Hormones and herbs related to practice **(Hananja Brice-Ytsma MNIMH, MSc)**

Oestrogen (weak and potent): Oestrogens are metabolised in the liver. Phase 1: Enzyme conversion to 2-hydroxyoestrogens or 16-hydroxyoestrogens (associated with cellular proliferation, DNA damage, carcinogenicity). Phase 2: Conjugation of oestrogen. Excretion via bile or urine. Conjugated oestrogens in the colon can be deconjugated and partially reabsorbed.

Phyto-oestrogenic compounds

Phenolic phyto-oestrogens: Isoflavonoids, coumestan, lignans.
Steroidal saponins.
Triterpenoid saponins.

Phenolic phyto-oestrogens

Isoflavones: genistein, daidzein & glucosides in Leguminosae.
Lignans: enterodiol and enterolactone, formed by bacterial action on precursors.
Flavones: apigenin, luteolin (parsley, artichoke leaves, celery, peppers, olive oil, rosemary, lemons, peppermint, sage, oregano, thyme, basil and coriander, chamomile, lemon Balm, peppermint, liquorice.
Flavonols: kaemfperol (rosmarinus, apples, grapes, tomatoes, green tea, potatoes, onions), quercetin (berries, chili peppers Red leaf lettuce raw kale asparagus Romaine lettuce, chicory greens, raw spinach, sweet peppers.
Flavanons: naringenin, 8-prenylnaringenin (Humulus lupulus).
Coumestans: coumestrol (Trifolium, alfalfa, soybeans, Brussels sprouts, spinach, chickpeas and other legumes).

Phenolic Phyto-oestrogens

Oestrogenic or anti-oestrogenic effect depending on endogenous oestrogen concentration (amphoteric).
Two oestrogen receptors (ER): ERα, in ovarian cancer lines and oestrogen receptor node-positive breast cancers and ERβ, expressed preferentially in normal breast & ovarian tissue.
Phenolic phyto-oestrogens mainly interact with ER β.
Many health benefits may not be due to effect on oestrogen receptors, but on enzymes, protein synthesis, cell proliferation / differentiation, etc..

Lignans

Lower lignan plasma levels in those with breast cancer. Vegetarian women have high concentration of lignans. Finland: high consumption of rye bread, lower incidence of breast, colon and prostate cancer.

Flaxseed (Linum sativum)

Enterodiol & enterolactone formed by bacterial action on secoisolariciresinol diglucosides.
Phenolic phyto-oestrogens: displace high endogenous oestrogen, Oestrogenic effect in low oestrogen environment. Preferential binding to β-oestrogen receptors.
Lignan effects: decreases cell proliferation, inhibits aromatase, lowers risk of breast, prostate and other hormone-sensitive cancers, Increases SHBG (binds oestrogens so reduced bioavailability).
In humans, flaxseed: reduces serum levels of 17-β-oestradiol and oestrone sulphate, increases prolactin levels, increases the urinary ratio of 2-hydroxyoestrogen and 16-α-hydroxyoestrone.

Clinical studies with flaxseed

improve menopausal symptoms and quality of life increased, lowers glucose and insulin levels, helpful in incontinence in postmenopausal women. Favourable effect on blood cholesterol, inhibits cancer cell growth and possibly reduces tumour angiogenesis in patients with prostate cancer.

Soya (Glycine max)

Constituents
Isoflavones: genistein, daidzein, glycitein, their glucosides genistin, daidzin, glycitin, a small amount of coumestrol. Phenolic phyto-oestrogens: displace high endogenous oestrogen, Oestrogenic effect in low oestrogen environment, Preferential binding to β-oestrogen receptors.

Pharmacodynamics
Individual variability in colonic micro flora influences amount: urinary recovery can vary from 15-66%, High for fermented soy products). Dietary fibre correlates positively with urinary isoflavone excretion. Very high in macrobiotic diet followers, low in omnivores.

