

## Hormones and Your Skin

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About one hundred years ago humans doubled their life expectancy. This was a monumental feat, given that the number of years the average person was expected to live was a relatively constant number throughout most of human history. Nutrition, modern medicine and technology were mostly responsible for this dramatic change. In 2007, average life expectancy was 80.4 years for women, and 75.3 years for men.<sup>1</sup> This gap may be narrowing, but one thing is clear – there is virtually a new population in the human experience, and women are the chief contributors. The aging female client is the backbone of our industry. Anti-aging skin care, led by cosmeceutical sales, is the leader in the multibillion dollar skin care industry, and it is not going away anytime soon.



Female life expectancy has increased dramatically over the years, while the age of menopause onset has remained stable at around 50 years of age. This means more and more women live in a hormone-deprived state, a relatively new phenomenon in human existence.<sup>4</sup> There is no decisive reason as to why women in particular live long past their reproductive years, but there is an interesting hypothesis that may shed some light. In fact, it is called the “grandmother hypothesis” and it argues that having an older female to help nurture children ensures that the younger generation reaches its maximal evolutionary potential. That is, having Granny around the house to help with the kids ensures they are well-behaved, fed and safe so they too can have long, healthy lives. Although extended longevity seems like a great advantage of the 21st century, it opens up a lot of doors for age-related changes and disease. Many of these changes also take place on the skin, so having a full understanding of how hormones – and the lack of them – affect skin will benefit the professional skin therapist in everything from consultation and skin analysis to providing effective and realistic solutions to the aging, hormone deprived client.

### The Role of Hormones

One of the most important factors involved in the initiation of aging is the endocrine system. Particularly important for women, the endocrine system produces and regulates hormones, which decline, sometimes drastically, with age. Hormones are chemical messengers that are produced in organs such as the ovaries, adrenal glands and thyroid glands. Sex steroid hormones, thyroid and growth hormones are involved in many different functions such as growth, immune, reproductive and metabolic functions, and even hunger and stress. Unlike extrinsic aging, which requires external factors like ultraviolet (UV) radiation, lifestyle and pollution to cause deep wrinkling and photodamage, intrinsic skin aging is governed by our own body’s biological clock. Dryness, fine wrinkling and paleness is all part of the natural process of skin aging. Many factors are involved in intrinsic skin aging: genetic mutations, increased inflammatory signals, decreased lipid production and decreased hormone levels. These hormone changes are now being more closely examined to reveal just how important they are to skin health,

especially in women. How do these hormones act on the skin? And specifically how do they impact skin aging?

## **Estrogen**

When it comes to popular hormones, estrogen takes the prize for most widely known and discussed. However, there are many misconceptions about this elusive and incredibly important substance. First of all, it is not purely a female hormone. True, it is primarily made in the ovaries and is abundant in females, but it is also found in males and made in different tissues outside of the ovaries. Secondly, the word estrogen actually encompasses a group of chemically similar hormones, so it is not a single substance. Estrogens include estradiol, the most abundant form in adult females, estriol, the primary estrogen during pregnancy and estrone, which is produced during menopause. Interestingly, in females, estrogens are made by converting the male hormones, known collectively as androgens, into estrogens. And these androgens are initially derived from cholesterol, the primary steroid that gives rise to many steroid hormone families. The conversions from cholesterol to androgens, or from androgens to estrogens, is all made via the actions of certain key enzymes. Without these enzymes, conversion would not be possible. The skin, among its myriad of functions, also has the necessary components to produce both cholesterol – and derive sex steroids from it – within the skin.

