Through the Changes: How Steroid Hormones Affect the Skin

by Sharon Maxwell

Hormones are chemical messengers produced by the endocrine system that tell organs what to do. Yet they are some of the most powerful forces in your life, controlling each moment of your day, from waking to sleeping, the reproductive cycle, how you age, and even your moods and desires. What a lot of people don’t know is that the hormones affect the skin because the skin is an endocrine organ; it has receptors that receive messages from the endocrine system, nervous system and immune system.1 According to Dr. Claudia Aguirre, there is also a powerful brain-skin connection, and we are still discovering the skin is far more sophisticated than ever imagined.

How Hormones Work

Hormones are regulated by the endocrine system, which contains numerous glands, including the pituitary, thyroid, pineal, thymus, pancreas, adrenal and sex steroid glands. Carrying the chemical data that controls the rate at which glands and other organs work, hormones travel in the blood stream to tissues or organs, affecting many different processes including: metabolism, growth and development, sexual function, reproduction and mood. Hormones are extremely powerful, taking only a small amount to cause significant changes in the body, which is why hormonal imbalance can have such serious consequences, such as diabetes, hyperthyroidism and hypothyroidism.2

Steroid Hormones and the Skin

Several hormones affect the skin, such as thyroid hormones and growth hormones (insulin-like growth factor-1), but this article focuses on steroid hormones, as they play an important role in the skin’s function.

The steroid hormones help control metabolism, inflammation, immune function, salt and water balance, development of sexual characteristics, and the ability to withstand illness, injury and stress. As far as we know, all steroid hormones are made from cholesterol and, although the body can manufacture about 75 percent of our cholesterol from non-cholesterol containing foods, the remaining 25 percent has to come from cholesterol-containing foods.3 Eliminating cholesterol-containing foods completely may result in hormonal imbalance, with low cholesterol in the elderly linked with depression and suicide.4,5
Sex Steroid Hormones

The three sex steroid hormones — androgen, estrogen and progesterone — have the biggest impact on the skin.

Androgenic Effects

The biggest difference between male and female skin is due to the male hormones known as androgens, which are responsible for coarse terminal body hair in men, androgenetic alopecia (male baldness), muscle development, and a denser network of collagen fibers than in women. The firm collagen and elastin network, together with the presence of terminal hair follicles, results in a thicker facial skin in men. Surprisingly, men — in particular, older men — have been shown to have increased sensitivity and a slower skin wound healing capacity than women; it is therefore important not to assume that all male skin is tough and requires more aggressive treatment.

The dominant sex hormone of the androgen group is testosterone, secreted in the testes in men and, to a lesser extent, by the ovaries in women. On average, it is estimated men produce 10 times more testosterone than women. Testosterone stimulates the sebaceous glands and the increased sebum production can mean hormones are a factor in the development of acne for both sexes during puberty. However, men’s skin is typically more stable after puberty, as women tend to be affected more heavily by hormonal fluctuations during pregnancy, menopause, and so on.

Estrogenic Effects

Estrogen encompasses all the types of estrogen chemicals in the body: including estradiol, the most abundant in reproductive years, estriol, in pregnancy, and estrone, in menopause. All the different forms of estrogen are synthesized from androgens. Although estrogen is made primarily in the ovaries, it is also produced by the adrenal glands, fat cells, muscle cells and the skin after menopause.

Estrogen is very good for the skin as it maintains hydration, increases collagen production, maintains epidermal thickness, and ensures a healthy blood flow, bringing oxygen and nutrients to the skin. As well as helping to enhance the skin’s protective barrier function, the higher the levels of estrogen, the larger the eyes and fuller the lips, which typically serve as a biological indicator of a woman’s health and fertility. Although the mechanism isn’t fully understood, high levels of estrogen and progesterone in the body can also cause pigmentation issues, for instance, as a result of pregnancy or taking birth control pills.