Hormonal effect
Oestrogenic effect: soy-rich diet helps menopausal symptoms e.g. hot flushes. Little effect on serum LH, FSH, but one trial showed increase in SHBG. Increases bone density: osteoblast ERβ expression higher. Effects enhanced by soy as a whole food rather than isolated isoflavonoids. Anti-oestrogenic: protective in oestrogen-promoted conditions e.g. breast cancer. Isoflavonoids occupy β-receptors, preventing overstimulation of proliferative tissue. Synergy with tamoxifen. Stimulates production of SHBG. Cancer protective not just from isoflavones or anti-oestrogenic effect but also:. anti-proliferative. anti-angiogenesis, antioxidant effect, tyrosine kinase inhibition, inhibits cell adhesions.

Safety of soy in relation to breast cancer
Early exposure to soy: lower incidence of breast cancer. Genistein: increases epithelial cell differentiation, ↓breast cancer risk. Tamoxifen: 2x reduction in carcinogenesis when combined with soy. No apparent interference with tamoxifen efficacy and possible decrease in risk of recurrence of cancer. Japanese breast and prostate cancer patients: better survival. Isoflavones supplements do not affect breast tissue density. Soy intake may reduce breast cancer risk.
Soy and other plant based phenolic phyto-oestrogens are safe and beneficial: isoflavonoids supplements use synthetic ipriflavone, a completely different proposition (200-600 mg/day of isoflavonoids compared to 15-60 mg/day of isoflavonoids in a normal diet).

Trifolium pratense

Constituents: Isoflavones in leaves: biochanin A, genistein, daidzein, Formononetin in flower heads. 1940s: Australian sheep develop lesions (clover disease) on reproductive organs, Ewes infertile. Investigated as a treatment for menopausal symptoms, despite no traditional indication.

Traditional use
Dermatological conditions, syphilis, glandular conditions. Topically: growths, swellings and cancers e.g. breast cancer. Included since the 1940s in the Hoxsley anti-cancer formula.

Menopausal symptoms: contradictory results.
Largest study: no reduction in menopause-related symptoms for two red clover isoflavone products. Promise with increasing /protecting bone density. based on BMD and T-score at the lumbar spine and plasma CTx levels.
May reduce risk of coronary vascular disease by increasing arterial elasticity.
Systematic review: hot flashes reduced, less effect on psychology status, sexual problems and sleeping disorders. Red clover consumption may decrease frequency of hot flashes, especially in women with severe hot flashes (≥ 5 per day). Subjective (vaginal dryness) and objective (maturation value) symptoms of vaginal atrophy showed a significant improvement.
Also in the systematic review: decrease in FSH and SHBG in red clover group (not statistically significant). LH, oestradiol, testosterone and endometrial thickness showed increase in red clover, (oestradiol was only significant). Methodological flaws of the included studies, menopause status and large heterogeneity among them.

Humulus lupulus

Hildegard von Bingen thought it caused melancholy. Women hop pickers began menstruating 2 days after beginning. Oestrogenic compounds 8-prenylnaringenin and Xanthohumol.
8-prenylnaringenin is metabolised during production of beer or after ingestion, preference to ERα, weakly mimics 17b-oestradiol, slightly uterotrophic, oestrogenic effect on mammary gland.

Xanthohumol
in vivo/in vitro: 'broad-spectrum' cancer chemo preventive with antibacterial properties. Both compounds inhibit aromatase, decrease breast cancer cell line proliferation and induce apoptosis. Protective against DNA damage by carcinogens and hepatoprotective.
Xanthohumol (XN): following effects observed at low dosage, anti-inflammatory, antioxidant, protective against DNA damage, hypoglycaemic, hepatoprotective, anticancerous.

Might be of use:
inhibiting non-alcoholic fatty liver disease, obesity, dysregulation of glucose metabolism and other components of the metabolic syndrome. This would link and confirm our knowledge of different uses of bitter herbs.

