diaTribe.org provides free cutting-edge diabetes insights and actionable tips for people with diabetes. Our mission is to help individuals better understand their diabetes and to make our readers happier & healthier.

Metformin is considered the first line of defense for people with type 2 diabetes, as it is safe, effective, and affordable. Millions of people around the world with type 2 diabetes take metformin.

What is metformin? How does it work?

Metformin is a type of drug called a biguanide, which inhibits the production of glucose in the liver. It is sold under these trade names:

- Glucophage
- Fortamet
- Glumetza
- Riomet

Metformin does not increase insulin levels in the body, but instead lessens the amount of sugar the body produces and absorbs. Here's how metformin lowers blood sugar:

- Decreases glucose production in the liver
- Increases the body's sensitivity to insulin
- Decreases glucose absorption from food

For most people with type 2 diabetes, metformin works to bring down blood sugar gradually when combined with a healthy diet and exercise. It's not a quick fix, but rather an important part of a health plan to keep the condition manageable. It can take four or five days to experience the full blood sugar benefit of metformin, depending on your dosage.

Who should take metformin?

We've Got Good News!

Metformin is affordable and covered by Medicare and most insurance plans

Metformin causes minimal side effects for most people

- **People with type 2 diabetes:** Most people with type 2 diabetes tolerate metformin well and are glad it's available in generic form, which keeps the price low. The medication is so effective as a first-line therapy that the American Diabetes Association includes it in its diabetes Standards of Care.
- **People with prediabetes:** The American Diabetes Association has said more doctors should be prescribing metformin to treat prediabetes (a state of higher-than-normal blood glucose levels that doesn't meet the diagnostic criteria for diabetes), especially for heavier people under the age of 60, although the FDA has not yet approved metformin for the condition.
- **People with type 1 diabetes:** metformin is not currently approved in the US or Europe for people with type 1 diabetes, but many doctors prescribe it anyway if someone with type 1 diabetes is overweight. metformin is an attractive option for many people with type 1 diabetes because it is shown to reduce glucose production in the liver and it can help improve insulin sensitivity.
- **People with gestational diabetes**
- **People with polycystic ovary syndrome**

Is metformin dangerous?

Since its approval, metformin has gained a reputation as the safest, least costly (it's generic!), and one of the most effective first-line drugs to treat type 2 diabetes. Metformin's global impact has made its benefits clear, and it is estimated to be the most prescribed diabetes medication worldwide.

Does metformin cause side effects?

Metformin does cause side effects in some people, but many of these are mild and associated with taking the medicine for the first time. For some people, taking large doses of metformin right away causes stomach trouble, so it's common for doctors to start small and build the dosage up over time. This means there's less chance of getting an upset stomach from the medicine, but also means it may take longer to experience the full benefit when getting started on metformin. Asking your doctor for the extended release version of metformin can also keep these symptoms at bay, and so can tracking your diet.

For most people who take Metformin, side effects are mild and relatively short in duration.

These are the side effects of metformin:

- Nausea and gastric distress such as stomach pain, gas, bloating, and diarrhea are somewhat common when people start metformin.
- Lactic acidosis is a serious, but rare, side effect of metformin. Lactic acidosis is caused by buildup of lactic acid in the blood. This can occur if too much metformin accumulates in the blood due to chronic or acute (e.g. dehydration) kidney problems. Severe acute heart failure, or severe liver problems can also result in a lactate imbalance.
- Metformin can increase the risk of hypoglycemia (low blood sugar), particularly for those who take insulin and drugs which increase insulin secretion (such as sulfonylureas), but also when combined with excessive alcohol intake. Regular checking with a blood glucose meter or with CGM is helpful in preventing low blood sugar episodes. Long-term use of metformin can block absorption of vitamin B12, causing anemia, so sometimes people need to supplement vitamin B12 through their diet as well.

What is a "faux low?"

Another common side effect often experienced by people taking metformin for the first time is a "faux low." A faux low happens when you drop your blood sugars to a "normal" range after running consistently high (i.e. above 180 mg/dl), whether by starting on a therapy like metformin or going on a low-carb diet, or both! Your body responds to this change as if it's in real hypoglycemia (below 70 mg/dl).

Although every person with diabetes has a different blood-sugar threshold and different symptoms, people often feel irritable, tired, shaky, and dizzy when their blood sugar is 70 mg/dl or lower.

If you experience symptoms like these and have confirmed with a glucose meter the low you are feeling is indeed false (i.e. your meter says you're at 96 mg/dl), keep taking your metformin as directed. Don't start eating carb-rich foods (like orange juice) to bring sugars back up. Drinking water and eating a high-sodium, non-carbohydrate snack (like nuts) can help with the symptoms.

Note: especially for type 2 folks out there on metformin and insulin or sulfonylureas, hypoglycemia is a real risk. If you're feeling low, check your blood sugar – there will be times when you do need to treat hypoglycemia with glucose tablets or orange juice or the like.

What's a normal dose of metformin?

For adults ages 18-79, the following doses are common. Consult your doctor to see what dose they recommend for you.

Immediate-release tablets

- Starting dose: 500 mg two times a day, or 850 mg once per day, taken with meals.
- Dose increases: your health care provider may increase your dose of metformin by 500 mg each week or 850 mg every two weeks, up to a total of 2,550 mg per day.
- Maximum dose: 2,550 mg per day.

Extended-release tablets

- Starting dose: 500 mg taken once per day with your evening meal.
- Dose increases: your health care provider may increase your dose by 500 mg every week, and may prescribe that you take a partial dose two times each day.
- Maximum dose: 2,000 mg per day.

What else can metformin do?

Researchers are currently studying whether metformin can help in the fight against cancer, neurodegenerative conditions, vision problems like macular degeneration, and even aging. It will be a while, however, before any of these other uses are proven to be effective.

Scientists are examining metformin's potential to protect against heart disease in people with type 2 diabetes – some older data supports this. Long-term heart outcome trials with metformin are underway and will be completed in 2024.

Many people with type 2 diabetes have lost weight after taking metformin, but researchers are still torn over how exactly metformin affects weight. Some scientists believe it decreases appetite, while others say it affects the way the body stores and uses fat. The FDA has not approved metformin as an aid in losing weight.