, or chew these tablets.
SHORT-ACTING SECRETAGOGUES	<p>Meglitinides: Hypoglycemic agents or insulin secretagogues; see the entry for sulfonylureas.</p> 	PRANDIN (repaglinide)	Novo Nordisk	If you've never taken a blood-glucose lowering agent for your diabetes or your A1c is less than 8%, the starting dose is 0.5 mg before each meal. If you've previously been treated with blood-glucose lowering agents and your A1c is greater than or equal to 8%, the starting dose is 1 mg or 2 mg before each meal.	16 mg	Prandin may be used by people with kidney disease. However, patients with severe kidney disease should start Prandin with the 0.5 mg dose. Prandin and Starlix work faster than sulfonylureas and have a shorter duration of action. They may cause hypoglycemia, but this is less likely than with sulfonylureas. Prandin and Starlix may also cause less weight gain than sulfonylureas. Do not take a dose if you are skipping a meal. The maximum dose per meal for Prandin is 4 mg. If you add a meal, you may add a dose of Prandin before that meal. Prandin can be taken 2, 3, or 4 times a day before meals. Prandin has not been studied in combination with sulfonylureas.
		STARLIX (nateglinide)	Novartis	The recommended starting dose is 120 mg before each main meal. In patients who are near their A1c goal, 60 mg is the starting dose.	360 mg	Prandin is contraindicated to be co-administered with gemfibrozil, a lipid lowering agent. This is because gemfibrozil significantly increases Prandin exposure, which may increase the risk of hypoglycemia. Prandin is not indicated for use in combination with NPH insulin. Prandin or Starlix may be used in combination with metformin or a TZD. Not approved for use during pregnancy or lactation.
SENSITIZERS	<p>Biguanides: These drugs work by decreasing the liver's glucose production.</p> 	GLUCOPHAGE* (metformin)	Bristol-Myers Squibb	Generally, significant effects are not seen with doses below 1,500 mg a day, but starting with lower doses and gradually increasing is recommended to minimize gastrointestinal reactions. The suggested starting dose is one 500 mg tablet taken with both the morning and evening meals, or one 850 mg tablet taken once a day with the morning meal.	Maximum effective dose is 2,000 mg per day.	Metformin rarely causes hypoglycemia when used alone. Metformin does not cause weight gain and does improve triglycerides. Gastrointestinal disturbances such as diarrhea, nausea, vomiting, abdominal bloating, and flatulence occur in up to one-third of users. Minimize side effects by taking with food. Do not use if kidney disease or active liver disease is present. Use caution with people 80 years old and older, or if heart failure is present. Do not use during medical tests that involve IV contrast drugs. Do not use for people who are going to have surgery. Do not use for people with significant alcohol intake. Not approved for use during pregnancy or lactation.
		RIOMET* (metformin oral solution)	Ranbaxy	500 mg (5 ml) twice a day with meals or 850 mg (8.5 ml) once a day with a meal.	2550 mg (25.5 ml) in divided doses with meals.	Refer to the Glucophage/metformin text directly above for important information about this medication. Also, go to www.riomet.com to download or review complete information about Riomet.
		GLUCOPHAGE XR* Extended-release tablets (metformin)	Bristol-Myers Squibb	The usual starting dose is 500 mg or 750 mg, taken once daily with the evening meal.	Dosage increases should be made in increments of 500 mg weekly, up to a maximum of 2,000 mg taken once daily with the evening meal.	See the entry for Glucophage/metformin. In some clinical trials, Glucophage XR lost the triglyceride-lowering benefit. Do not divide, crush, or chew these tablets.

* Lactic acidosis—a rare but very serious (often fatal) complication—has been associated with the use of Glucophage (metformin). However, the reported incidence of lactic acidosis in people taking this medication is very low. Lactic acidosis happens more often in people with kidney problems. Signs of lactic acidosis are feeling very weak, tired, or uncomfortable; experiencing unusual muscle pain, trouble breathing, or unusual stomach discomfort; feeling cold, dizzy, or lightheaded; or suddenly developing a slow or irregular heartbeat. Contact your physician if your medical condition suddenly changes.