Clinical studies: menopausal symptoms
8-prenylnaringenin quickly and completely resorbed in human intestine and relevant plasma levels achieved. Favourable effects on vasomotor symptoms and other menopausal discomfort: decrease in hot flushes, palpitations, insomnia, irritability, sweating.
Cross-sectional study found a greater bone density in healthy women beer drinkers.
Hops shown to possesses oestradiol-like effect on osteogenic differentiation and bone density.

Salvia officinalis

Culpeper: “it heals the memory, warming and quickening of the senses”.
Cholinergic activities have been identified in Sage.

Perspiration-inhibiting/Antihidrotic effect studies
Several open studies, in the 1930s.
A larger study from 1989 (unpublished) on patients with idiopathic hyperhidrosis:
Excessive sweat induced by pilocarpine (Para sympathomimetic alkaloid) was inhibited extract of fresh sage (4.5 g herb daily).

Clinical research supports the traditional usage in menopausal Symptoms.
Salvia officinalis (sage) and Medicago sativa (alfalfa): hot flushes and night sweating reduced.
Induced a significant increase in Prolactin and Thyroid stimulating hormone response to Thyrotropin-releasing hormone TRH. (Oestradiol, LH, FSH, prolactin and TSH were not changed.) Suggested to have an antidopaminergic action.

How do they think it works?
The antioxidant and anti-inflammatory, Cholinesterase-inhibiting activities.
Rosmarinic acid: neuroprotective, antioxidative and anti-apoptotic effects against amyloid beta plaques toxicity in neuronal cells. Oestrogenic activity.

Sage and the effect on Glycaemic control and lipid profile
In hyperlipidemic type 2 diabetic patients sage lowered: fasting glucose, HbA1c (glycated haemoglobin), total cholesterol.
In hyperlipidemic patients sage lowered the blood levels of total cholesterol, triglyceride, LDL and VLDL, but increased the blood HDL.

Bone resorption inhibition activity: The dried leaves of sage strongly inhibit bone resorption.

Steroidal saponins

Used by pharmaceutical companies to produce progesterone & cortisone.
Traditionally for menstrual problems.
Herbs containing steroidal saponins: Dioscorea villosa, Trillium erectum, Chamaelirium luteum, Tribulus terrestris, Asparagus racemosus.
Gut bacteria separate the sugar molecule from the steroidal sapogenin.
Best known is diosgenin: diosgenin-rich herbs traditional for fertility, & menstrual cycle.
Probably affect hypothalamus-pituitary-ovary axis.
Post-ovulation: corpus luteum improves oestrogen/progesterone ratio.
Information from Tribulus terrestris (menopausal symptoms as Relieves hot flushes, insomnia and depression): increases FSH & oestradiol in premenopausal women, improves fertility, reduces hot flushes but does not increase oestradiol levels in postmenopausal women.

Tribulus terrestris

Clinical trials with Tribestan
Endocrine effects: increases serum FSH.
Ovulation induction in oligo/anovular infertility Menopausal symptoms: reduced Hot flushes, sweating, insomnia and depression.
Steroidal saponins have effect on the Hypothalamus Pituitary Ovary axis, by initiating ovulation. with ovulation the formation of the corpus luteum, which then increases oestrogen and but also progesterone formation (and thus improve oestrogen to progesterone ratio).
Low oestrogen environment: the steroidal compounds bind to vacant receptors in the hypothalamus and so decrease the symptoms of oestrogen withdrawal.
In the postmenopausal women sapogenin may directly or indirectly via hypothalamus and/or pituitary gland increase the production of oestrogen precursors from the adrenal cortex.
Premenopausal: because the estrogenic substances are very weak compared to the normal oestrogen, the body thinks that the oestrogen levels are lower than they really are and respond by increasing FSH, hence oestrogen production increases.

