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**Inositol: a new pharmacological tool for several issues in PCOS**

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Statement of the problem: Polycystic ovary syndrome (PCOS) is a complex syndrome characterized by reproductive and metabolic implications.

Polycystic ovary syndrome (PCOS) may be a condition that affects a woman's hormone levels. Women with PCOS produce higher-than-normal amounts of male hormones. This hormone imbalance causes them to skip menstrual periods and makes it harder for them to urge pregnant.PCOS also causes hair growth on the face and body, and baldness. And it can contribute to long-term health problems like diabetes and heart condition .Birth control pills and diabetes drugs can help fix the hormone imbalance and improve symptoms. Female fertility is very hooked in to successful regulation of energy metabolism. Central processes within the hypothalamus monitor the metabolic state of the organism and, alongside metabolic hormones, drive the peripheral availability of energy for cellular functions. Within the ovary, the oocyte and neighbouring somatic cells of the follicle add unison to realize successful metabolism of carbohydrates, amino acids, and lipids. Metabolic disturbances like anorexia, obesity, and DM have clinically important consequences on human reproduction. During this article, we review the metabolic determinants of female reproduction and their role in infertility. Doctors don't know exactly what causes PCOS. They believe that prime levels of male hormones prevent the ovaries from producing hormones and making eggs normally. Genes, insulin resistance, and inflammation have all been linked to excess androgen production. Some women start seeing symptoms round the time of their playing period. Others only discover they need PCOS after they've gained tons of weight or they've had trouble getting pregnant.PCOS can disrupt a woman's menstrual cycles and make it harder to urge pregnant. High levels of male hormones also cause unwanted symptoms like hair growth on the face and body. Lifestyle interventions are the primary treatments doctors recommend for PCOS, and that they often work well. Weight loss can treat PCOS symptoms and improve the chances of getting pregnant. Diet and aerobics are two effective ways to reduce .Medicines are an option if lifestyle changes don't work. Contraception pills and metformin can both restore more normal menstrual cycles and relieve PCOS symptoms. Polycystic ovaries contain an outsized number of harmless follicles that are up to 8mm (approximately 0.3in) in size. The follicles are underdeveloped sacs during which eggs develop. In PCOS, these sacs are often unable to release an egg, which suggests ovulation doesn't happen .It's difficult to understand exactly what percentage women have PCOS, but it's thought to be quite common , affecting about 1 in every 5 women within the UK.More than half these women don't have any symptoms.

Pharmacologic treatments target the hormonal and metabolic dysregulations associated to the disease such as insulin resistance, anovulation, hirsutism and menstrual irregularities. Inositol consists of nine stereo isomeric forms, all having a ring made by 6-carbons with a hydroxyl group attached to each carbon. Such stereoisomers are engendered through the epimerization of the hydroxyl groups. Myo-Inositol (MI) is the most important and widespread inositol. Also, D-chiro-inositol (DCI) deserves great attention; it is originated from MI by means of the epimerization of the C1 hydroxyl group, furthermore it exists a 40:1 ratio between myo-inositol and D-chiro-inositol. This enzymatic reaction is controlled by insulin and acts in agreement with specific tissue necessities. MI in the ovary is involved in glucose uptake and FSH signalling while DCI works as inducer of testosterone synthesis under insulin stimulus. In insulin resistant PCOS

This work is partly presented at the Event on International Conference on 4th World Congress of Polycystic Ovarian Syndrome held on June 07-08, 2018 in London

women hyperinsulinemia ends causing a severe growth of DCI concentrations from MI thorough the upregulation of epimerase activity in the ovary.

MI could play a pivotal role in re-addressing both hormonal and metabolic parameters toward homeostasis, counteracting the symptoms and signs typical of this syndrome. In fact, our personal data show an improvement of menstrual disorder, hirsutism and both a reduced ovarian hyperandrogenism and hyperinsulinism by six months of a combined treatment with MI+DCI. Conclusion & Significance: MI and DCI could represent an alternative important new tool for the management of metabolic and hormonal features in POCS, although longitudinal randomised studies along with prospective interventional trials may contribute to better clarify the role of this intriguing and safe new therapy.

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