

# Resveratrol regulates the glycolysis pathway to enhance follicular growth in polycystic ovary syndrome.

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## Abstract

**A reproductive, hormonal, and metabolic condition called polycystic ovary syndrome (PCOS) is commonly accompanied by hyperandrogenism, chronic inflammation, and oxidative stress. A naturally occurring polyphenolic stilbene called resveratrol can be found in small concentrations in several foods. It has received a lot of attention as a potential treatment for metabolic diseases, but its use to PCOS has been very sparse. The impact of resveratrol on the clinical characteristics of PCOS, ovarian morphology, androgen profile, markers of oxidative stress, markers of inflammation, and metabolic markers connected to PCOS is highlighted in this review. The control of glycolysis-related mediators such PKM2, LDH-A, and SIRT1 may be linked to the protective effects of resveratrol in PCOS animals. Resveratrol might be a promising contender for preventing the onset of PCOS.**

**Keywords:** Polycystic ovary syndrome, Resveratrol, Ovulation, Glycolysis, SIRT1.

## Introduction

Hyperandrogenism, insulin resistance, and other metabolic consequences are phenotypes of the Polycystic Ovarian Syndrome (PCOS), which is also known as PCOS. The biochemical sign of PCOS is hyperandrogenism. Theca cells in the ovaries produce more androgen, which raises the levels of androgen in the ovary. PCOS is linked to weight gain, insulin resistance, abdominal obesity, and difficulties losing weight in affected women. Women with PCOS are also more likely to develop health issues like diabetes, heart disease, hypertension, high cholesterol levels, sleep apnea, stroke, depression, and anxiety. As the use of antiandrogens or the inhibition of ovarian function (for example, by combination oral contraceptive tablets) is frequently clinically inappropriate, there are presently few viable treatments for PCOS [1].

There have been various alternative therapy modalities that mostly involve dietary modifications and nutritional supplementation to minimize oxidative stress and inflammation in PCOS. There is a need for an efficient pharmaceutical therapy for the management of PCOS because the available treatment choices are still limited and because doing so could potentially improve other symptoms as well. Randomized clinical trials have been carried out by numerous groups to see whether the effects of resveratrol that have been observed in preclinical research may be applied in clinical practise. To comprehend the pharmacological impact of resveratrol on people with PCOS or PCOS-induced rodent models, we examined sixteen recent randomised clinical trials in this narrative review [2].

Resveratrol mediates a wide range of physiological effects within the human body, such as preventing free radical formation through antioxidant and platelet aggregation inhibitory properties; reducing tumour growth through proapoptotic factors as well as chemoprotective effects by reducing apoptosis potential of chemotherapy drugs on cell membranes and nucleic acids; immunomodulation by inducing IL-2 response and cytotoxic T cell production as well as promoting rec-reactive protein production. The possible anti-aging and anti-diabetic capabilities of resveratrol have been investigated in more recent studies on the physiological effects of the substance [3].

Insulin resistance and glucose homeostasis have improved in mouse models after resveratrol administration. After receiving resveratrol therapy, the PCOS group's ovarian morphology improved in terms of atretic and secondary follicles and the diminished number of Graafian follicles. At various follicle developmental phases, resveratrol interacts with the silent information regulator SIRT1, which is expressed in human granulosa nucleus cells and oocytes. Randomized clinical trials have been carried out by numerous groups to see whether the effects of resveratrol that have been observed in preclinical research may be applied in clinical practise. To comprehend the pharmacological impact of resveratrol on people with PCOS or PCOS-induced rodent models, we examined sixteen recent randomised clinical trials in this narrative review [4].

Oral contraceptives are the mainstay of current pharmacological therapies, which aim to lessen the consequences of hyperandrogenism but may interfere with infertility plans in women. Anti-androgens and the management of comorbidities

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are two additional symptomatic treatments, but none target the underlying cause of the illness. Since there are currently no pharmacologically approved treatments for PCOS patients, we sought experimental data to see whether resveratrol would be a suitable treatment option based on prior preclinical research. So, according to our review, resveratrol administration frequently decreased androgen and inflammatory marker levels dramatically. Weight gain, insulin resistance, and the prevalence of type II diabetes are clinical characteristics of PCOS; however there aren't many pharmaceutical treatments that work well for this problem. Although the drug may cause menstrual irregularities, metformin has been mentioned as a viable therapy. Its effects are still being researched [5].

## Conclusion

Concerns about the use of resveratrol in PCOS treatment have been addressed in our review. Our analysis does, however, have certain constraints. The trials on human individuals have low sample numbers, and the majority of RCTs used PCOS rat models. These flaws make it difficult to determine whether an RCT's neutral results were caused by dosing, sample size, or the general lack of potency of natural resveratrol (possibly fixed through chemical techniques/analogues), making it difficult to interpret. Resveratrol also has variable and limited bioavailability.

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