Dioscorea villosa

Constituents: steroidal saponins dioscin and other precursors of diosgenin, aglycone of dioscin used industrially to produce progesterone and cortisone.
Pharmacokinetics: Glycosides such as dioscin are broken down in the large intestine by microbial activity to form the aglucone diosgenin. Need a healthy gut flora.
Does not contain progesterone. Trial using wild yam cream: little effect on menopausal symptoms.
No traditional use for menopausal symptoms.
Historical use
Eclectics: Favourite spasmolytic specific for bilious colic. And dysmenorrhoea.
Prof. J. King: "…prompt and permanent relief… not only of value in bilious colic, but in all forms of colic and… gastro-intestinal irritation", "… in dysmenorrhoea the result of spasmodic irritation of the mucous membrane of the cervix uteri."

Pharmacology Low oestrogen environment: Steroidal compounds bind to receptors in the hypothalamus, Lessen oestrogen withdrawal symptoms.
Postmenopausal: Sapogenin may act on hypothalamus and/or pituitary. Increased production of oestrogen precursors from adrenal cortex.
Premenopausal: weakly oestrogenic substances bind to hypothalamic receptors. Body responds as though oestrogen levels are low.
Effect of yam Dioscorea alata ingestion in healthy postmenopausal women. Increased: oestrone, sex hormone binding globulin (SHBG), oestradiol. Decreased: cholesterol concentration.

Mexican yam reduced serum lipid peroxidation and serum triglycerides, increased HDL-cholesterol levels. Diosgenin possibly Interferes with absorption of dietary and endogenous cholesterol. Enhances cholesterol secretion into bile.

Adverse Reactions
All saponin-containing herbs taken orally may irritate gastric mucous membranes and cause reflux. To minimise this side effect wild yam should be taken with food.

Chamaelerium luteum

Constituents: Steroidal saponins (chamelirin, a glycoside of diosgenin). Very limited phytochemical information is available. Recent research into roots isolated two new steroidal saponins that contain an unusual aglycone 3, unique to Chamaelirium.

Pharmacology: amphoteric effect on hormonal secretion by ovary, Chamaelirium has never been investigated. Speculated that it increases FSH, stimulating ovulation.

Traditional indications: "Female conditions", The women used C. luteum to prevent miscarriages. *On the United Plant Savers "At Risk" list* As of 2010, at least 90% of the plants being sold are thought to have been collected from the wild.

Trillium erectum (Beth root): another threatened herb, most people tend to use Capsella bursa pastoris, Alchemilla vulg. instead, though they do not contain steroidal saponins. Traditionally an aid in labour and anti-haemorrhagic.

Asparagus racemosus (shatavari).
Constituents: steroidal saponins, saponins of the furanostanol-type, such as shatavarin-I, Alkaloids, including the non-hepatotoxic pyrrolizidine alkaloid asparagamine A, Mucilage.

Female reproductive system tonic, Sexual tonic/aphrodisiac "capacity to have a hundred husbands", Galactogogue, Demulcent for dry and inflamed membranes therefore possibly for vaginal dryness. Menopause, promoting conception: sexual debility and infertility in both sexes, Insufficient lactation, Threatened miscarriage, Leucorrhoea. General debility, fatigue, infections, body ache.

Clinical: evaluation of galactogogue activity of asparagus racemosus powder, RCT in India, Conclusion: Beneficial effect on lactation.

Triterpenoid glycosides

Cimicifuga racemosa

Constituents: Triterpene glycosides, Isoferulic and salicylic acids. Efficacy of methanolic extracts depends upon at 3+ fractions with a synergistic action.

Analgesic: e.g. dysmenorrhoea, childbirth, emmenagogue, tonic.

Used widely in C18-19th US for gynaecological conditions of many kinds, since mid-1950s widely used by German gynaecologists: Intermittent bleeding, disturbances in the menstrual cycle, PMS, climacteric complaints especially hot flushes and psychic complaints.

