

# POLYCYSTIC OVARIAN SYNDROME (PCOS)

CORE TREATMENT	
<b>Manage testosterone excess and insulin resistance signs and symptoms –facial hair growth, visceral obesity, acne, amenorrhoea, infertility</b>	
<i>Inositol, Peony &amp; Liquorice to Clear Testosterone</i>	Acute dose: 2 tablets twice daily Maintenance: 2 tablets once daily
<b>Correct magnesium deficiency as a driver of hormonal imbalances</b>	
<i>Magnesium and Broccoli for Women's Health</i>	1 serve twice daily
<b>If with marked metabolic dysfunction – insulin resistance</b>	
<b>If insulin resistance is driven by stress:</b> <i>Healthy Blood Glucose support</i>	2 tablets three times daily
<b>If insulin resistance is driven by inflammation:</b> <i>Healthy Glucose Metabolism</i>	2 capsules three times daily
<b>If with progesterone deficiency (corpus luteum failure) causing infertility, or if periods associated with PMS, pain, mastalgia</b>	
<i>Vitex, Ginger &amp; Withania to Increase Progesterone</i>	1 tablet daily
<b>If with stress &amp;/or fatigue (rebalance hormonal axis)</b>	
<b>Stress Less Program</b>	
<b>If with gut derived inflammation or suspected toxicity</b>	
<b>Questionnaire-guided Detoxification Program</b>	
<b>Diet and lifestyle strategies for healthy hormonal balance</b>	
<b>Wellness and Healthy Ageing Program</b>	
Or if overweight or obese: <b>Shake It Professional Weight Management program</b>	
With all dietary prescriptions: <b>Healthy Hormonal Diet and Lifestyle hand-out</b>	

Alphabetical Reference of Nutritional Support		
Formula Catch Phrase	Key Benefits	Dosage Range
Healthy Blood Glucose Support	Powerful insulin sensitising herbs with <i>Panax ginseng</i> to improve insulin sensitivity and regulate insulin production. More indicated for stress-induced insulin resistance.	2 capsules three times daily
Healthy Glucose Metabolism	A hops, acacia and chromium modulate inflammation associated with insulin resistance. Reducing inflammation can improve insulin sensitivity and reduce cystic formation.	2 capsules three times daily
Healthy Hormone Balance	Soy Isoflav-One™ is shown to powerfully enhance the healthy metabolism of oestrogen to protective 2OH oestrogens. Hormone metabolism is further supported when combined with turmeric, BroccoPlus™ and methylating nutrients.	2 capsules three times daily
Inositol, Peony & Liquorice to Clear Testosterone	A blend designed to manage excessive testosterone activity and insulin resistance which commonly occurs post menopause. Inositol greatly enhances insulin sensitivity, combined with peony & liquorice to inhibit ovarian testosterone synthesis and increase aromatase activity to support oestrogen levels.	Acute dose: 2 tablets twice daily Maintenance: 2 tablets once daily
Magnesium and Broccoli for Women's Health	Magnesium plays important roles in oestrogen detoxification in the liver and bowel, and deficiency can contribute to hormonal imbalance. Blended with phytonutrients this combination is tailored to support healthy female hormonal metabolism and support feminine wellbeing.	1 serve twice daily
Vitex, Ginger & Withania to Increase Progesterone	An herbal and nutritional blend is designed to manage the symptoms and causes of progesterone deficiency, working in both the brain and the body to provide effective relief for PMS, painful periods, irregular cycles and infertility.	1 tablet daily

