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Phytotherapeutic Management of Endocrine Dysfunctions

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When Hormones Are Not Enough

Current perceptions of endocrine dysfunctions often place great weight on serum or salivary levels of hormones as the most accurate indication of hormone function. This becomes troubling when clinicians observe an increasing percentage of patients who have hormone levels in the "normal range", but still have significant symptoms of hormone dysfunction. Increased understandings of insulin resistance has raised awareness that while measuring hormone levels is important, just as important is the physiological response to those hormones, or in many cases, the lack of physiological response. To the clinician managing menopause, andropause, PMS/PMDD and PCOS patients the incongruence between objective data (lab tests) and subjective data (patient symptoms), can best be explained to patients by introducing the concepts of cellular resistance and sensitivity as well as hormone agonists and antagonists. When explaining "hormone function" to patients, an effective educational phrase is "It's not just the levels, it's the listening." Collectively, essential fatty acids and targeted phytotherapeutics increase cellular ability to "listen" to hormone messages.

While resistance may be therapeutically approached through increasing essential fatty acids such as docosahexaenoic acid, agonists and antagonists may be therapeutically approached with targeted phytotherapeutic agents. The most effective first line of phytotherapeutic agents for the management of menopause, andropause, PMS/PMDD and PCOS patients primarily target the function of endogenous androgens, estrogens, and progestogens. While classic endocrinology models may explain some actions of phytotherapeutic agents which affect hormone function, the phytotherapeutic management of endocrine dysfunctions require as much of an understanding of phytotherapy as it does endocrinology.

Hormones are nothing more than chemical messengers that, in most cases, originate in one place, such as ovaries, testes, adrenal glands, or other endocrine tissue, and exert their affect at a different site, such as brain, heart, bone, blood vessels, or other tissue – including other endocrine tissues. There are a number of different ways in which cells receive messages and respond to hormone messengers. Endocrine, as noted, is defined as cellular response to a hormone originating from distant endocrine cells. Autocrine is defined as cellular response to a hormone that originates from the cell itself, such as the synthesis of estrogens from androgens within breast tissue. Paracrine is defined as cellular response to a message originating from nearby tissue, such as breast tissue converting androgens to estrogens and secreting them to affect adjacent cells. Like endocrine responses, autocrine and paracrine responses are responses to substances originating from the organism itself. They are from distant cells, the cell itself, or nearby cells respectively. Responses which originate from outside the organism, and from plant sources specifically, may be termed "phytocrine".

Phytocrine, like endocrine, may be used as a means of describing how cells respond to chemical messages. In that regard, the variable actions of plants with phytocrine activity must be recognized. The actions of phytocrines may broadly be divided into agonists and antagonists. An agonist to a specific hormone works with that hormone,

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thereby supporting, restoring, enhancing or substituting for one or more of its functions. An antagonist to a specific hormone works against that hormone, diminishing, quenching or blocking one or more affect of that hormone.

Phytocrine Classification

Another way to classify phytocrines can be based on the way in which they exert their actions. Some phytocrines bind to hormone receptors, some increase the ability of the body to make hormones, and some mimic important hormone functions. Any given plant that has phytocrine activity may affect cells in one or more of these fashions. In classifying phytocrines based on the way in which they exert their actions, we can recognize three primary classes; phytohormones, phytohormonogenics, and functional mimetics of hormones.

Phytohormones are plant constituents with hormone-like structures. Sometimes referred to as phytosterols, they possess weak hormone activity. They may bind to hormone receptors resulting in the same type of response that the hormone would cause. Even though the type of response is the same, the intensity may be weaker, and/or the duration of the response (retention time) may be different. Further classifications of phytohormones include the widely recognized term "phytoestrogens", which bind to estrogen receptors. Additional phytohormones include "phyto-progestogens", which bind to progesterone receptors and "phytoandrogens", which bind to androgen receptors. A clinically valuable group of "phytoantiandrogens" bind to androgen receptors, but exert an antagonistic functional response. Currently recognized phytoestrogens include various isoflavones such as genistein and daidzein from soy, biochanin A, & formononetin from red clover, and puerarin & 3'-methoxypuerarin from kudzu (*Pueraria lobata*).

