OMICS International
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Endocrinol Metab Syndr 2015, 4:4
http://dx.doi.org/10.4172/2161-1017.C1.012

Polycystic Ovarian Syndrome Conference

November 16-18, 2015 Seattle, USA

Alternative PCOS treatment: Naturopathic and integrative care approaches to PCOS

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According to the office on women's health at the United States Department of Health and Human Services, over 5 million women suffer from Polycystic Ovarian Syndrome (PCOS). While there are conventional treatments that may help to combat some of the effects of PCOS, many women are seeking alternative therapies, including naturopathic medicine. Naturopathic treatments for PCOS include diet and lifestyle changes, supplementation of various vitamins, minerals and botanicals such as vitamin D, myo-insitol and berberine and investigation of other not so common organs and pathways that may contribute to PCOS including the adrenal glands and the gastrointestinal tract. Discussion of these topics will stem sources from PubMed as well as personal case reports.

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Regulation of steroid production by cAMP and cAMP-phosphodiesterases

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Hormones that stimulate Gs-coupled adenylyl cyclase (AC) are major stimulators of steroid production in the ovary, adrenal gland and testis. Since elevated cAMP levels can stimulate steroid production more than 100 fold, it is likely that cAMP is the principle second messenger regulator of steroid hormone production in the body. The levels of cAMP are controlled not only by ACs but also by cAMP phosphodiesterases (PDEs) and PDE inhibitors can be potent stimulators of steroid output. However, to elicit maximum steroid output, more than one PDE must be inhibited. Mechanistically, current data suggest that most of the effects of cAMP and PDE inhibition in steroidogenic cells are mediated via activation of cAMP-dependent protein kinases (PKAs). In an effort to explain at a molecular level how synergy between PDE inhibitors can occur and also to explore the molecular mechanism by which PKA can stimulate steroid production, our laboratories are utilizing a phosphoproteomic analysis of MA10 Leydig cells stimulated by various combinations of PDE inhibitors. We find a rather large number of cAMP/PKA consensus phosphorylation sequences (>200) that are increased by the PDE inhibitor combination. Nearly all of these are known or suggested to be involved in processes that would be expected to increase cholesterol substrate availability to the mitochondria. Therefore, the data suggests that cAMP/PKA acts to coordinate a large increase in steroid production by modulating many different metabolic regulatory pathways, all of which contribute to increasing the availability of free cholesterol at the mitochondrial outer membrane.

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