

Inositol Can Be Effective for Polycystic Ovary Syndrome

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STORY AT-A-GLANCE

- › Researchers from Budapest, Hungary, demonstrated that inositol is an effective treatment for polycystic ovary syndrome (PCOS), which is a complex condition where a woman's ovaries produce a higher-than-normal level of androgens
- › The exact cause has not been identified. Symptoms include excess body hair, weight gain, male pattern baldness, skin tags and missed or irregular periods. This can lead to infertility or increase the risk of miscarriage, gestational diabetes, or preeclampsia
- › Women with PCOS are often insulin resistant and have a higher risk of diabetes, sleep apnea, endometrial cancer and high blood pressure. Insulin resistance is also associated with Type 2 diabetes, obesity, Alzheimer's disease and disease acceleration in cancer
- › Other strategies that may positively influence symptoms of PCOS include reducing exposure to PFAS, supplementing with ashwagandha, vitamin K-2 MK-4 and CoQ10

Researchers from Budapest, Hungary, have demonstrated that inositol is an effective treatment for polycystic ovary syndrome (PCOS).¹ The researchers noted that metformin is currently the “gold standard insulin sensitizer” that is widely used to mitigate insulin resistance in women with PCOS.

Insulin resistance is a physiological condition in which the cells do not respond to insulin as they should. Many lifestyle factors can contribute to insulin resistance, not the least of which is a diet loaded with processed foods, added sugars and Omega-6 seed oils rich in [linoleic acid](#).

The most important change to make to reduce your insulin resistance and improve insulin sensitivity is to eliminate industrially processed seed oils, which are misleadingly labeled as vegetable oils. These radically increase oxidative free radicals and cause mitochondrial dysfunction.

To eliminate linoleic acid, you must avoid processed foods and most restaurant foods. For most people, it can take three years of rigid restriction to normalize tissue linoleic acid levels to healthy ranges. Time-restricted eating is another strategy that can help improve insulin resistance. Researchers have found that adding inositol can improve symptoms of PCOS and glucose levels.²

Inositol an Effective Treatment for Polycystic Ovary Syndrome

Up to 20% of women in reproductive years report PCOS, which makes it one of the most common causes of infertility and endocrine disorder.³ The researchers in the featured study note⁴ that in one cross-sectional study, 75% of lean women and 95% of overweight women with PCOS presented with insulin resistance. Although metformin is widely used to help regulate blood sugar in women with PCOS and reduce symptoms, the common and very common side effects include:⁵

Lactic acidosis	Impaired renal function
Hypoglycemia	Flu syndrome
Chest discomfort and palpitation	Rash and increased sweating
Infections	Myalgia
Lightheadedness	Taste disturbance
Headache	Rhinitis
Indigestion	Abdominal discomfort

Dyspepsia

Loss of appetite

Diarrhea

Nausea and vomiting

Flatulence

The researchers conducted a systematic search and review of the literature⁶ to evaluate the safety and efficacy of inositol as a potential alternative to metformin in the treatment of PCOS. They identified 26 trials that included data from 1,691 women. The primary outcome measurement was normalization of the menstrual cycle; secondary outcomes were clinical and laboratory hyperandrogenism, body mass index and carbohydrate metabolism.

Inositol produced a regular menstrual cycle in women with PCOS 1.79 times higher than placebos and showed noninferiority when compared to metformin. Inositol also induced greater decreases across a variety of measurements including free and total testosterone, glucose levels and the time it takes for the body to use insulin.

There were fewer side effects reported with inositol than with metformin. Side effects in the group taking metformin include bloating, generalized weakness and nausea.⁷ The researchers concluded “Inositol is an effective and safe treatment in PCOS. Moreover, inositol showed noninferiority in most outcomes compared to the gold standard treatment, metformin.”⁸

What Is PCOS?

PCOS is a complex condition in which women's ovaries produce a higher level of androgens than normal.⁹ These male sex hormones are normally present in small amounts. The exact cause has not been identified but researchers do know that many women who have PCOS also are insulin resistant.

The symptoms of PCOS include missed or irregular periods, excess body hair, weight gain, acne or oily skin, male pattern baldness, skin tags and dark skin patches along the

back of the neck, groin, and under the breasts. Missed or irregular periods can lead to infertility. While having PCOS does not mean you cannot get pregnant, hormonal imbalances do interfere with ovulation and can increase the risks of gestational diabetes, miscarriage and preeclampsia.

Studies have found that PCOS is associated with other health conditions such as diabetes, sleep apnea, endometrial cancer, high blood pressure and high cholesterol levels, and depression and anxiety. Researchers don't know if PCOS causes these health issues or if the health conditions cause PCOS.

While the effect on the reproductive system appears to lessen as a woman gets closer to menopause, the effect of hormonal imbalance on the rest of the body does not. Instead, some health conditions associated with PCOS, such as diabetes and cardiovascular disease, may increase as a woman ages.