Phytohormonogenics are plants which augment the ability of the body to generate hormones. Classically, phytohormonogenic plants are considered to have adaptogenic properties. These plants may have a direct effect on target tissue, increasing the hormone production within specific endocrine tissue, or they may have an affect on the hypothalamic-pituitary-adrenal axis and/or the hypothalamic-pituitary-gonadal axis, in effect increasing adrenotrophic and/or gonadotrophic hormones or functions. Clinically valuable phytohormonogenics include "phytoprogestogen-ogenics", which increase endogenous progesterone production and "phytoandrogen-ogenics", which increase endogenous androgen production. Due to current perception of estrogen as being dangerous, "phytoestrogen-ogenics", which can increase endogenous estrogen production are rarely used or promoted to patients. The "phytoandrogen-ogenic" properties of *Withania somnifera* can be attributed to its activation of the hypothalamic-pituitary-gonadal axis, which increases gonadotrophic hormones.[1] The active constituent of *Coleus forskohlii*, forskolin has a direct effect on progesterone producing tissues.[2,3]

One of the most intriguing classes of phytocrines is the "Functional Mimetic of Hormones", which are plants which mimic one or more hormone functions. The functional mimetics of hormones can cause the same physiological response of the hormone they are mimicking. They do not need to bind to a hormone receptor to cause a similar functional response as the hormone. These phytocrines may mimic one or more functions of a hormone. These phytocrines may also be considered as functional agonists. Functional mimetics are clinically valuable for targeted functions of testosterone, progesterone and estrogen without binding to hormone receptors. An example of an herb used as a functional mimetic of estrogen is *Bacopa monniera*[4], which mimics the abilities of estrogen to help the body adapt to both acute and chronic stress as well as maintain cognitive function, though it does not bind to estrogen receptors. Though black cohosh (*Cimicifuga racemosa*) has periodically been described as having phytoestrogen properties, due to its ability to diminish menopause symptoms that are associated with estrogen deficiency, we now know that *Cimicifuga racemosa* does not universally bind to either of the known estrogen receptors,[5,6] though it may have selective estrogen receptor modulator (SERM) activity specific to bone and hypothalamo/pituitary tissues.[7]

As the traditional perceptions of phytotherapeutic agents as only "phytohormones" is expanding to include phytohormonogenics and functional mimetics of hormones,

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the recognition of different classes of phytocrines allows us to use phytotherapeutic agents for endocrine dysfunctions with greater clinical efficacy.

Clinical Applications of Phytotherapeutics in Endocrine Dysfunction

Phytotherapeutic applications designed to support normal function of estrogen can now address all of the needs of estrogen. Traditional approaches for weak estrogen function were thought to be solely phytoestrogens, and targeted primarily vasomotor symptoms. We now realize that Black Cohosh acts as a functional mimetic that does not always require estrogen receptors to exert its effects. Additional functional mimetics of estrogen, such as Bacopa, can support other tissues that respond to estrogen. In addition to relieving hot flashes and night sweats, formulations can now support healthy function of bone, heart, brain, breasts, vagina and other estrogen sensitive tissues. Phytotherapeutics to support progesterone function promote endogenous progesterone production as well as support and mimic the anti-inflammatory, anti-allergy and anti-autoimmune properties of progesterone, in addition to supporting uterine, cardiovascular, bone and neuro-cognitive functions.

Phytotherapeutics designed to support androgen function promote endogenous testosterone production, mimic the anabolic, strengthening, and stimulating effects of testosterone, and support healthy brain, nerve, muscle, immune, cardiovascular, and other systems prone to atrophy, senescence or weakness.

Clinical application requires recognition that the synergy of phytomedicines has the same validity as the synergy of pharmaceutical agents.[8] The synergism seen in phytotherapeutic formulations manifests in such a way that the clinical efficacy of multiple constituents act collectively to create an effect which is greater than the sum of the effects that each is able to create independently. In this fashion,while Bacopa, Schisandra and Cranberry fruit each have the ability to positively influence neuro-cognitive function, clinical observation reveals more rapid onset of these influences with increased efficacy when these components are part of a synergistic formulation.

Phytotherapeutics to Restore Optimal Estrogen Function

The foundation for phytotherapeutics to restore optimal estrogen function includes the isoflavones from soy (*Glycine max*), kudzu (*Pueraria lobata*) and red clover (*Trifolium pretense*), which have the ability to diminish menopausal symptoms and support maintenance of bone mineral density. These phytoestrogens may also help protect the cardiovascular system, support the immune system, inhibit angiogenesis, and protect against oxidative damage as antioxidants. Therapeutic dosages of Black Cohosh (*Cimicifuga racemosa*) effectively diminish menopause symptoms such as hot flashes, night sweats, insomnia, irritability, heart palpitations, and headaches without always affecting estrogen receptors as noted.