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SENSITIZERS	<p>Thiazolidinediones (glitazones, "TZDs"): These drugs help the muscle cells respond to insulin and use glucose more effectively.</p> 	<p>AVANDIA (rosiglitazone maleate)</p>	<p>GlaxoSmithKline</p>	<p>4 mg a day, given as a single dose or in two divided doses.</p>	<p>8 mg per day, if not taking insulin</p>	<p>Avandia rarely causes hypoglycemia when used alone.</p> <p>It can take two weeks to see a reduction in blood glucose and two to three months to see the full effect of AVANDIA.</p> <p>Patients taking either AVANDIA or ACTOS (below) should carefully read the drugs' labels and product information regarding a possible increase in the risk of bone fractures and discuss it with their physicians.</p>
		<p>ACTOS (pioglitazone HCl)</p>	<p>Takeda</p>	<p>15 mg once daily, taken with or without food.</p>	<p>45 mg per day</p>	<p>Actos must be used with caution in people with congestive heart failure. Blood tests to check for serious liver problems should be conducted before therapy and periodically thereafter as determined by a physician. ACTOS in combination with insulin may be initiated at 15 mg and should not exceed or 30 mg when taken with insulin.</p>
STARCH BLOCKERS	<p>Alpha-Glucosidase Inhibitors: These drugs work in the intestines to slow the digestion of some carbohydrates so that after-meal blood glucose peaks are not so high.</p>	<p>PRECOSE (acarbose)</p>	<p>Bayer</p>	<p>25 mg (half a 50 mg tablet), taken orally three times a day at the start of each main meal.</p>	<p>150-300 mg per day (100 mg with each meal)</p>	<p>Abdominal pain, flatulence, and diarrhea tend to return to pretreatment levels as therapy continues. Take with the first bite of food for maximum effectiveness. Not approved for use during pregnancy or lactation. When these medications are used in combination with insulin, meglitinides, or sulfonylureas, hypoglycemia may occur and must be treated with pure glucose (tablets or gel) or milk because Precose and Glyset delay the absorption of other carbohydrates.</p>
		<p>GLYSET (miglitol)</p>	<p>Pharmacia Upjohn</p>	<p>25 mg to 50 mg taken with meals.</p>	<p>300 mg per day (100 mg with each meal)</p>	
DPP-4 INHIBITOR	<p>These drugs enhance a natural body system called the incretin system, which helps to regulate glucose by affecting the beta cells and alpha cells in the pancreas. The novel mechanism of action of DPP-4 inhibitors is glucose-dependent, responding to the presence of elevated glucose and resulting in the release of insulin and decrease of glucagons only when needed, thereby lowering the potential for hypoglycemia.</p>	<p>JANUVIA (sitagliptin phosphate)</p>	<p>Merck & Co., Inc.</p>	<p>100 mg once daily, with or without food, for all approved indications.</p> 	<p>100 mg once daily</p>	<p>In clinical trials, Januvia demonstrated an overall incidence of side effects comparable to placebo. The most common side effects reported with Januvia (≥ 5 percent and higher than placebo) were stuffy or runny nose and sore throat, upper respiratory infection, and headache. Across the clinical program, Januvia once-daily was weight neutral compared to placebo, and the overall incidence of hypoglycemia was similar to placebo. Because Januvia is renally eliminated, and to achieve plasma concentrations of Januvia similar to those in patients with normal renal function, a dosage adjustment is recommended in patients with moderate renal insufficiency and in patients with severe renal insufficiency or with end-stage renal disease (ESRD) requiring hemodialysis or peritoneal dialysis. Safety and effectiveness of Januvia in pediatric patients have not been established. There are no adequate and well-controlled studies in pregnant women. Januvia should be used during pregnancy only if clearly needed. Caution should be exercised when Januvia is administered to a nursing woman.</p>
		<p>ONGLYZA™ (saxagliptin)</p>	<p>Bristol-Meyer Squibb Company AstraZeneca</p> 	<p>ONGLYZA is indicated as an adjunct to diet and exercise to improve blood sugar (glycemic) control in adults for the treatment of type 2 diabetes mellitus. ONGLYZA once daily can be used in combination with commonly prescribed oral anti-diabetic medications – metformin, sulfonylureas or thiazolidinediones (TZD) – or as a monotherapy to significantly reduce glycosylated hemoglobin (A1C) levels. ONGLYZA offers once-daily dosing of 2.5 mg or 5 mg that can be taken regardless of meals.</p>	<p>2.5 mg/once daily 5 mg/once daily</p>	