In the skin, estrogens affect skin thickness, wrinkle formation and skin moisture. Estrogens can increase glycosaminoglycans (GAGs), such as Hyaluronic Acid, to maintain fluid balance and structural integrity. They can also increase collagen production in the skin, where they maintain epidermal thickness and allow skin to remain plump, hydrated and wrinkle-free.<sup>2</sup> During periods of elevated hormonal activity, such as pregnancy or with some oral contraceptives, skin pigmentation is exacerbated in certain sun-exposed areas such as the forehead, nose and cheeks. This phenomenon, known as melasma, is strictly hormone-related and is a clear example of hormonal effects on the skin pigmentation. The skin is not the only external feature that benefits from estrogens. Besides resulting in plump, healthy skin, estrogens can also make hair grow long and healthy. During pregnancy, women often experience hair growth, where the anagen phase is prolonged. The plummeting post-partum and even menopausal estrogenic levels cause thinning and falling hair, sometimes resulting in clinically significant hair loss, the so-called telogen effluvium.

In essence, estrogens help our skin and hair remain youthful. Of course, with puberty, menstruation and menopause, progesterone is also a key player. However, the research is still scant in this area. Future research will hopefully shed some light on the interactions between estrogens and progesterone, to better understand these described changes in skin and hair.

## **Testosterone**

Testosterone is the chief male sex hormone and is the primary reason for everything that makes a man, well... male. Coarser hair, thicker and oilier skin, and generally a later onset for showing signs of skin aging are all due to testosterone. Female pattern alopecia, or baldness, is attributed to increased androgen levels and is the most common cause of hair loss in women. With age, the estrogen-androgen

ratio becomes unbalanced, and changes are seen following menopause. Since androgens, and in particular testosterone, are involved in skin sebum production, females may experience increased oiliness or even adult acne when hormones become unbalanced during menstruation or menopause. The effects of androgens on skin are important in both male and female clients, as both can experience effects of altered androgen levels.

## **Thyroid Hormones**

The thyroid is a small butterfly-shaped gland situated just in front of the voice box. The thyroid gland makes two thyroid hormones which affect metabolism, brain development, breathing, body temperature, muscle strength, bone health, skin dryness, menstrual cycles, weight and cholesterol levels. Again, balance is key when it comes to these hormones. Too much, and skin can become warm, sweaty and flushed. Too little, and skin becomes dry, coarse, thick and even sweating is decreased. Thyroid dysfunction can also lead to thinning hair and eventual hair loss.

## **The Female Menopause**

In our culture, menopause is frequently seen in a negative light, as something that requires medical attention and signifying a time of loss. Women are bombarded with messages about the impending doom of menopause even before they begin to have children. It is no wonder, then, that women tend to develop a negative body image during this transitional period. However, this transitional period is a completely natural process that must be understood in order to be appreciated. Only then can women take charge of their bodies and transition to menopause in a healthy and positive manner. So what occurs on the skin during perimenopause – the transitional period before menopause – and after menopause?

During the transition into menopause, often characterized by hot flashes, female skin may appear flushed, red and blotchy. Estrogens have anti-inflammatory properties, so the loss of these hormones can also lead to increased inflammation, which can exacerbate certain conditions like rosacea. As discussed, estrogens play a major role in the collagen and elastin network of the skin. Losing estrogens means losing dermal collagen production. So skin thins out, loses elasticity and sets the stage for wrinkle formation. Estrogens also regulate GAGs in the skin, and losing these hormones results in dehydrated, itchy skin. Estrogenic loss also reduces the number of blood vessels in the skin, resulting in pale skin with a lack of nutrients traveling to the skin's surface.<sup>2</sup> In all, we get pale, thin and dry skin. Since the drop in estrogen is sudden and more drastic than other hormones such as testosterone, it can also lead to an increase in androgenic characteristics such as increased facial hair. This is a sensitive time in a woman's life, and it is imperative to treat the aging female client undergoing this hormonal transition with respect and understanding. Given the severity of the biological changes, is there anything we can do to rejuvenate the skin in an older woman?