The therapeutic effects that hops, (*Humulus lupulus*) has in reducing hot flashes in menopausal women and its efficacy in mood disturbances such as restlessness and anxiety, and sleep disturbances appear to be due to the phytoestrogenic activity of constituents such as 8-prenylnaringenin. Sage (*Salvia officinalis*) contains phytoestrogen substances that are effectively used to treat hot flashes and to decrease perspiration in both daytime and night-time excessive sweating. The positive effects of Sage on the nervous system include both memory-improving properties and calming actions, the later of which have been attributed to its ability to bind to the GABA/benzodiazepine receptor complex in brain tissue.

The neuro-cognitive supporting actions of Schisandra (*Schisandra chinensis*) may be associated with its affect on serotonin and GABA receptors,[9] while its ability to manage cardiovascular symptoms, especially those associated with menopause, may be attributed to its ability to activate estrogen receptors and affect nitric oxide-mediated vasorelaxation.[10] Thus, Schisandra may expresses phytoestrogen properties, and be a functional mimetic of estrogen in regard to serotonin and GABA receptors.

The ability of Cranberry fruit (*Vaccinium macrocarpon*) to protect neuronal and cognitive brain function, as well as cardiovascular health is associated with antioxidant activity, mimicking the estrogen receptor-independent antioxidant activities or estradiol.[11,12,13] At present, the neuro-protective antioxidant properties[14] and nootropic actions[15] of Bacopa (*Bacopa monniera*) are not associated with estrogen-receptors, suggesting functional mimetic attributes. Since Don Quai (*Angelica sinensis*) has weak estrogen receptor binding capacity[16] it may be considered a phytoestrogen which may explain its traditional use to increase vaginal lubrication, though it does not produce estrogen-like responses in endometrial thickness.[17] The action of increased bone formation by ferulic acid, a constituent of Don Quai, is different from the actions estrogens,[18] suggesting functional mimetic of estrogen properties.

Phytotherapeutics to Restore Optimal Progesterone Function

Since there is essentially no ovarian secretion of progesterone during the follicular phase of the menstrual cycle,[19] the follicular phase represents the physiological baseline of progesterone production by the adrenal glands. Given that the adrenal glands are capable of sustaining follicular levels of progesterone in premenopausal women, healthy adrenal glands are capable of maintaining follicular levels of progesterone in postmenopause women, as observed clinically. Phytotherapeutics that restore progesterone function will include phytoprogestogen-ogenic herbs that optimize the healthy hormone producing function of the adrenal glands, the primary source of postmenopause progesterone.

The phytoprogestogen-ogenic actions of Bupleurum (*Bupleurum falcatum*) are attributable to the ability of

saikogenin A, to increase ACTH levels,[20] since ACTH can increase progesterone levels.[21] The ability to stimulate the hypothalamic-pituitary-adrenal system by promoting ACTH release maintains the size and function of the adrenal glands. The anti-inflammatory actions of saikogenin A mimic the anti-inflammatory functions of progesterone. Bupleurum is also a functional mimetic of progesterone's ability to reduce asthma symptoms.[22,23,24]

Phytoprogestogen-ogenic attributes may also be assigned to Rehmannia (*Rehmannia glutinosa*) due to its affects on the hypothalamic-pituitary-adrenal axis.[25,26,27] In addition to mimicking the osteoblastic stimulating actions of progesterone, Rehmannia also inhibits osteoclastic activity, in effect preventing osteoporotic bone loss.[28] As previously noted, the active constituent of *Coleus forskohlii*, forskolin has a direct effect on progesterone producing tissues.[29,30,31] Forskolin also exhibits progesterone mimetic properties such as antihypertensive[32] and anti-allergic actions.[33] The progesterone mimetic properties of Passiflora (*Passiflora incarnata*), such as anti-asthmatic,[34] anxiolytic,[35] and sedative,[36] may be due to a benzoflavone moiety (BZF) isolated from Pasiflora.[37] The anxiolytic effect of the flavonoid present in *Passiflora incarnata*, has been linked to an activation of the GABA(A) receptors, mimicking the GABA(A) agonist properties of progesterone.[38]

The traditional use of Vitex (*Vitex agnus-castus*) as a progesterone enhancing herb may be due to its ability to stimulate progesterone receptor expression,[39] as well as its ability to eliminate deficits in the luteal progesterone synthesis.[40] Peony (*Paeonia lactiflora*), a common constituent of traditional formulas targeting dysmenorrhea and menorrhagia, may exert its effect on the hypothalamic-pituitary axis and may activate ovarian function.[41,42,43] Though used primarily for its contribution to uterine health, peony also has cognitive enhancing and significant antioxidant attributes.[44,45] The beneficial effect that progesterone has on uterine health is mimicked in part by the actions of Vitex and Peony.