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GLP-1 RECEPTOR AGONIST	<p>BYETTA was the first glucagon-like peptide-1 (GLP-1) receptor agonist to be approved by the FDA for the treatment of type 2 diabetes. BYETTA exhibits many of the same effects as the human incretin hormone GLP-1. GLP-1 improves blood sugar after food intake through multiple effects that work in concert on the stomach, liver, pancreas and brain. BYETTA provides sustained A1C control with potential weight loss (BYETTA is not a weight-loss product).</p> <p>BYETTA is an injectable prescription medicine that may improve blood sugar (glucose) control in adults with type 2 diabetes mellitus, when used with a diet and exercise program. It can also be used with metformin, a sulfonylurea, a thiazolidinedione or Lantus® (insulin glargine), which is a long-acting insulin. BYETTA is not insulin and should not be taken instead of insulin. BYETTA should not be taken with short- and/or rapid-acting insulin. BYETTA is not for people with type 1 diabetes or people with diabetic ketoacidosis. BYETTA has not been studied in patients with a history of pancreatitis. Other antidiabetic therapies should be considered for these patients.</p>	 <p>BYETTA® (exenatide) injection</p>	<p>Amylin Pharmaceuticals, Inc. Eli Lilly and Company</p>	<p>5 micrograms twice a day (60 minutes before the two main meals of the day, at least 6 hours apart) for at least 30 days; may be increased to 10 micrograms</p>	<p>10 micrograms/ twice a day</p>	<p>Based on post-marketing data BYETTA has been associated with acute pancreatitis, including fatal and non-fatal hemorrhagic or necrotizing pancreatitis. Patients should be observed for signs and symptoms of pancreatitis after initiation or dose escalation of BYETTA. The risk of getting low blood sugar is higher if BYETTA is taken with another medicine that can cause low blood sugar, such as a sulfonylurea or insulin. The dose of sulfonylurea or insulin may need to be lowered while BYETTA is used. BYETTA should not be used in people who have severe kidney problems and should be used with caution in people who have had a kidney transplant. Patients should talk with their healthcare provider if they have severe problems with their stomach, such as delayed emptying of the stomach (gastroparesis) or problems with digesting food. Antibodies may develop with use of BYETTA. Patients who develop high titers to exenatide could have worsening or failure to achieve adequate glycemic control. Consider alternative therapy if this occurs. Severe allergic reactions can happen with BYETTA. There have been no clinical studies establishing conclusive evidence of macrovascular risk reduction with BYETTA or any other anti-diabetic drug.</p> <p>The most common side effects with BYETTA include nausea, vomiting, diarrhea, feeling jittery, dizziness, headache, acid stomach, constipation and weakness. Nausea most commonly happens when first starting BYETTA, but may become less over time.</p> <p>These are not all the side effects from use of BYETTA. A healthcare provider should be consulted about any side effect that is bothersome or does not go away.</p> <p>For additional important safety information about BYETTA, please see the full Prescribing Information (www.BYETTA.com/pi) and Medication Guide (www.BYETTA.com/mg).</p>
GLP-1 RECEPTOR AGONIST	<p>Victoza® is an injectable type 2 diabetes medication. However, it is not insulin, does not contain insulin, and is not taken with insulin. It can be taken with other diabetes medications, including metformin, sulfonylureas, and TZDs under a doctor's prescription.</p> <p>Victoza® is 97 percent similar to a hormone made in the body called glucagon-like peptide-1, or GLP-1. When a person eats, GLP-1 helps the beta cells in the pancreas release the right amount of insulin to move sugar from the blood into the cells. Victoza® has the same effect and also helps slow down the time it takes for food to leave the stomach, which can help the body manage its blood sugar level. Victoza® also blocks the liver from releasing too much sugar by lowering the amount of another hormone, glucagon.</p>	 <p>Victoza® (liraglutide) injection</p>	<p>Novo Nordisk</p>	<p>Victoza® is taken once a day, with or without food, using the Victoza® Pen. Doctors can prescribe three doses: 0.6 mg (starting dose), 1.2 mg, and 1.8 mg.</p>	<p>1.8 mg</p>	<p>Victoza® is an injectable prescription medicine that may improve blood sugar (glucose) in adults with type 2 diabetes when used along with diet and exercise. Victoza® is not recommended as the first medication to treat diabetes. Victoza® is not insulin and has not been studied in combination with insulin. Victoza® is not for people with type 1 diabetes or people with diabetic ketoacidosis. It is not known if Victoza® is safe and effective in children. Victoza® is not recommended for use in children.</p> <p>Before using Victoza®, patients should tell their doctors about all the medicines they take, especially sulfonylurea medicines or insulin, as taking them with Victoza® may affect how each medicine works.