There is no known cause for PCOS and no single test that can diagnose it. Physicians rule out other causes for the symptoms through physical examination, pelvic examination, pelvic ultrasound and blood tests. Diagnosis relies on a woman having at least two of the following symptoms:

- Irregular menstrual periods
- Signs of high androgen levels, including abnormal hair growth on the face, chin and body, acne and thinning scalp hair
- High levels of serum androgens
- Multiple cysts on one or both ovaries

In addition to metformin used to lower blood sugar levels, physicians may prescribe hormonal birth control pills to make the menstrual cycles more regular and potentially lower the risk of endometrial cancer. Anti-androgen medications may be used to reduce scalp hair loss and block the growth of body hair.

Insulin Resistance Triggers More Medical Conditions

Insulin resistance leads to Type 2 diabetes and, currently, we have an epidemic of diabetes in the U.S., with an estimated 37 million Americans with Type 2 diabetes.¹⁰ This is 11% of the population with a disease that contributed to over 100,000 deaths in 2020 and 2021, an increase from 87,000 in 2019. Another 1 in 3 American adults is prediabetic, which is defined as an elevation in blood glucose over 100 milligrams per deciliter (mg/dl) but lower than 125 mg/dl.

Yet, fasting blood sugar that is regularly over 90 mg/dl **suggests insulin resistance**. The seminal work by the late Dr. Joseph Kraft, author of “Diabetes Epidemic and You: Should Everyone Be Tested?” suggests that 80% of Americans are insulin-resistant and on their way toward developing diabetes.¹¹

As I and others noted during the COVID-19 pandemic, the real **pandemic was insulin resistance**, which was highlighted by comorbidities that increase your risk of severe COVID-19 disease, of which obesity was chief. After old age, obesity appeared to be the most prominent risk factor for severe disease and doubled the risk of hospitalization in those under the age of 60 in one study.¹²

Obesity stimulates the release of inflammatory mediators, which are associated with the development of depression, cancer, renal diseases, cardiovascular disease and poor health outcomes.¹³ Obesity is used to measure morbidity and mortality risk related to the association with inflammatory markers.

A search of the literature¹⁴ showed adipose tissue in lean individuals secretes anti-inflammatory markers while adipose tissue in obese individuals produces more pro-inflammatory markers. This shift also correlates with insulin resistance.

There's also a link between **insulin resistance and disease acceleration**. “Insulin resistance is a critical cause of metabolic dysfunctions. Metabolic dysfunction is common in patients with cancer and is associated with higher cancer recurrence rates and reduced overall survival. Yet, insulin resistance is rarely considered in the clinic,” explained one research team.¹⁵

Alzheimer's disease is another health condition that's intimately connected to insulin resistance.¹⁶ Further, as noted in *Frontiers in Endocrinology*, "Insulin resistance (IR) plays a crucial role in the development and progression of metabolism-related diseases such as diabetes, hypertension, tumors, and nonalcoholic fatty liver disease, and provides the basis for a common understanding of these chronic diseases."¹⁷

More Strategies to Positively Influence Symptoms of PCOS

The featured study noted that inositol may help to effectively regulate blood sugar and mitigate the symptoms of PCOS. However, there are other strategies women can also use to reduce symptoms. Exposure to PFAS may reduce a woman's odds of getting pregnant by up to 40% and increase her risk of PCOS.¹⁸ Senior study author Dr. Damaskini Valvi, assistant professor of environmental medicine and public health at Icahn Mount Sinai, explained in a news release:

"PFAS can disrupt our reproductive hormones and have been linked with delayed puberty onset and increased risks for endometriosis and polycystic ovary syndrome in few previous studies. What our study adds is that PFAS may also decrease fertility in women who are generally healthy and are naturally trying to conceive."

One step that has demonstrated a positive influence in the management of PCOS symptoms is vitamin K2 MK-4. In one randomized study,¹⁹ 60 vitamin D-deficient women with PCOS either took a placebo or a combination of calcium, vitamin D and vitamin K for eight weeks. Those in the treatment group enjoyed a greater decrease in testosterone and symptoms than those in the placebo group.

CoQ10 has also demonstrated a positive influence. A 2019 paper²⁰ engaged 86 women with **PCOS who were given CoQ10**, CoQ10 with vitamin E, vitamin E alone or a placebo. After eight weeks, the group taking CoQ10 alone or in combination with vitamin E had improved levels of sex hormones and improved insulin resistance.

Ashwagandha, an adaptogenic herb with multiple purposes, is another option that may help relieve the symptoms of PCOS. It was used in ancient Ayurvedic medicine.²¹ Its ability to rebalance hormones (including thyroid hormone, estrogen and progesterone) has been shown to improve polycystic ovary syndrome.²²

Licorice is another widely prescribed herb in traditional medicine. It helps treat the symptoms of PCOS, including reducing body fat²³ and testosterone levels in healthy women,²⁴ which may be one way it helps women with PCOS.

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