The antispasmodic and anti-inflammatory properties of Wild Yam (*Dioscorea villosa*) in many ways mimic the same actions of progesterone. Though traditionally considered a progestogenic herb, recent findings show that diosgenin causes coronary artery relaxation in which neither estrogen or progesterone receptors are involved.[46] Historically, the actions of Dioscorea have been attributed to an ability to relax the autonomic nervous system and therefore decrease vasomotor symptoms such as hot flushes and night sweats which are associated with autonomic dysfunction,[47,48] suggesting it acts more as a functional mimetic of progesterone.

Phytotherapeutics to Restore Optimal Testosterone Function

If asked what the most important feature of testosterone was, most patients today would indicate its contribution to optimal sexual function in both genders. While phytotherapeutics targeted to improve testosterone function can contribute to optimal sexual function, they often improve other important functions of testosterone as well, such as increased stress adaptation, an important function of testosterone in both genders.

Traditionally used for sexual debility, Shatavari (*Asparagus racemosus*) exhibits actions similar to acetylcholine,[49] a neurotransmitter involved in the sexual arousal response. The adaptogenic, anti-stress and immuno-stimulating activity of Shatavari has been validated in animal studies, and has the ability to provide antioxidant protection to neuronal tissues.[50,51]

Damiana (*Turnera diffusa*) is widely used in the traditional medicine as an aphrodisiac, an attribute confirmed by animal studies, which demonstrated that Damiana acts as a sexual stimulant.[52] Its ability to enhance engorgement or erectile tissue is associated with its vasodilatory abilities.[53] However, no androgen receptor interactions have been documented, suggesting Damiana is a functional mimetic of testosterone.

Epimedium (*Epimedium sagittatum*), also called "Horny Goat Weed" has traditionally been used for sexual dysfunction, fatigue and libido enhancement. Epimedium has been shown to improve sexual function and quality of life even in patients with chronic disease.[54] The effects of Epimedium are attributed to icariin, cGMP-specific PDE5 inhibitor that affects both the male and female sexual response.[55-59] Though Epimedium has no demonstrable androgen affects, it does have glucocorticoid antagonist properties,[60] which may allow for a relative increase in androgen function.

The demonstrable ability of Maca (*Lepidium meyenii*) to enhance fertility in both men[61] and women[62] and improve sexual desire is not related to changes in pituitary or gonadal hormones.[63,64] Maca does not activate androgen receptors[65] and may actually block androgen receptors.[66] The properties of Maca may be due to the presence of tetrahydro-beta-carbolines,[67] the same neuroactive alkaloids found in chocolate and cocoa,[68] which exert potent serotonin agonist actions.[69] Improvement of L-arginine-nitric oxide activity has also been attributed to Maca.[70] At best, Maca is a functional mimetic of testosterone.

Mucana (*Mucuna pruriens*) is recognized as an aphrodisiac in Ayurvedic Medicine, used for both men and women with low libido, and for women undergoing menopause. Significant increase of sexual behavior through enhanced libido has been attributed to L-dopa, a constituent of Mucuna.[71,72,73] The sexual response functions of l-dopa are enhanced by the presence of testosterone,[74,75] revealing androgen agonist activities. The growth hormone secretagogue[76] actions of L-dopa may also be contributory.

Tribulus (*Tribulus terrestris*) is another herb used in Ayurvedic medicine that is considered to be a reproductive tonic. Though animal studies have demonstrated androgen increasing properties of Tribulus,[77,78] subsequent human studies suggest that *Tribulus terrestris* steroid saponins

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Women, Take Heart. Soy Isoflavones as Self-Care for Menopausal Symptoms and Disease Risks.