Clinical effect: reduces serum LH levels, Prevents osteoporosis, Oestrogenic like effect in bladder, No uterotrophic effects. CR does not bind to known oestrogen α or β receptors. Mixed & selective oestrogen agonism-antagonism depending on tissue.

Mode of action: dopaminergic activity, lowers prolactin levels, Inhibits pituitary LH secretion. Inhibits proliferation of ER α -positive MCF-7 Ca breast cells. Inhibition of human prostate cells in vitro via Aryl hydrocarbon receptor (AhR): AhR widely expressed in breast tissue and tumours: is it via dopaminergic antiproliferative action? or an unknown third subtype of ER?.

CR with tamoxifen: clinical trials combination therapy of tamoxifen and CR, possibly enhances the effect of tamoxifen. helps reduce hot flushes and improves quality of life.

Effect on bone metabolism; comparable osteoprotective effect to conjugated oestrogen, Decreased activity of osteoclast cells responsible for bone degradation. Increased bone-specific alkaline phosphatase, the marker for bone formation.
Effect on the endometrium and vagina; no changes in endometrium: unlikely to promote uterine cancer. Increase in superficial cells in vaginal smear, lowering pH in the vagina to prevent ascending infection. Increase of lubrication upon sexual activity.

Effects on urinary bladder: changes of tone, increased muscle tone measured in the bladder (animal studies). Possible effect on urinary incontinence.

Other effects: favourable effect on hepatic and lipid metabolism, leads to prevention of atherosclerosis. Effect on leptin feedback to the hypothalamus to reduce food intake, CR in vivo showed the same effect.

Clomiphene ± Black Cohosh for unexplained Infertility: higher pregnancy rates, Higher serum progesterone in the luteal phase (days 21 to 23). Possible explanation: Indirect oestrogenic effect of CR by supporting follicular development.

Cimicifuga and PCOS related infertility: two RCTs have shown improved pregnancy rates in those with PCOS with CR added to clomiphene during one menstrual cycle. lower LH for women with PCOS receiving Cimicifuga racemosa compared to clomiphene alone. favourable changes in FSH/LH ratio. Higher progesterone level from the first treatment cycle, indicating better ovulation and greater endometrial thickness.

Clinical trials: summary of significant findings
Effective for moderate as opposed to mild menopausal symptoms, Effective in relieving early menopausal symptoms.
Improvement of bone metabolism seen with CR.
Trials on hot flushes in breast cancer patients: lowering of the most debilitating symptoms of sweating.

Actions: neuroendocrine effect (dopaminergic and serotonergic receptor binding). Oestrogen modulation/oestrogen-like effect. Uterine and ovarian tonic. Anti-inflammatory. Analgesic. Spasmolytic. Nervine.

Specific indications: severe menopausal symptoms, hot flushes (also breast cancer patients on tamoxifen) mild depression, myalgia, bone metabolism, osteoporosis, Infertility (alongside clomiphene). Conditions needing LH reduction (ovarian failure, infertility, miscarriage, cysts, PCOS). Premenstrual syndrome, amenorrhoea, dysmenorrhoea, menorrhagia, ovarian pain, endometriosis. Arthritis, neuralgia, myalgia, tinnitus.

Hepatotoxicity: evidence is poor: poor case data, uncertainty of product, quality, & identification, undisclosed indication, missing /inadequate evaluation of alcohol use, co-medication, comorbidity, re-exposure test and alternative diagnoses not excluded, and others….
Clinical trial checking liver toxicity: no significant changes in hepatic artery, portal vein or total hepatic blood flow, or liver function tests.

Mis-identification of herbs!! Most common cause of hepatotoxicity related to Cimicifuga racemosa
Dosage: 40mg CR vs. 127 mg per day, similar safety and efficacy observed in both, Dosage in most clinical trials 80mg/day.
Equivalent weekly dosage as tincture: 0.6ml 1:1 , 1.8ml 1:3, 3.0ml 1:5, 6.0ml 1:10 60% alcohol needed to extract triterpene glycosides.

