



# Fact Sheet

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The Patient Education Website of the American Society for Reproductive Medicine

## Insulin-sensitizing agents and polycystic ovary syndrome

### **What is PCOS?**

Polycystic ovary syndrome (PCOS) is a common reproductive disorder, affecting 5% to 10% of women of reproductive age. Women with PCOS have a number of conditions that may include irregular menstrual cycles, an increase in facial and body hair, increased weight, and infertility. Diagnosis is made on a combination of clinical, laboratory, and ultrasound findings.

### **What is the link between PCOS and insulin/glucose abnormalities?**

As many as 70% of women with PCOS have decreased sensitivity to insulin due to increased weight. This causes those women to overproduce that hormone. Higher levels of insulin are needed to keep sugar levels under control in overweight PCOS patients. The resulting high levels of insulin may contribute to excessive production of male hormones (such as testosterone) and can lead to problems with ovulation (timely release of an egg). Women with PCOS who are not overweight should not be treated for insulin resistance.

In addition to reproductive problems, women with PCOS have a higher chance of developing medical problems such as type 2 (non-insulin dependent) diabetes, high blood pressure, and heart disease. Even young adolescents and thin women with PCOS may develop these complications. Women with PCOS also are at greater risk of complications during pregnancy, including pregnancy-induced high blood pressure, diabetes during pregnancy (gestational diabetes), preterm birth, and increased fetal and neonatal death.

### **How is insulin resistance diagnosed?**

Insulin resistance may be suspected based on clinical features such as a darkening of the skin around the neck. Fasting laboratory tests may be performed but are not routinely recommended. If a patient is thought to have insulin resistance, a glucose tolerance test (GTT) should be administered to rule out diabetes.

### **What are the options to treat insulin resistance?**

Weight loss, improved nutrition, and exercise are very important. Behavioral change should be the first line of therapy for an overweight woman with PCOS.

Drugs approved by the Food and Drug Administration (FDA) for the treatment of type 2 diabetes have shown promise for PCOS. These drugs, known as insulin sensitizing agents, improve the body's response to insulin.

The best-studied insulin sensitizing agent available in the United States for women with PCOS is metformin. Metformin reduces circulating insulin and androgen (male hormone) levels and restores normal ovulation in some women with PCOS. Gastrointestinal irritation, especially diarrhea and nausea, is a common side effect. These symptoms usually improve after a few weeks and can be lessened if the dose is slowly increased.

Lactic acidosis is a rare but serious adverse effect of metformin. This is a build-up of acid in the blood stream caused by inefficient metabolism. It can cause deep and rapid breathing, vomiting, abdominal pain, lethargy and heart-rhythm disturbances. Metformin is not recommended for patients with kidney, lung, liver, or heart disease. Metformin should also be temporarily stopped prior to surgery or X-ray procedures that use intravenous contrast because of the increased risk of lactic acidosis. Similarly, metformin should not be used by anyone on a low-carbohydrate diet.

Metformin and other thiazolidinediones have been shown to reduce hyperandrogenism (an increase in male hormone levels and excessive hair growth) and restore ovulation in some PCOS patients. Pioglitazone is not commonly used for PCOS patients and if needed should be supervised by an experienced physician.

In obese PCOS women, especially those with insulin and glucose problems, bariatric (weight loss) surgery may be an effective treatment. In some, surgery can significantly reduce obesity and reduce or eliminate insulin resistance. However, proper nutrition and exercise are still necessary for continued results.

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