Dr. Ronald Klatz and Dr. Bob Goldman

Heart disease is the number one killer of American women and is responsible for half of all the deaths of women over age fifty. Ironically, in past years women were rarely included in clinical heart studies, but finally physicians have realized that it is as much a woman's disease as a man's. Postmenopausal women face at least fifteen times the risk of dying of heart disease than of an estrogen-dependent cancer. Indeed, research suggests that two isoflavones present in soy – genistein and daidzein – appear to lower a woman's risk of developing hormone-related diseases such as breast cancer and endometriosis. Results from one study revealed that women who ate the most soy and other phytoestrogen-rich foods were 54% less likely to develop endometrial cancer. Researchers believe that genistein, which has been shown to inhibit angiogenesis, may also block the protein tyrosine kinase, which promotes the growth and proliferation of tumor cells. Meanwhile, results of research published in 2002 revealed that women who eat soybeans and soy-based foods have significantly less "high risk" dense breast tissue, which is linked to breast cancer. In fact, women who consumed the most soy were 60% less likely to have dense breast tissue than women who ate the least. Soy isoflavone supplements are now available and may confer similar health benefits as the isoflavones found naturally in soy foods.

Menopause brings changes in the level of fats – lipids – in a woman's blood. In menopausal women, levels of LDL ("bad") cholesterol increase, while HDL ("good") cholesterol decreases, both as a direct result of estrogen. A meta-analysis conducted by Dr. Anderson and colleagues of the Veterans Affairs Medical Center (Lexington, Kentucky USA) on 38 independent studies revealed that soy consumption reduced cholesterol levels in 89% of the studies. The analysis, which concluded that "soy protein... significantly decreased serum concentrations of total cholesterol, LDL cholesterol, and triglycerides without significantly affecting serum HDL cholesterol concentrations," revealed that women who ate soy could, on average, expect a cholesterol reduction of 23 mg per deciliter.

Estrogen is beneficial for women who are at great risk for stroke or hypertension because it raises the HDL cholesterol level and lowers the LDL cholesterol, decreases the risk of heart attack, and does not elevate blood pressure. A 2002 study conducted at the University of Baskent (Turkey) found that estrogen also reduces homocysteine levels. Elevated levels of homocysteine, an amino acid formed when other amino acids in the blood are broken down by normal metabolic processes, are considered a major risk factor for heart disease. Yet, Estrogen Replacement Therapy (ERT) is not appropriate for every woman. Instead, some women may consider supplementation with soy isoflavones which exert a mild estrogenic activity and thus can be one way in which women can naturally raise their estrogen levels.

Soy isoflavones may also reduce the risk of hormone-dependent cancers. A study by Dr. Messina and team of the National Cancer Institute (National Institutes of Health, USA), found that 65% of 26 animal-based cancer studies demonstrated a protective effect of soy or soy isoflavones. Human research also suggests a protective role of soy against cancer, as pointed out by studies including those by Dr. Aldercreutz (University of Helsinki, Finland) and Dr. Lee (National University of Singapore).

Soy isoflavones have also been found to directly improve menopausal symptoms. In a study by Dr. Albertazzi and colleagues of University of Ferrara (Italy), supplementation with 60 grams of soy protein per day for 12 weeks led to a 45% decrease in the number of hot flashes (compared to a 30% reduction in the placebo group). Isoflavones are also valuable in osteoporosis prevention. Dr. Potter and team of University of Illinois at Urbana-Champaign (USA) found that supplementation with 40 grams of soy protein powder per day (containing 90 mg of isoflavones per day) was protective against bone mineral loss in the spine.

Soy isoflavones may represent one of the most potent self-care options for menopause. The benefits perhaps are best and simply stated by Dr. Han and team from Escola Paulista de Medicina/Federal University of Sao Paulo (Brazil). They followed 80 women who consumed soy isoflavones for four months, finding that "total cholesterol and low-density lipoprotein decreased significantly," without any adverse effects on blood pressure, plasma glucose, and high-density lipoprotein. Dr. Han's group concluded that "[a] isoflavone 100-mg regime treatment may be a safe and effective alternative therapy for menopausal symptoms and may offer a benefit to the cardiovascular system."

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possess neither direct nor indirect androgen-increasing properties.[79] The ability of Tribulus to increase the release of nitric oxide may account for its claims as an aphrodisiac.[80,81]

Ashwagandha (*Withania somnifera*), also commonly used in Ayurvedic medicine, is best regarded as adaptogen[82,83] with aphrodisiac properties, which may be due to increased interstitial cell stimulating hormone and testosterone-like effects[84] as well as the induction of nitric oxide synthase.[85] The antistressor properties, due to anxiolytic GABA-mimetic activity[86] which act independent of GABA receptors,[87,88,89] may be contributory.