Supportive Lifestyle Programs	
Wellness and Healthy Ageing Program	This program combines a low-glycaemic diet and lifestyle recommendations for exercise, relaxation, intellectual stimulation and effective stress management – all factors associated with healthy metabolism (insulin sensitivity and energy production) and hormonal health. Learn more with the Healthy Ageing Questionnaire, online at <a href="http://www.metagenics.com.au">www.metagenics.com.au</a> or <a href="http://www.metagenics.co.nz">www.metagenics.co.nz</a>
Questionnaire-guided Detoxification program	Female hormonal health is highly dependent on effective liver and bowel clearance of oestrogens (and other steroid hormones), as well as effective detoxification of environmental toxins. The questionnaire helps to determine the most appropriate prescription for patients with 2-, 4- and 6-week plans. The Detoxification Questionnaire is available for download from <a href="http://www.metagenics.com.au">www.metagenics.com.au</a> or <a href="http://www.metagenics.co.nz">www.metagenics.co.nz</a> Note: <b><i>Detoxification is not recommended in pregnancy.</i></b>
Shake It Professional Weight Management Program	A ketogenic diet that restricts carbohydrates to reduce insulin levels and stimulate fat burning, particularly of visceral adipose tissue, thus helping to minimise the risk of many women's health issues. Obesity and insulin resistance increase oestrogen production and may impair fertility, increase systemic inflammation and drive PCOS.
Stress Less Program	Stress has a profound influence on female hormones and the menstrual cycle, which may manifest in the physical signs and symptoms of PMS, dysmenorrhoea, amenorrhoea, irregular cycles, menorrhagia, menopausal hot flushes, infertility or oestrogen-dependant pathologies, such as PCOS, endometriosis and fibroids. The Stress Less program incorporates dietary and lifestyle advice alongside herbal and nutritional recommendations designed to support balanced stress physiology, emotional wellbeing, mental health and hormonal health.
Healthy Hormonal diet and lifestyle hand-out	Diet has a potent impact on hormonal health, with certain fruits and vegetables shown to modulate hormone production, support phase I and phase II metabolism, improve bowel clearance of detoxified hormones and ameliorate inflammation to manage hormonal symptoms and restore hormonal homeostasis. This one page hand-out is designed to enhance the dietary prescription of the Wellness or Shake It programs. A free download from <a href="http://www.metagenics.com.au">www.metagenics.com.au</a> or <a href="http://www.metagenics.co.nz">www.metagenics.co.nz</a>

## Definition

Polycystic Ovarian Syndrome (PCOS) is a reproductive disorder characterised by multiple cystic growths on the ovaries (polycytic ovaries). PCOS develops when the ovaries are stimulated to produce excessive amounts of male hormones (androgens), particularly testosterone, either through the release of excessive luteinising hormone (LH) by the pituitary gland or through high levels of insulin in the blood (hyperinsulinaemia) in women whose ovaries are sensitive to this stimulus.

PCOS is characterised by a complex set of symptoms with research to date suggesting that insulin resistance is a leading cause. A majority of patients with PCOS (some investigators say *all*) have insulin resistance. Insulin resistance is a common finding among both normal weight and overweight PCOS patients. Their elevated insulin levels contribute to or cause the abnormalities seen in the hypothalamic-pituitary-ovarian axis that lead to PCOS. Specifically, hyperinsulinaemia causes a number of endocrinological changes associated with PCOS, including the following:

- Increased GnRH pulse frequency.
- LH over FSH dominance.
- Increased ovarian androgen production.
- Decreased follicular maturation.
- Decreased SHBG binding.

PCOS is the most common cause of oligomenorrhoea and amenorrhoea, and thought to affect 4-7% of normally menstruating women. These women may have reduced fertility and an increased risk of miscarriage.

### **Aetiology / Risk factors**

Major causative factors and risk factors that can contribute to the incidence of PCOS include

- insulin resistance
- obesity
- family history of PCOS
- stress
- nutritional deficiencies
- high glycaemic load diet
- sedentary lifestyle

### **Signs and Symptoms**

Common signs and symptoms of PCOS include

- Enlarged ovaries, generally 2-3 times larger than normal, resulting from multiple cysts
- Irregular menstrual cycles – i.e., oligomenorrhoea or amenorrhoea
- Hirsutism (especially facial hair)
- Central obesity – "apple-shaped" obesity centred around the lower half of the torso
- Infertility, generally resulting from chronic anovulation (lack of ovulation)
- Elevated serum androgens (male hormones), specifically testosterone, androstenedione, and dehydroepiandrosterone sulphate (DHEAS), causing hirsutism and occasionally masculinisation.
- Androgenic alopecia (male-pattern baldness)
- Jaw-line acne, oily skin, seborrhoea
- Acanthosis nigricans (associated with insulin resistance)
- Prolonged periods of PMS-like symptoms
- Sleep apnoea (especially if with metabolic syndrome)
- Chronic pelvic pain
- Blood sugar dysregulation – e.g., hypoglycaemic episodes, diabetes, etc
- Hypothyroidism

### **Diet and Lifestyle**

Dietary and lifestyle guidelines that may assist in the management of PCOS:

- ***Shake It Professional Weight Management Program***
- ***Questionnaire-guided Detoxification program***
- ***Wellness and Healthy Ageing Program*** – Including a diet composed of mainly low-GI foods combined with regular exercise helps to combat the effects of insulin resistance.
- Avoid refined carbohydrates including sugar, sweets, fruit juices, white breads, pasta and potatoes. These foods have a high glycaemic index and not recommended for PCOS sufferers.
- Smoking cessation is the highest priority in currently smoking patients.
- Regular aerobic exercise (starting slowly and increasing as patient's fitness improves) has been shown to stimulate non-insulin dependent glucose transport into cells.

