

Module 8, Lesson 1 Handout:

Female Hormones

Let's talk sex hormones. When working with female clients, you'll want to be prepared to talk about the role that these hormones play in their health. It's important to note that men have these same hormones, just in different amounts and serving different purposes. See Module 9 Lesson 1 Handout for more on that.

Estrogen

The Basics

Estrogen is mainly produced in the ovaries, and is also made in fat cells and the adrenal glands. Estrogen is responsible for the development of physical female features like breasts, curvy hips, and pubic hair, and it plays a big role in reproduction. Estrogen regulates menstrual cycles, supports blood clotting and the thickness of the uterine wall, and plays a role in libido and vaginal lubrication. During pregnancy estrogen is made by the placenta and tells the breasts to produce milk. On top of all that, estrogen helps regulate cholesterol, protect bone health and affects other organs including the brain and heart.

In Depth Look & Imbalances

There are three major types of estrogen: estrone (E1), estradiol (E2) and estriol (E3).

Estrone (E1) is the least powerful of the estrogens. It's made in the ovaries, fat tissue and adrenal glands, and is the main estrogen your body makes after menopause. It plays a role in female sexual development and function, and it helps maintain bone health. Estrone isn't well studied compared with other estrogens, but we do know obesity can lead to higher levels of estrone (because it's made in fat cells), and high levels of estrone have been linked to breast and endometrial cancer. We also know low levels of estrone can lead to osteoporosis because of its role in bone health.

Estradiol (E2) is made in the ovaries and is the most abundant, powerful type of estrogen prior to menopause. Estradiol is to thank for the development and maintenance of physical female characteristics. It also prepares the body for pregnancy. During menstruation, estradiol levels increase, causing the release of the egg and thickening of the uterus lining. Too much estradiol may lead to depression, lack of sex drive, constipation, acne, weight gain, heart disease and even breast and uterine cancer. Low levels can cause osteoporosis, mood swings, and delayed puberty in young girls.

Estriol (E3) is made by the placenta during pregnancy. It stimulates uterus growth and prepares the body for birth. Estriol will increase about three weeks prior to a woman's due date; if it increases earlier this may lead to premature birth.

Progesterone

The Basics

Progesterone plays a major role in fertility and menstruation. In a nutshell, progesterone supports fetal development by changing mom's body to prepare and inhabit a fetus, and nourish a newborn. It's responsible for triggering the uterine lining to prepare for a fertilized egg by thickening the walls of the uterus. If there is no fertilized egg, the body breaks down the uterine lining through menstruation and progesterone levels drop again. During pregnancy, it keeps the body from ovulating. Progesterone also plays a role in lactation production.

In Depth Look & Imbalances

Progesterone is secreted in the corpus luteum, which is a temporary endocrine gland the female body produces during the second half of the menstrual cycle after ovulation. Around day 14, when the egg "ripens" and ovulation starts, the remnants of the ovarian follicle that enclosed the developing egg form a structure called the corpus luteum. This is the structure that releases progesterone. Progesterone prepares the body for pregnancy in the event that the released egg is fertilized. If the egg is not fertilized, the corpus luteum breaks down, the production of progesterone falls and a new menstrual cycle begins. If the egg is fertilized, progesterone stimulates the growth of blood vessels that nourish the early embryo. Progesterone then prepares the tissue lining of the uterus to allow the fertilized egg to implant and helps to maintain the endometrium throughout pregnancy. During the early stages of pregnancy, progesterone is still produced by the corpus luteum and is essential for supporting the pregnancy and establishing the placenta, which then takes over progesterone production.

During pregnancy, progesterone plays an important role in the development of the fetus; stimulates the growth of maternal breast tissue; prevents lactation; and strengthens the pelvic wall muscles in preparation for labor. The level of progesterone in the body steadily rises throughout pregnancy until labor occurs and the baby is born.

Synthetic progesterone is often used in the treatment of hot flashes and in managing symptoms of menopause. It may also be used in the treatment of amenorrhea and vaginal dryness. In women with endometriosis, it's the hormone that will depress estrogen receptors. Some birth control pills also

have synthetic progesterone. Low progesterone may cause miscarriages, uterine bleeding, and abnormal menstrual cycles.

Testosterone

The Basics

In women, testosterone is made in the ovaries, adrenal glands, and skin and fat cells. It plays a role in bone, breast, vaginal and brain health and also in fertility, sex drive, mood and energy.

Testosterone levels are much lower in women than in men (women have about 5-10% of the testosterone that men have). Levels are a bit higher in younger years and then dip a little between ages 20 and 40. Much testosterone in women is converted to estradiol.

In Depth Look & Imbalances

Concerns arise when testosterone levels get too high in women. High levels of testosterone can lead to polycystic ovarian syndrome (PCOS), acne, excessive facial hair growth, infertility, miscarriage, amenorrhea, and obesity. On the flip side, too little testosterone can cause low sex drive, vaginal dryness, changes in breast tissue, fertility issues, irregular periods, depression, fatigue and osteoporosis.

Recommendations for Balancing Hormones

The hormonal system is complex and having these hormones in balance is vital for overall health. Though every female is unique, there are several lifestyle recommendations for keeping this system in balance. Here is where you can play an important role.

- Eat to support a healthy gut. Gut microbiota are responsible for synthesizing, releasing, and regulating many of your hormones. Cut back on added sugars; ditch artificial sweeteners; add in fiber, particularly prebiotic fiber found in foods like asparagus, onions, artichokes and leeks; and include fermented foods like yogurt, kimchi and sauerkraut for probiotics.
- Consider fiber intake. Several studies have linked higher fiber diets with lower levels of estrogen in women of all ages. Work with a client to adjust fiber intake depending on her hormone status and goals
- Look at fat in the diet. Solid research supports higher fat diets can lead to increases in estrogen. Adjust the diet based on the clients needs
- Choose high quality protein including plant based protein such as beans and legumes, and when you're including animal protein go for organic to avoid residual hormones given to animals raised in large scale operations

- Watch out for soy. Soy is a controversial topic because it contains phytoestrogens, which are naturally occurring compounds that have been shown to be endocrine disruptors, but one of the reasons this topic gets tricky is because the research goes both ways. Many studies find that eating soy may be beneficial for health. If clients don't already eat soy, there's no need for them to start, but high quality, minimally processed, organic soy like tofu and tempeh is likely safe (and may even be beneficial) to include a few times a week. Avoid any processed forms of soy such as soy protein isolate, typically found in packaged foods like burgers, bars and cereals.
- Bump up antioxidants through fruits and vegetables. Results from the BioCycle Study, a prospective cohort of 259 women, showed a connection between antioxidant intake and hormone balancing, concluding high antioxidant intake can help support normal reproduction in women. The study specifically looked at α -tocopherol, γ -tocopherol, retinol, lutein, lycopene, β -carotene and ascorbic acid.
- Ditch anything with BPA. Switch out plastic water bottles and food storage containers for glass and shop for foods in BPA-free containers when choosing packaged products
- Go natural with beauty and cleaning products. So many of the big brands contain hormone disrupting chemicals such as parabens and phthalates. Use products made by brands that are committed to natural and harm free ingredients. We know the word "natural" alone doesn't give a product the thumbs up. The EWG has a comprehensive online database to search for the healthiest products.
- Uphold all of the pillars of a Nutritious Life. Managing stress, getting enough sleep, exercising regularly, staying hydrated, living consciously... it's all connected to balancing hormones