Getting Your Beauty Sleep with Topical Melatonin

By Gary Goldfaden, MD and Robert Goldfaden

The failure to get a good night’s sleep affects nearly every system in our bodies, including the body’s largest organ—the skin. The signs of sleep deprivation are often written all over our faces—from bags under the eyes to wrinkles and furrows to lack of skin tone—all of which can contribute to premature skin aging.

Scientific studies show that the restorative power of sleep is vital for rejuvenating and repairing the skin and is controlled by the hormone melatonin. However, as melatonin levels decline with age, only miniscule amounts of the small quantities produced by those suffering from sleep problems actually reach the skin. Fortunately, going straight to the source and applying melatonin directly to the skin will allow those suffering from insomnia to benefit from its rejuvenating powers for restoring the appearance and texture of skin.

We spend one-third of our lives sleeping. A common problem as people get older, however, is not experiencing the same level of restorative sleep as they did in their youth. Research shows that a good night’s sleep is not just essential for a healthy mind, but a healthy body too. Sleep debt has been shown to hasten the onset of diseases such as type 2 diabetes and obesity, and to reduce immunity. Whatever the cause of insomnia, research suggests that it also impairs our beauty sleep by not allowing skin cells to repair themselves from the wear and tear of the day.

The sleep/wake cycle that controls the body’s clock is influenced by the master hormone melatonin, which is secreted cyclically from the pineal gland in the brain in response to the amount of light hitting our eyes. Melatonin keeps us in sync with the rhythms of the day and the season. In humans, melatonin secretion increases soon after the onset of darkness, peaks in the middle of the night (between 2 and 4 am), and gradually falls during the second half of the night.

Feeling unrested in the morning or drowsy during the day can be a signal of sleep deprivation. According to a National Institutes of Health Consensus Statement, about 30% of American adults have some symptoms of insomnia within a given year, while approximately 10% have associated symptoms of daytime functional impairment. The prevalence of insomnia is also reported to be higher among women and older people. This may not be surprising since melatonin levels decrease dramatically and predictably with aging, with about 30% of people over the age of 50 experiencing some degree of insomnia.

Fortunately, melatonin supplementation can help to reset our biological clock. The timing and intensity of melatonin levels plays a role in many neuroendocrine functions. In fact, melatonin is closely linked with aging, stress/cortisol levels, jet lag, mood swings, and sleep patterns. Because of its ability to regulate day-night cycles, melatonin has been shown to be effective as a sleep aid in many people.

A meta-analysis of 17 studies concluded that melatonin supplementation decreases sleep latency (the time it takes to fall asleep) while increasing sleep efficiency and total sleep duration. Supplementation with melatonin has been found to be particularly helpful for elderly people suffering from insomnia, with 0.3 mg of melatonin before bedtime improving their sleep compared with a control group. Melatonin has also shown promise in treating a variety of sleep disorders, of which the best studied is jet lag, by effectively helping people adjust to new time zones. In addition, melatonin appears to produce sedation in some people that compares favorably to conventional pharmaceuticals used for inducing sleep—without impairing mental function.
Scientists have recently discovered that the skin contains melatonin receptors, which suggests that melatonin also plays an important role in regulating skin function and structure. People with reduced melatonin secretion not only suffer from insomnia, but are unable to benefit from its effects in the rest of the body. To make matters worse, since the skin does not have as intense a network of blood circulation as other organs such as the brain, what little melatonin is produced has a hard time reaching the skin, which may compromise skin integrity.

While the skin protects itself against multiple environmental and endogenous stressors during the day, scientists have recently discovered that during the nighttime hours, the skin springs into action to repair itself and get back into balance through a restorative and renewal process. Indeed, so much hormonal activity occurs in the skin that it is often referred to as another endocrine gland. It is believed that an altered rhythm and low levels of melatonin secretion in this localized system may play a role in the etiology and treatment of several common skin disorders, for example, atopic eczema and psoriasis. Melatonin is also believed to protect against certain cancers by a variety of mechanisms.

Melatonin plays a key role in rejuvenating skin through its interactions with major skin cells such as keratinocytes and fibroblasts. Melatonin protects keratinocytes against cell death, while stimulating the growth of fibroblasts. Fibroblasts produce the essential proteins collagen and elastin, which provide structural support for the skin. As we age, these fibroblast cells start to develop dramatic mitochondrial dysfunction, rendering them less able to produce enough energy to fulfill their role in supporting the skin. This is borne out in animal research showing that a deficiency in melatonin reduces skin thickness, increases lipid peroxidation, and induces skin degenerative changes—all of which have been shown to be improved with melatonin treatment.

Melatonin has also been found to be effective against skin aging. It has powerful antioxidant properties by quenching mainly hydroxyl radicals, the most damaging of all radicals. In addition, research shows that pretreating human skin with topical melatonin can confer strong protection against ultraviolet (UV) light-induced erythema (sunburn) by suppressing oxidative damage. Studies also show that while sleep deprivation can delay wound healing, topical treatment with melatonin can improve the quality of wound healing and scar formation.

**BENEFITS OF TOPICAL MELATONIN**

While oral melatonin supplements can improve sleep in most people, melatonin appears in rather low levels in the blood due to prominent first-pass degradation in the liver, which can limit skin access. The efficacy of melatonin as a topical agent offers a promising avenue to enhance the skin’s nightly repair cycle. Researchers have found that melatonin penetrates into the stratum corneum (the outer layer of skin) and accumulates there due to its distinct lipophilic chemical structure, reinforcing the skin’s capacity for repair, renewal, and revitalization during the night.