Herbs having an effect on Progesterone

Vitex agnus castus

Hippocrates: "If blood flows from the womb, let the woman drink dark wine in which the leaves of the chaste tree have been steeped.".
1953 First clinical work on vitex's galactagogue activity (using Agnolyt), During WW2, for stimulating milk production in German women under stress from Allied bombing (1941, 1942 and 1943). 1950s, animal studies further confirm lactation-stimulating action.

Constituents: a number of diterpenes: clerodadienols, highly lipophilic, easily pass the blood-brain barrier.

Mode of action: dramatic improvement in menstrual regularity in pts with cystic endometrial hyperplasia, 60s research suggested progesteronic activity (still mentioned in textbooks). Decreases prolactin secretion via dopamine receptor agonism.
Dopaminergic: dopamine inhibits prolactin secretion from pituitary. Increased prolactin inhibits corpus luteum development, reducing progesterone secretion.
Studies on prolactin levels and Vitex: dose dependent effect. Men: low doses caused a rise in prolactin (120 mg, 0.12ml FE) and higher doses (480mg, 0.48ml FE) led to much reduced secretion.
Clinical trials: latent hyperprolactinaemia. Latent hyperprolactinaemia causes deficient corpus luteal function. Leads to low levels of both progesterone and oestrogen. Some trials showed increase in progesterone and oestrogen production.
Vitex showed **affinity to certain opiate receptors**.

Melatonin release: Dioscorides "brings sleep". Vitex trial in men caused dose-dependent increase of melatonin secretion, especially at night.
In vivo reduces LH and testosterone, leptin, Intraperitoneal injections of Vitex in vivo decreased LH and testosterone levels.
Vitex useful as prophylaxis for osteopenia.

Systematic Review: Vitex is effective in the treatment of premenstrual syndrome, premenstrual dysphoric disorder and latent hyperprolactinaemia. Improvements in headaches, breast fullness, irritability and anger and mood changes. Migraine: a reduction in frequency of monthly attacks,.

Effect on menstrual cycle: a trial on latent hyperprolactinaemia reported that Vitex reduced prolactin secretion: normalising a shortened luteal phase, increasing mid-luteal progesterone and 17β-oestradiol levels, Intrauterine device induced bleeding.

Other Clinical trials.
Mefenamic acid and vitex agnus were both effective at reducing IUD-induced bleeding.
Severe dysmenorrhoea, acne vulgaris, fertility. Positive effects for Vitex agnus-castus in oligo/amenorrhoea and infertility, menstrual cyclicity significantly improved.
Luteal phase effect in hyperprolactinaemia, Women with luteal phase defects due to latent hyperprolactinaemia: Prolactin release reduced after 3 months. Shortened luteal phases normalised. Deficits in luteal progesterone synthesis eliminated.
Restless legs syndrome (RLS): positive response in 71% of otherwise untreated patients.

Actions: prolactin inhibitor (unusually high amounts are suspected to be responsible for impotence and loss of libido), Dopamine agonist. Indirectly progesterogenic. Galactagogue.

Indications
PMS symptoms: mastalgia, fluid retention, irritability, anger, depressed mood, mood changes, headache, premenstrual aggravations (such as mouth ulcers, orofacial herpes, epilepsy).
Menstruation problems: irregular menstruation, secondary amenorrhoea, metrorrhagia (from functional causes), oligomenorrhoea, polymenorrhoea, especially marked by progesterone deficiency (cystic hyperplasia of the endometrium) and latent hyperprolactinaemia.