## **Is Hormone Replacement Therapy the Answer?**

At the forefront of the menopausal skin treatments are topical steroid hormones. A relatively new field in skin care, it is not yet a plausible solution due to lack of research and existing side effects. Nevertheless,

research has shown improvements in skin elasticity, moisture and skin thickness in women using either topical or oral hormone replacement therapy (HRT). However, HRT does not always prove to be fully beneficial. For example, a recent study showed that sun-damaged skin does not improve with estrogen treatment.<sup>3</sup> Moreover, side effects have even shown increased pigmentation on cheeks after hormonal therapy.<sup>2</sup> The research on male skin and hormone therapy is even more scant. So you can see that much more work is needed in this general area.

### **What Can We Do For the Menopausal Client?**

Despite the growing research on medicated hormonal treatments on the skin, there are many options available already to turn dry, itchy and thinning skin into smoother, fresher skin. Since collagen production is drastically affected during hormonal loss, it is imperative to use ingredients that boost collagen production in the skin. Retinoids, including Retinol, are part of the Vitamin A family with a great track record in increasing collagen and controlling pigmentation. Vitamin C, which has also been shown to boost collagen production, also brightens skin and evens out skin tone. Peptides that increase production of elastin, collagen and GAGs like Palmitoyl Tripeptide-38 and Palmitoyl Pentapeptide will benefit dry, loose skin by plumping and firming skin effectively. To battle the fires brought on by hot flashes and increased inflammation, look for anti-inflammatory ingredients like Avena Sativa Extracts, Chamomile and Bisabolol, even peptides that control neurogenic inflammation, as this can exacerbate symptoms. A dehydrated epidermal barrier benefits greatly from essential fatty acids, phytosterols and ceramides. Of course during hot flashes, we may want to constrict the capillaries with topical caffeine and avoid lifestyle trigger factors such as heat, sun and alcohol. Antioxidants can be an amazing powerhouse of rejuvenation – ingredients such as Superoxide Dismutase, Gingko Biloba, and White and Green Tea extracts to further protect the skin from oxidative damage.

Professional treatments for the aging client should take into consideration the loss of these vital hormones, so design a menu to specifically address these concerns. Focus on increasing hydration, stimulating collagen production and re-energizing the skin. Aside from the above ingredients, the use of invigorating essential oils can also provide hydration, nourish and heal skin. Using oils like Rosewood and Jasmine to provide intense hydration and Carrot Seed, Argan and Rosehip Oils to boost antioxidants, improve elasticity and reinforce the epidermal lipid barrier are all great treatment options with the added bonus of providing aromatherapy during this particularly stressful time. Exfoliation is a key step in rejuvenating aging skin with slowed cell renewal. Heavier moisturizers are appropriate for an aging skin client, so be prepared to use rich emollients that hydrate and protect chronically dry skin. Despite the fact that women experience the most drastic skin changes, men also lose testosterone leading to the same dry skin condition, so the same protocol can be used for an aging male client. Educating your clients for proper at-home care is imperative in maintain youthful skin during the latter decades. The earlier they use proper skin care the better, but some helpful tips are always appreciated. A diet rich in healthy fats, like Omega-3s found in salmon and nuts, will help nourish skin from the inside. Extrinsic aging is practically inescapable, so daily use of sun protection is a must in everyone's skin care regimen. This is particularly important in aged skin, as it is thinner and allows even more penetration by damaging UV rays.

## Stop Being So “Hormonal”

Perhaps it is time, what with all the research devoted to hormonal effects on the body and mind, to remove the negative connotations when it comes to hormones. They truly are powerful substances involved in just about every aspect of human biology and behavior. The aging population is increasing and women are at the forefront of this growth. It is no surprise the vast majority of anti-aging products and treatments are targeted at women. In fact, almost eight million nonsurgical cosmetic procedures were performed in 2010 at a cost of \$4.1 billion dollars, according to the American Society of Cosmetic Dermatology and Aesthetic Surgery. Although this can be a distressing and uncomfortable stage of life, it is important for our industry to provide comfort as well as solutions to the people affected by hormonal loss. Understanding the power of these hormones on the skin will allow you, the skin therapist, to better treat your clients and form long-lasting relationships at any age.

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