

Type 2 Drugs

There are now six classes of diabetes pills and several combination oral meds. Each has a different way of helping you control your diabetes. BY MARIE MCCARREN



TYPE 2 DRUGS

IT'S A COMPLICATED CONDITION. If you're a typical person with type 2, your blood glucose levels are high because you have:

- A pancreas that doesn't make enough insulin to control your blood glucose
- A liver that releases glucose inappropriately
- Muscle cells that don't easily take in glucose

But it wasn't always that way. Here's how things worked *before* you developed type 2 diabetes:

You ate. Your blood glucose level started to go up. When your pancreas sensed the glucose, it sent out insulin. When your muscle and fat cells sensed the insulin, they let in glucose.

Your liver helped control your blood glucose levels, too. It tracked insulin levels in your blood. Under normal conditions, when there was insulin in your blood, glucose levels were high, too. Your liver would say, "Oh, good, the body just ate. No need for me to send out glucose."

But when you didn't eat for hours (like when you were sleeping), your liver sensed the lack of insulin in your blood. It then released glucose to keep your glucose level from dropping too low.

But today you have type 2 diabetes. If your diabetes is typical, it began like this:

You'd eat. Your blood glucose levels would go up. Your pancreas would put out the right amount of insulin. But your muscle cells couldn't sense the insulin. So they didn't take in much glucose.

Your liver may have failed to sense the insulin, too. It would think, "Hmm, no insulin means the body hasn't eaten recently. I'd better put out glucose."

Your pancreas would sense that there was still a lot of glucose in your blood, so it would produce extra insulin. This may have gone on for years. When your pancreas could no longer keep up with the extra demand, your blood glucose levels went up and stayed up. And you were told you had diabetes.

So type 2 diabetes involves several problems, and there are a number of potential solutions. One may be insulin injections. These can overcome insulin resistance. There are also six classes of diabetes pills. Each class acts in a different way to control blood glucose levels.

Many people benefit from taking two or more diabetes drugs, each of which addresses a different problem. Such combination therapy is so common that some drug companies now market combination pills. (See "Combination Pills," at lower right.)

No matter which diabetes pill you use, you may also need insulin injections to move glucose into your cells and control blood glucose levels. ▲

Marie McCarren is the author of American Diabetes Association Guide To Insulin & Type 2 Diabetes. She lives in Arnold, Md.

ORAL AGENTS FOR TYPE 2

| Class | Generic Name | Available as a Generic | Brand Names |
|--|-----------------------------|------------------------|---------------------------------|
| alpha-Glucosidase Inhibitors | acarbose | no | Precose |
| | miglitol | no | Glyset |
| Biguanides | metformin | yes | Glucophage |
| | metformin (long-acting) | yes | Glucophage XR, Glumetza, others |
| | metformin (liquid) | no | Riomet |
| DPP-4 Inhibitors | sitagliptin | no | Januvia |
| Meglitinides (Can cause low blood glucose, but risk is lower than with sulfonylureas.) | nateglinide | no | Starlix |
| | repaglinide | no | Prandin |
| Sulfonylureas (These drugs can cause low blood glucose.) Note: Drugs followed by an asterisk are older sulfonylureas. They tend to cause more hypoglycemia and are seldom used today. | glimepiride | yes | Amaryl |
| | glipizide | yes | Glucotrol |
| | glipizide (long-acting) | yes | Glucotrol XL |
| | glyburide | yes | DiaBeta, Micronase |
| | glyburide (micronized) | yes | Glynase PresTab |
| | chlorpropamide* | yes | Diabinese |
| | tolazamide* | yes | generic only |
| Thiazolidinediones (TZDs) | pioglitazone | no | Actos |
| | rosiglitazone | no | Avandia |
| Combination Pills | metformin + glyburide | yes | Glucovance |
| | metformin + rosiglitazone | no | Avandamet |
| | metformin + glipizide | yes | Metaglip |
| | metformin + pioglitazone | no | Actoplus Met |
| | metformin + sitagliptin | no | Janumet |
| | pioglitazone + glimepiride | no | Duetact |
| | rosiglitazone + glimepiride | no | Avandaryl |

| | Comments/Cautions |
|--|--|
| | Take with the first bite of each meal. Advantages: Acarbose and miglitol normally do not cause weight gain. Side effects include gas, bloating, and diarrhea. To minimize side effects, ask your doctor about starting with a low dose and building up slowly. Who shouldn't take: Because these medications work directly in the intestines, people with inflammatory bowel disease, other intestinal diseases, or obstructions should not take them. Hypoglycemia: Acarbose and miglitol don't cause low blood glucose (hypoglycemia) when used alone. When used with certain other diabetes medications, low blood glucose can occur. In these cases, treat hypoglycemia with pure glucose, such as glucose tablets or glucose gels, or fruit juice. Acarbose and miglitol delay the breakdown of many other carbohydrates, so those carbs should not be used to treat low blood glucose. |
| | Advantages: Metformin does not cause weight gain and may improve cholesterol levels. It does not cause low blood glucose (hypoglycemia) when used alone. Common side effects when starting metformin are nausea, diarrhea, or loss of appetite, but these should subside within a few weeks. To minimize these side effects, take with meals. In some cases, the dose may need to be reduced and then gradually increased as the body gets used to the medicine. Lactic acidosis is a rare but serious side effect. Metformin may not be right for you if you have kidney problems or severe respiratory problems, are 80 or older, are taking medication for heart failure, have a history of liver disease, drink alcohol excessively (binge drinking), or are hospitalized. If you are scheduled for any medical testing, radiology, or surgical procedures where you will have to fast or have an iodinated dye injected into your veins, you must inform medical personnel that you are taking metformin. |
| | Advantages: Does not cause weight gain. Side effects: May occasionally cause stomach discomfort and diarrhea. Cautions: If you have kidney problems, your doctor may prescribe lower doses. Your doctor may do blood tests from time to time to see how well your kidneys are working. |
| | Take at start of meals. Skip the dose if you skip a meal. |
| | Probably safe in people with kidney disease, but patients who have kidney disease or who are elderly should be started on a lower-than-usual dose. |
| | Most effective when taken with a meal, and may be more effective when taken 30 minutes before meals. |
| | Should be taken with meals. |
| | Effects may last entire day. May not be suitable for patients with kidney disease. |
| | More readily absorbed than regular glyburide, so the strengths of the tablets are different. |
| | Longest-acting drug in this class, so it has a higher potential to cause low blood glucose. Not recommended for elderly patients and those with kidney disease. May cause low blood sodium levels, jaundice, and possibly skin rashes. |
| | Patients with kidney disease may need smaller doses. Used infrequently. |
| | An older agent; used infrequently for diabetes. |
| | It typically takes 4 to 6 weeks to see an effect on your blood glucose. Side effects: Can cause weight gain and fluid retention. Heart failure: These drugs can cause heart failure. Call your doctor right away if you have any signs of heart failure, such as rapid weight gain, shortness of breath, edema (fluid retention in ankles, legs, or hands), or fatigue. People with heart failure should not take these drugs. Liver tests: Your doctor should check your liver function prior to starting these medications and periodically throughout your treatment. Call your doctor right away if you have any symptoms of liver damage, such as nausea, vomiting, abdominal pain, fatigue, loss of appetite, or dark urine. Women: These medications may cause women who are not ovulating and haven't gone through menopause to begin ovulating again, enabling them to conceive. Also, oral contraceptives may be less effective when taking these medications. Women should discuss this issue with their doctors. Avandia: Carries a potential increased risk of heart attack. |
| | See cautions for each drug in the combination, listed separately above. |