Eleutherococcus senticosus, has no documented androgen properties. The anti-fatigue, anti-stress, immuno-enhancing effect, enhanced neuro-cognitive, and anti-depressive effects associated with regular use may be associated with effects on the hypothalamic-pituitary-adrenal (HPA) axis, which plays a primary role in the reactions of the body to repeated stress and adaptation to stressors.[90,91,92] Increased nitric oxide and enhanced acetylcholine function contribute to improved sexual function.[93,94]

Phytotherapeutics to Quench Excessive Testosterone Function

Androgen excess, affecting up to 10% of women, places these women at great risk for insulin resistance, diabetes, dyslipidemias, cancers and cardiovascular disease.[95,96] Phytoantiandrogens are a class of phyto-compounds that decrease tissue sensitivity to androgens or decrease androgen activity, often through 5-alpha-reductase inhibition, which decreases conversion of testosterone to the more androgenic dihydrotestosterone. These actions are most likely due to the presence of free fatty acids such as palmitic-acid and stearic-acid as well as the phytosterol beta-sitosterol, all of which have 5-alpha-reductase inhibiting activity.[97,98,99] These three constituents are present in *Serenoa repens*, *Ocimum sanctum* and *Trigonella foenum-graecum*. Palmetic acid is also an active component within *Foeniculum vulgare* and *Urtica dioca*. *Foeniculum vulgare* and *Pygeum africanum* also contain beta-sitosterol.[98,99] Some phytoantiandrogens also have antihyperglycemic, antihyperlipidemic, and anti-inflammatory properties, all of which greatly benefit women with hyperandrogenism.

Saw Palmetto's (*Serenoa repens*) antiandrogenic properties are attributed to inhibitory affects on 5-alpha-reductase due to a high content in the free fatty acids and beta-sitosterol.[100,101] Anti-inflammatory properties have also been noted in *Serenoa repens*.[102]

Fennel (*Foeniculum vulgare*), traditionally considered an anti-androgen, has demonstrable anti-hirsutism and anti-inflammatory properties[103,104] in part due to palmitic acid and beta-sitosterol. The anti-androgen properties of Nettles (*Urtica dioica*) may be due to palmitic acid, as well as other free fatty acids such as oleic acid, linoleic acid and linolenic acid.[98,99] Antihyperglycemic and anti-inflmmatory effects have also been demonstrated for *Urtica dioica*.[105,106,107]

Holy Basil (*Ocimum sanctum*) displays significant anti-androgenic affect in androgen responsive tissues, an effect that was reversible and returned to normal two weeks after the withdrawal of treatment.[108,109] Sedative properties have also been identified in *Ocimum sanctum*, an adaptogen in Ayurvedic medicine which demonstrates antistressor properties to adverse stimuli as well as toxic substances.[110,111,112] Anti-inflammatory, antihyperglycemic and antihyperlipidemic action have also been documented in Holy Basil.[113-118]

Fenugreek (*Trigonella foenum-graecum*) has anti-androgen activities, due to beta-sitosterol, palmitic-acid and stearic-acid, and also has the ability to lower total cholesterol, LDL, VLDL cholesterol and triglycerides significantly.[119-122] The anti-hyperglycemic and anti-inflammatory properties noted in fenugreek are of additional benefit.[123,124]

The anti-androgen properties of Pygeum (*Pygeum africanum*) may be due to beta-sitosterol and other sterols that suppress the effects of dihydrotestosterone.[99,125] Anti-inflammatory properties have also been documented in Pygeum.[126]

Conclusion

Phytotherapeutic management of endocrine dysfunction allows clinicians hormone-free choices for addressing conditions associated with suboptimal estrogen, progestogen and androgen function such as some cases of menopause and some forms of PMS & PMDD. Andropause can be managed without the risks of testosterone replacement therapy. Androgen excess disorders, seen in some menopause cases, some forms of PMS/PMDD as well as PCOS and PCO-like syndrome can effectively be managed with phytoantiandrogens.

As phytotherapeutic research continues, current understanding of the mechanisms by which plant derived substances affect the endocrine system will be expanded. All indications are that increased understanding of the affect that phytotherapeutic agents have on androgen, estrogen and progestogen function will allow individuals with endocrine dysfunction more hormone-free options that significantly impact quality of life and risk of disease.

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