## Pathology Tests

TEST	INTERPRETATION GUIDELINES
<b>Follicle Stimulating Hormone (FSH)</b>	<p>FSH stimulates follicle development in the ovaries and is often used as a gauge of ovarian function. Elevated FSH levels indicate poor follicle development and consequently, anovulatory cycles. Reduced levels of FSH may indicate hyperprolactinaemia.</p> <p><b>Normal Values - Reproductive female</b>            Follicular phase (days 1-14): 1-6U/L            Ovulation (day 14): 6-17U/L            Luteal phase (days 14-28): 1-6U/L</p>
<b>Luteinising Hormone (LH)</b>	<p>LH triggers the release of the ovum from the ovary – the LH surge at around day 12 leads to ovulation within 48 hours. Elevated LH levels can indicate ovarian dysfunction. Reduced levels of LH may indicate hyperprolactinaemia. In PCOS testing, the LH:FSH ratio may be used in the diagnosis. The ratio is usually close to 1:1, but if the LH is higher, it is one possible indication of PCOS.</p> <p><b>Normal Values - Reproductive female</b>            Follicular phase (days 1-14): 1-15U/L            Ovulation (day 14): 22-56U/L            Luteal phase (days 14-28): 1-15U/L</p>
<b>Prolactin (PRL)</b>	<p>Prolactin promotes breast development and milk production. Its release is stimulated by TSH and inhibited by dopamine. Elevated prolactin levels may interfere with ovulation and cause infertility.</p> <p><b>Normal Values - Reproductive female</b>            PRL: 3.8-23.8µg/L</p>
<b>Oestradiol (E2)</b>	<p>Oestradiol is the main oestrogen produced by the ovaries in response to LH and FSH. Reduced levels may indicate ovarian abnormalities.</p> <p><b>Normal Values - Reproductive female</b>            Follicular phase (days 1-14): 100-200pmol/L            Ovulation (day 14): 500-1700pmol/L            Luteal phase (days 14-28): 500-900pmol/L</p>
<b>Progesterone (P4)</b>	<p>Progesterone is produced by the corpus luteum after ovulation and is required to stimulate endometrial growth. Reduced progesterone levels can indicate luteal phase defects and/or anovulatory cycles.</p> <p><b>Normal Values - Reproductive female</b>            Follicular phase (days 1-14): 2.0-4.5nmol/L            Ovulation (day 14): 2.0-4.5nmol/L            Luteal phase (days 14-28): 7.0-70nmol/L</p>
<b>Dehydroepiandrosterone Sulphate (DHEAS)</b>	<p>DHEAS is a mild androgen produced by the adrenal glands. Elevated levels may indicate PCOS.</p> <p><b>Normal Values - Reproductive female</b>            DHEAS: 0.8-10.2µmol/L</p>
<b>Testosterone</b>	<p>Testosterone is the major androgen. Elevated levels in women can lead to infertility. Increased androgen production often leads to lower SHBG as well.</p> <p><b>Normal Values - Reproductive female</b>            Free testosterone: &lt;4pmol/L/L            Total testosterone: &lt;4nmol/L/L            SHBG: 30-90nmol/L/L</p>
<b>Glucose Tolerance Test</b>	<p>Patients are given the Glucose Challenge and their blood glucose levels are monitored afterwards. Can be used to detect impaired glucose tolerance.</p>

Glucose tolerance test interpretation: blood glucose level (mmol/L)				
	Normal Values	Impaired glucose tolerance	Impaired fasting glycaemia	Diabetes mellitus
<b>Fasting</b>	<5.5	<5.5	5.5–6.9	≥7.0
<b>2 hour</b>	<7.8	7.8–11	<7.8	≥11.1

### Pharmaceutical Treatments

- **Biguanides:** e.g., metformin. These drugs are considered to be insulin sensitisers — they improve insulin action at target cells and reduce insulin resistance.
- **Thiazolidinediones:** these drugs improve insulin sensitivity by allowing glucose to enter the cells. Thiazolidinediones increase LDL cholesterol and weight and raise HDL cholesterol levels, and may be effective in treating PCOS.
- **Spirolactone:** an antiandrogen used to treat hirsutism.
- **Oral contraceptives:** may be used to treat hirsutism. They reduce the secretion of LH and FSH from the pituitary by decreasing amount of gonadotropin-releasing hormones, decreasing ovarian androgen production and reducing free testosterone. Oral contraceptives with ethinyloestradiol that are particularly of low androgenic potential include, for example, those with gestodene, desogestrel or cyproterone.
- **Clomiphene:** This drug increases the natural production of LH and FSH, which stimulate ovulation. Used for those wishing to become pregnant. **Gonadotrophins and Human chorionic gonadotropin (hCG):** are also used to stimulate ovulation to assist in fertility.