Paeonia lactiflora

Constituents: monoterpene, paeoniflorin, has received most research attention.
Wide range of actions attested by preclinical studies: antioxidant, antimutagenic, immunomodulation, anti-atherosclerotic effects associated with lipid peroxidation inhibition, protection of endothelium from effects of hyperlipidaemia, platelet aggregation inhibition anticoagulation and fibrinolysis, spasmolysis, memory improvement, anti-epileptic, hepatoprotective, inhibition of hydrochloric acid secretion, appetite suppression, metabolism stimulation.

Clinical trials
TGP, total glycosides of Paeony = water/ethanol extract of which paeoniflorin is the major active component: anti-inflammatory, hepatoprotective and immuno-regulatory activities.
Hepatoprotective, enhancing orthodox treatment of RA: combination of methotrexate and leflunomide used for active RA, associated with liver toxicity.
Sjögren syndrome clinical trial: saliva secretion increased, Serum gamma-globulin decreased from the 6th month, Schirmer's test improved significantly after 12 months. Efficacy equivalent to hydroxychloroquine sulphate but higher safety and initiating time about 6 - 12 months.
Other clinical studies: TGP treatment reduced albuminuria and inflammatory markers in type 2 diabetes mellitus patients with diabetic kidney disease.
Clinical trial: chronic cor pulmonale with pulmonary hypertension: intravenous injection of benefit.

Studies combined Paeony and Glycyrrhiza. Spasmolytic effect of Paeonia and Glycyrrhiza – synergism in action. Peony interferes with acetylcholine release into neuromuscular junction. Liquorice interferes with acetylcholine activity in neuromuscular junctions.
Paeonia & Glyc. combination reduces dysmenorrhea in women with uterine fibroids
Reduced muscle cramps due to hepatic cirrhosis, diabetes mellitus, dialysis, alcoholism, cerebrovascular disease and muscle pain related to cancer drug. Muscle pain due to paclitaxel (Taxol®) and carboplatin therapy was eased.

Inhibits prolactin
Peony-Glycyrrhiza have an effect on the dopaminergic system: They reduce prolactin levels leading to normalising progesterone level.
Risperidone-induced hyperprolactinaemia: Paeony and Glycyrrhiza alleviated antipsychotic-induced hyperprolactinemia without exacerbating psychosis. The combination can also reduce sexual dysfunction in men caused by Risperidone-induced hyperprolactinemia.
In vivo androgen test: paeoniflorin, glycyrrhetic acid and glycyrrhizin: decreased testosterone production, stimulated aromatase activity to promote oestradiol synthesis from testosterone.

Glycyrrhiza glabra Reduced testosterone, increased oestradiol (enhanced aromatisation of testosterone to 17-β oestradiol), Increased ovulation rates, Decreased plasma testosterone in healthy ♀ (22–26 years old), With spironolactone: synergistic effect on androgen excess, reduced. metrorrhagia.
Clinical study: reduced body fat.

Paeonia and Glycyrrhiza Combination lowered serum testosterone in women with PCOS, and in those described as infertile, oligomenorrhoeic / amenorrhoeic, or hyperandrogenic. In women with acne vulgaris significantly decreased serum free testosterone after 12 weeks.

Women's health summary indications Paeonia with liquorice normalises ovarian function by reducing prolactin levels, its effect on aromatase, which promotes oestradiol synthesis from testosterone.

Clinical indications: androgen excess: PCOS. Hyperprolactinaemia: PMS, ovulatory failure, infertility, Endometriosis, adenomyosis, uterine fibroids, mastalgia, menopausal symptoms. Dysmenorrhoea,

uterine overactive in pregnancy. Nephritis or kidney problems related to type two diabetes. Muscle cramps.

Dosage: Paeonia: 4.5–8.5 mL/day of 1:2 15/30 ML PER WEEK OF 1:1 of each Paeonia and Glycyrrhiza. Japanese clinical trials used Paeonia and Licorice combination (extract equivalent to 4–6 g/day of dried Paeonia root and 4-6 g of Glycyrrhiza glabra). Aqueous ethanol is a more effective solvent than water for many of the constituents. Healthy gut flora needed.

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