</p> <p>Patients should tell their doctors if they are allergic to any of the ingredients in Victoza®; have severe stomach problems such as slowed emptying of the stomach (gastroparesis) or problems with digesting food; have or have had kidney or liver problems; have any other medical conditions; are pregnant or plan to become pregnant. Women should tell their doctors if they are breastfeeding or plan to breastfeed. It is unknown if Victoza® will harm an unborn baby or if it passes into breast milk.</p> <p>The risk for getting hypoglycemia, or low blood sugar, is higher if Victoza® is taken with another medicine that can cause low blood sugar, such as a sulfonylurea. The dose of sulfonylurea medicine may need to be lowered while taking Victoza®.</p> <p>The most common side effects with Victoza® include headache, nausea, and diarrhea. Nausea is most common when first starting Victoza®, but decreases over time in most people.</p>
AMYLIN MIMETIC	<p>First-in-class injectable medication used with mealtime insulin to control blood sugar in adults with type 1 or type 2 diabetes. When eating, amylin is co-secreted in the beta cells of the pancreas along with insulin.</p>	<p>SYMLIN® (pramlintide acetate) injection SYMLINPEN™ (pramlintide acetate) pen-injector</p>	<p>Amylin Pharmaceuticals, Inc.</p>	<p>The amount of Symlin used depends on whether the patient has type 1 or type 2 diabetes.</p> <ul style="list-style-type: none"> • For type 2: Start SYMLIN at 60 mcg injected subcutaneously, just before major meals (meal must have at least 250 calories or 30 grams of carbohydrate). • For type 1 - Start SYMLIN at 15 mcg injected subcutaneously, just before major meals (meal must have at least 250 calories or 30 grams of carbohydrate). 	<p>Type 2: 120 mcg Type 1: 60 mcg with main meals</p>	<p>Insulin-induced low blood sugar (severe hypoglycemia): Low blood sugar is a serious side effect of insulin therapy. When you use Symlin and insulin, your blood sugar may drop too low, especially if you have type 1 diabetes. If this low blood sugar (severe hypoglycemia) happens, it is seen within 3 hours after a Symlin injection. Severe low blood sugar makes it hard to think clearly, drive a car, use heavy machinery, or do other risky activities where you could hurt yourself or others.</p> <p>When you first start Symlin, your healthcare professional should tell you to reduce the dose of insulin you take before meals by 50 percent. Future insulin changes should be directed by your healthcare professional based on blood sugar testing. It is critical to the safe and effective use of Symlin that you understand your healthcare professional's instructions, follow them carefully, and take your Symlin exactly as prescribed.</p> <p>Nausea is the most common side effect of Symlin. Mild nausea is more likely during the first weeks after starting Symlin and usually does not last long. Talk to your healthcare professional for advice on how to manage nausea.</p>
DPP-4 INHIBITOR	<p>The drug lowers blood sugar in a glucose-dependent manner by increasing incretin levels, which increase insulin levels after meals and throughout the day.</p>	 <p>TRADJENTA (linagliptin)</p>	<p>Boehringer Ingelheim Eli Lilly</p>	<p>5 mg once a day, with or without food</p>	<p>5 mg</p>	<p>TRADJENTA 5 mg once daily was approved based on a clinical trial program which included approximately 4,000 adults with type 2 diabetes. Included in the program were placebo-controlled studies evaluating TRADJENTA as monotherapy and in combination with the commonly prescribed medications for type 2 diabetes – metformin, sulfonylurea, or pioglitazone. TRADJENTA showed statistically significant A1C reductions of up to 0.7 percent when used as monotherapy (compared to placebo). When used in combination with metformin, sulfonylurea, and metformin plus sulfonylurea, the addition of TRADJENTA resulted in significant A1C reductions of 0.6, 0.5, and 0.6 percent respectively (compared to placebo). In the initial combination of TRADJENTA plus pioglitazone, significant reductions in A1C of 0.5 percent were observed compared to placebo.</p> <p>Adverse reactions reported in greater than or equal to five percent of patients treated with TRADJENTA and more commonly than in patients treated with placebo included nasopharyngitis. Hypoglycemia was more commonly reported in patients treated with the combination of TRADJENTA and sulfonylurea compared with those treated with the combination of placebo and sulfonylurea. The incidence of hypoglycemia was similar to placebo when TRADJENTA was administered as monotherapy or in combination with metformin or pioglitazone. Pancreatitis was reported more often in patients randomized to TRADJENTA (one per 538 person-years versus zero in 433 person-years for comparator).</p>

Printer-friendly charts are available at www.DiabetesHealth.com/charts