Fluctuating Hormones

Affected by many different factors such as diet, environment, stress, mood, and enzymes, hormones can also stimulate other hormones, and only a slight change in hormone balance can cause significant effects in the body and skin. We now know the skin is affected by hormones, and it can even secrete hormones, which is why it can be classified as an endocrine organ. Throughout life, hormones fluctuate and these hormonal changes can have an effect upon the skin — from puberty, through pregnancy, to menopause.
Puberty

One particular enzyme that has an effect on the skin is 5-alpha reductase, which is produced in many tissues in both males and females, especially in the reproductive tract, testes and ovaries. When testosterone levels rise, this can stimulate 5-alpha reductase, which converts testosterone into dihydrotestosterone and, in turn, stimulates sebum production in the sebaceous glands. At puberty, testosterone levels escalate and 5-alpha reductase goes into overdrive causing an excess production of sebum.

The sebaceous glands enlarge and secrete more sebum than can be absorbed. This sticky sebum causes the cells inside the follicle to stick together and this impaction plug provides a nice environment for anaerobic bacteria (Propionibacterium acnes) to thrive. This can result in comedones, which may lead to more inflammatory lesions, such as the painful papules and pustules that we see in teenage acne.

As therapists, we cannot stop the cause of acne if it is hormonally induced, but we can recognize the symptoms and deal with the problems. Teenage clients should be educated in the value of not over scrubbing the skin clean, which would stimulate blood flow and, in turn, oil production. It is important to avoid products containing stripping ingredients that remove the natural acidic barrier protecting against bacteria, such as specially denatured (SD) alcohols, and comedogenic ingredients that can cause congestion in the follicle, such as Lanolin, D and C colors and Isopropyl Myristate. To avoid scarring, spots should not be squeezed or picked, and instead products should be applied containing ingredients that:

- Reduce sebum production by inhibiting the 5-alpha reductase enzyme, such as Niacinamide and Zinc Gluconate
- Help to clear congested follicles by stimulating natural exfoliation, such as Salicylic Acid (a Beta Hydroxy Acid)
- Eliminate bacteria, such as Benzoyl Peroxide
- Contain antibacterial and anti-inflammatory properties, such as Tea Tree

The skin needs to be assessed regularly to check desired results are being achieved and skincare information repeated regularly, as teenagers may struggle to see consequences of their actions fully.

Pregnancy

The dominant hormone in pregnancy is progesterone, with the placenta producing 10 to 20 times more than normally experienced in a menstrual cycle, and estrogen is also present in high levels.

There are a variety of skin changes that may occur during pregnancy due to the increase in estrogen and progesterone, with hormonal fluctuations affecting each woman differently. For example, potentially either causing a hormonal imbalance or regulating a previous imbalance. Overall, the skin can become softer, due to its increased ability to retain moisture, giving that characteristic glow of pregnancy. The skin
around the cheeks, nose and eyes may darken, which is known as chloasma or the mask of pregnancy. This appears dark in fair-skinned women and light in dark-skinned women.

Some women who are predisposed to acne find their skin clears up while others can develop acne for the first time. Dry, itchy skin is also common, as well as eczema. We must consider what is safe to use during pregnancy, and what to avoid. If the client is in her first trimester, expecting her first baby, or has had previous complications, it is advisable to be very cautious as the client is likely to be very nervous. If there is concern over a particular ingredient, ask the client to check with her doctor.

During the pregnancy, there are some ingredients to be aware of, such as Retinol (a form of Vitamin A used to treat wrinkles) and Salicylic Acid (used to treat acne). High doses in the oral form of both these ingredients have been shown to cause birth defects, but although there are no studies to show retinoid ingredients are harmful when applied topically to the skin, most doctors recommend pregnant women should avoid Vitamin A and its derivatives (such as Retinoic Acid). Similarly, doctors are unsure of the effects of Salicylic Acid and its ability to penetrate topically into the bloodstream, so again they advise caution. Small amounts of Salicylic Acid used in a cleanser that is rinsed off the skin is considered safe, but products such as masks or peels that cover more surface area and sit on the skin for longer are more likely to be absorbed, so should be avoided.  