Fortunately, very low concentrations of melatonin are needed to penetrate into the skin. Melatonin’s chemical structure is such that it passes through cell membranes with relative ease, especially when its permeation can be enhanced with agents that reduce its lag time into the skin.

The quest for such agents has shown methylsulfonylmethane (MSM) to be an effective permeation enhancer. It is used in a variety of conditions to minimize pain and inflammation since it can easily penetrate through cellular membranes, including the skin, carrying along with it any substance that can be absorbed into the skin, such as melatonin.

MSM is also a unique and natural source of sulfur, which is a crucial component of the body’s connective tissues. It is believed that exogenous MSM gives up its sulfur to essential amino acids and serum proteins, thus providing key functional and structural roles in these molecules. In addition, MSM is rated as one of the least toxic substances in biology, having been shown to be safe in animal and human studies.

**GETTING YOUR BEAUTY SLEEP WITH TOPICAL MELATONIN**

- Poor sleep adversely affects nearly every system of the body, including its largest organ—the skin.
- Inadequate sleep can lead to bags under the eyes, wrinkles and furrows, and poor skin tone, contributing to premature aging.
- The hormone melatonin is responsible for regulating sleep-wake cycles and plays a key role in skin repair and renewal. Aging and sleep disturbances can decrease the body’s production of melatonin.
- Topical application of melatonin rejuvenates the skin through numerous mechanisms, including fighting free radicals, providing photoprotection, and supporting skin healing.
- Other topical agents including methylsulfonylmethane (MSM), gamma-aminobutyric acid (GABA), vitamins C and E,
RELAXING AND CALMING INGREDIENT

The effectiveness of melatonin in the skin can also be enhanced with agents that relax the body before sleep. Gamma-aminobutyric acid (GABA) is a key inhibitory amino acid that the body relies on to combat stress and remain in a serene state when faced with overstimulation. GABA exerts its actions through the same anti-anxiety receptors that are targets for drugs such as Valium® and is the most widespread and important inhibitory neurotransmitter in the brain. Considered as the brain’s natural sedative, a recent study shows that supplementing with GABA can balance the excitability that can lead to restlessness, anxiety, and other disruptive conditions.28

PROTECTING AND FIRMING THE SKIN

Combining melatonin, MSM, and GABA with peptides and classic anti-aging nutrients such as vitamins C and E can help optimize the skin’s renewal and repair cycle while firming skin and providing powerful antioxidant protection.

Vitamins C and E work together in providing antioxidant protection and supporting collagen synthesis to preserve and restore skin health. Studies show that these antioxidants are depleted in aged and photoaged skin. In photoaged skin, for example, vitamin C levels are only 69% of young skin levels in the epidermis and 63% in the dermis. Naturally aged skin contains 61% of youthful vitamin C skin levels in the epidermis, while the dermis retains about 70% of youthful levels. A similar trend is seen for vitamin E levels, which are significantly lower in the epidermis of photoaged and naturally aged skin, compared with young skin.29 Applying vitamin E topically can protect against free radicals generated by solar radiation as well as preserve vitamin E levels in the skin.30 Studies with topical vitamin C on photoaged skin show significant improvement in wrinkling correlated with evidence of new collagen formation31 and other clinical parameters such as tactile roughness, skin tone, and sallowness/yellowing as well as subjective improvement.32

ANTIOXIDANT TEA BENEFITS

As well as vitamins C and E, the potent natural antioxidants found in white, green, black, and red tea extracts33,34 can help protect skin from the aging effects of inflammation and oxidative stress. Red tea, in particular, is a powerful source of antioxidants,34 while green tea provides the protective strength of epigallocatechin gallate (EGCG) to guard skin from the dangers of UV exposure and DNA damage.35 Furthermore, tea extracts are excellent sources of vitamin C activity.36 Vitamin C may contribute to the formation of new collagen,37 improving both the tone and structure of the skin.

COMBINATION SKIN REJUVENATION

When combined and applied topically as a cream, melatonin, GABA, MSM, vitamins C and E, and specialized tea extracts offer a unique solution to maximize the skin’s nightly repair cycle. These innovative ingredients provide powerful antioxidant protection while complementing each other in renewing the skin.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

Gary Goldfaden, MD, a clinical dermatologist and lifetime member of the American Academy of Dermatology, is founder of Academy Dermatology in Hollywood, FL, and COSMESIS Skin Care. He is also a member of the Life Extension Scientific Advisory Board.

References


33. Gawlik M, Czajka A. The effect of green, black and white tea on the level of alpha and gamma tocopherols in free radical-induced oxidative damage of human red blood cells. Acta Pol Pharm. 2007 Mar-Apr;64(2):159-64.


All Contents Copyright © 1995-2010 Life Extension Foundation All rights reserved.

These statements have not been evaluated by the FDA. These products are not intended to diagnose, treat, cure or prevent any disease. The information provided on this site is for informational purposes only and is not intended as a substitute for advice from your physician or other health care professional or any information contained on or in any product label or packaging. You should not use the information on this site for diagnosis or treatment of any health problem or for prescription of any medication or other treatment. You should consult with a healthcare professional before starting any diet, exercise or supplementation program, before taking any medication, or if you have or suspect you might have a health problem. You should not stop taking any medication without first consulting your physician.