Fake tanning products, such as those containing Dihydroxyacetone, which react with the dead cells in the stratum corneum to produce a brown pigment, should also be avoided if the skin is sensitized, to prevent potentially causing a reaction. Shorter treatments focused on skin concerns might be preferable as one hour may be too long for pregnant women to lie comfortably on the couch, plus extra pillows and bolsters may be required for client comfort, and the room temperature should be kept comfortable.

**Perimenopause and Menopause**

Menopause is defined as the cessation of menstruation for 12 consecutive months, marking the end of a woman’s reproductive years. The average age for menopause is 51, but levels of the hormones estrogen and progesterone can start to fluctuate up to 10 years before — termed perimenopause. This can be a confusing time as women can experience both symptoms of high estrogen or low estrogen, as the activity of the ovaries decline. In perimenopause, clients may experience fluid retention, bloating, swollen ankles and swollen eyes. There can be hot flashes and an increased sensitivity, leading to a more reactive skin, with rosacea being prevalent between the ages of 30 and 50, and more common in women than men. The skin may produce more or less sebum, depending on hormonal fluctuations, and dehydration and acne may occur. High estrogen levels keep testosterone in check, but as estrogen levels decline, testosterone levels can increase and women can experience hair growth in a male pattern on the face (such as upper lip or chin), and an increase in oil production, potentially resulting in adult acne.

Once women have reached menopause, progesterone production stops, estrogen production diminishes significantly and estrone becomes the dominant estrogen. As estrogens increase the production of glycosaminoglycans (GAGS), such as Hyaluronic Acid, which help maintain fluid balance, a lack of estrogen can diminish skin moisture levels, potentially causing dehydration. Decreased collagen and...
elastin can cause sagging skin, reduced sebaceous gland activity may result in skin dryness and uneven pigmentation can occur.

Estrogens stimulate fat deposits over the female body, so as estrogen levels drop during menopause, fat deposits are redistributed and become concentrated in the abdomen and/or thighs and buttocks. The result is a loss of supportive fat below the skin of the face, neck, hands and arms, which allows sagging and wrinkles to appear.

Useful ingredients to help target the skin of the menopausal client include those that:

- Increase collagen production, such as Peptides and Retinol
- Even out skin tone, such as Vitamin C
- Reduce inflammation, such as Oat Kernel Extract and Bisabolol
- Replenish barrier lipids, such as Shea Butter, Jojoba Seed and evening Primrose Oil

Menopause is not a disease that needs to be fixed; it is a natural change in life and we should help our clients to approach it positively. As every female client has a unique menopausal experience, a thorough skin assessment is required at each session, plus factors such as lifestyle, exercise and nutrition taken into account before offering treatments to balance mind, body and spirit. The therapist needs to be flexible and adaptable, for example, if the client is experiencing hot flashes characteristic of perimenopause, calming, cooling treatments would be beneficial; and for a client with the dry, lackluster skin typical of menopause, energizing treatments may be more appropriate.

Use of direct high frequency may help heal the spots of clients experiencing acne; galvanic iontophoresis, microcurrent or ultrasound would enhance product penetration; and incorporating aromatherapy, acupressure or Ayurvedic techniques for their rebalancing effects may prove useful. Exfoliation, hydration, and layering of products with masks, active serums, barrier lipids, a product containing SPF15 or above, in addition to a good homecare regimen, and an effective exercise and nutrition program, will all help keep skin in optimum condition.

All women have to deal with the effects of their hormones at some point in their life, whether during puberty, pregnancy or menopause. The skin is not just a sheath or covering of the body, it is an endocrine organ. If we understand the role of hormones and skin, we can remove the confusion for clients, and help them to maintain healthy skin.

References:

