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REPORT

Unique Plant Lipids for Skin Rejuvenation and Hydration

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Cosmetic companies around the world have devoted exhaustive research efforts and massive amounts of money to perfecting unique topically-applied molecules called **ceramides** to help revive and hydrate aging skin.

In a recent **groundbreaking study** researchers tested the effectiveness of a **200 mg orally-ingested formula** containing wheat – derived lipids and ceramides; the results were remarkable: the formula **completely restored hydration in 95% of participants** suffering from dry, flaky, itchy skin!¹

A growing number of published studies continue to highlight the **amazing skin rejuvenating benefits** of plant-derived ceramides and lipids.

In this article, you will discover how these **highly specialized plant lipids** not only hydrate skin and combat conditions like **eczema and dermatitis**, but also support the structural integrity of the skin to stave off **fine lines and wrinkles**.



ORAL PLANT CERAMIDES: MOLECULAR SKIN REGENERATORS

Beginning in the early 1990s, leading cosmetic companies formulated and marketed ceramide-based **topical** skin-care products for treating fine lines, wrinkles, and dryness. Due to their moisture – retaining properties, ceramides were eventually added to foundation makeup and lipsticks to help moisturize and protect skin exposed to sun, wind, environmental chemicals, and the ravages of aging.

While Western cosmetic companies were focusing on topical ceramide products, Japanese nutraceutical firms began employing a more innovative approach to ceramide therapy—**oral** delivery of ceramides in capsules, functional foods, and beverages.

In 2000 oral ceramide supplements received governmental approval in Japan for general use, although Japanese women had long been ingesting concentrated ceramides in **Konjac tuber**, a centuries-old staple of the Asian diet.²

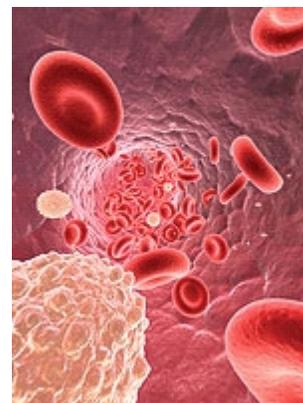
Ceramides also occur in human skin and their levels decline sharply with advancing age. Orally ingested plant ceramides have been shown to effectively replace the ceramides lost through normal cell shedding, skin damage, and aging. Oral ceramides are delivered efficiently to the **stratum corneum** layer of the epidermis via the blood stream. Recent research suggests this oral delivery method improves the functionality of ceramides and produces results not seen in cosmetic topical applications.³

WHY YOUR AGING SKIN NEEDS ADDITIONAL CERAMIDES

More than just a cosmetic problem, skin aging exposes you to significant health risks from infectious microorganisms, UV radiation, defective permeability to topical drugs, and increased susceptibility to contact dermatitis from environmental chemicals. You also need your skin to be at its functional best in order to properly regulate body temperature, synthesize optimal amounts of vitamin D, and provide critical sensory input from the environment.

Both in vitro^{4,5} and in vivo^{1,6} studies demonstrate that the moisture content of the stratum corneum in aging humans is decreased.⁷ In maturing individuals, the stratum corneum is also susceptible to inflammation and infection. Research shows that aging skin also suffers from reduced structural integrity due to lower lipid content—mostly a lower proportion of ceramides.^{5,7, 8}

Studies confirm the decline of the ceramide content in aging human skin,⁹ possibly due to a decline in enzyme activity that helps to deliver ceramides in usable form to the skin.¹⁰ When aging skin's ability to make ceramides diminishes, as it inevitably does, increased ceramide intake becomes essential. Increased ceramide intake is required to reverse an increased susceptibility to environmental assaults (e.g., decreased humidity, solvents, and detergents) and a diminished capacity to recover from these insults.¹¹



Studies show that **drug permeability** in the aged human stratum corneum is significantly altered. Specifically, the ability of aging skin to absorb lipid soluble topical applications (including drugs) is greatly diminished.¹² Maintaining an optimal concentration of ceramides in the stratum corneum is thus indispensable for supporting not only healthy skin structure, but also for maintaining healthy skin function and optimal responsiveness to delivery of topical drugs.

SKIN HEALTH: CLINICAL STUDIES

A double-blind placebo-controlled study was conducted at Osaka City University to evaluate the effects of 6 weeks of treatment with oral ceramide supplements in 33 patients (6 men and 27 women) suffering from chronically dry, rough skin. The test supplement was given in the form of soft capsules containing **40 mg** per day of a rice-derived lipid matrix containing ceramides. Study investigators concluded that oral delivery of natural, plant-based ceramides was safe and was directly delivered to the stratum corneum:

“Experiments have shown that after oral administration plant-based ceramides are absorbed unchanged in the small intestine.... The substance is then transported by the capillaries into the horny layer and the keratin intercellular spaces. The supplements containing rice ceramides as used in this study, in contrast to the ceramide substances distributed in animal brains, provide superior supplementation that can be expected to be both safe and effective for oral administration.”²

In another clinical study, a proprietary ceramide – rich lipid blend made from **non-GMO wheat** showed exceptional promise in rehydrating even chronically dry, thin, itchy skin. At the end of a 4-week, placebo controlled pilot study to determine the formula's tolerability and clinical efficacy, **65%** of participants treated with **80 mg** per day of a **proprietary wheat lipid complex** containing ceramides experienced an increase in skin moisture compared with only **45%** of the placebo group. Because it takes about **4 weeks**—the entire length of the pilot study—for newly formed skin cells to migrate to the stratum corneum, improvements observed in this short time period were deemed very promising by study investigators.¹

A 90-day follow-up study tracked subjects who were recruited because of chronically dry skin, including those suffering from chronic itching. The study consisted of subjective evaluation by the participants as well as objective dermatological measurements of skin roughness, itching, flaking and hydration, determined by a test of electrical impedance and by laboratory tissue analysis. Active treatment consisted of **200 mg** per day of the wheat lipid formula vs. placebo. By the end of the study, participants treated with the ceramide-rich wheat extract experienced *significant softening of their skin*.¹



Electrical assessment of skin hydration showed improvement in **95%** of the treatment group compared with no statistically significant change in the placebo group. All participants who had previously experienced chronic itching reported sharply decreased itch or complete elimination of the complaint at the study's conclusion. Dermatological evaluation revealed a significant reduction of *squames* (flaking patches of skin) in the treatment group compared with the placebo group. When subsets of participants from both the active treatment and placebo groups were further examined, *levels of protective lipids increased in leg tissue samples in the treatment group* while no statistically significant change in levels of protective lipids was noted in the placebo group.¹

A recent double-blind, randomized, placebo-controlled study was carried out on 51 women aged **20-63** years with dry to very dry skin who received either **350 mg** of a proprietary wheat – derived lipid extract containing ceramides or placebo for **3 months**.¹³ Evaluation of skin hydration on legs, arms, and face, assessed at baseline and at the study's end, was performed using dermatological scores (dryness, roughness, reddening), skin hydration measurement, and self-assessment scores. Skin hydration was significantly increased at the end of the study on the arms and legs in the group receiving the ceramide – rich formula compared with the placebo group. Skin dryness and redness was reduced in the treatment group, which also noted improvement in overall skin hydration. Study investigators concluded that the ceramide – rich wheat extract capsules were well

tolerated by study participants.

BLOCKING BACTERIAL INFECTION

The skin surface represents our primary barrier to the external environment, and as such, it is our *first line of defense* against microbial infection. Lipids at the skin's surface, including ceramides, comprise a major part of an antimicrobial barrier. When this barrier becomes compromised, as it inevitably does with age, numerous health conditions can arise.

In *atopic dermatitis*, for example, ceramide concentrations in the *stratum corneum* are diminished.¹⁴ Individuals with atopic dermatitis generally have higher concentrations of bacteria, especially *Staphylococcus aureus*, on the skin surface.¹⁵

A recent study confirmed that increased colonization by the bacteria *Staphylococcus aureus* in atopic dermatitis is correlated with the reduction in ceramides.¹⁶ Frequently present on the skin surface, *Staphylococcus aureus* has significant potential for causing infections if the skin barrier function is disrupted or if the surface environment is otherwise altered.¹⁷⁻¹⁹ *S. pyogenes* is another common cause of potentially serious skin infections, including **erysipelas** and **cellulitis**, which are characterized by the spread of the bacteria into the deep layers of the skin.²⁰ *Pseudomonas aeruginosa*, another opportunistic bacterium, can infect skin wounds or functionally compromised regions of the skin.²¹

RELIEF FROM DERMATITIS AND ECZEMA

Atopic dermatitis, like other inflammatory skin conditions, is an immunologic-related condition. Accordingly, topical corticosteroids and other immunosuppressive agents are mainstays of therapy, but the risk of toxicity from these agents is significant, particularly in children. One study designed to investigate the pathogenesis of allergic contact dermatitis and other inflammatory skin conditions found that repairing the breakdown in the ceramide barrier while continuing topical medications could alleviate childhood atopic dermatitis.²²

In the quest to find safer therapies for contact dermatitis, investigators treated **580** patients suffering from contact or irritant dermatitis with a skin lipid mixture containing ceramides alone or in combination with topical corticosteroids until abatement for **8** weeks. Statistically significant improvement was seen in both treatment groups at weeks 4 and 8 as compared to baseline. Individuals who used ceramides in combination with topical corticosteroids experienced greater relief, compared with those who used topical corticosteroids alone.²³



Another study evaluated the use of topical synthetic skin lipids and natural ceramides to treat **detergent-induced dermatitis**. Study results showed that although the concomitant use of both products afforded protection equal to that of healthy human skin against detergent-induced dermatitis, slightly better results were obtained with a mixture of natural ceramides than with synthetic skin lipids. Investigators believe that supplementation using an oral ceramide extract is effective in ameliorating detergent-induced dermatitis because of their structural resemblance to the lipids in the *stratum corneum*.²⁴

Ceramide therapy has also proven to be effective in combating the itching and inflammation caused by **eczema**. In addition, ceramide treatment has been shown to *normalize* skin surface lipids and reduce symptoms in patients afflicted with this condition.²⁵

SUMMARY

Known for their ability to support aging skin, a growing body of scientific research reveals that *ceramides*—a family of lipid molecules naturally occurring in your skin and in plants—represent a new class of *functional* lipids.

As a traditional component of the Asian diet, plant-derived ceramides have long been recognized for their ability to promote healthy, youthful skin, and many leading cosmetic products have thus been formulated to contain these unique plant lipids.

Recently, a proprietary, **non-GMO oral wheat lipid formula** containing ceramides has yielded dramatic improvements in the hydration, elasticity, and youthful appearance of dry, flaky, itchy skin, with complete elimination of dryness reported by **95%** of study subjects.

A wide base of scientific research supports the notion that orally ingested plant ceramides can rehydrate, revive, and reinvigorate damaged and aging skin.



WHAT ARE CERAMIDES?

Structurally similar ceramides are found in plants and the human body as components of specialized lipid molecules called **sphingolipids**. Sphingolipids are an essential element of human skin.²⁶ The six primary forms of ceramides commonly found in skin are formed via a biosynthetic reaction in the top layer of the skin, the epidermis. All 4 layers of the epidermis contain ceramides, and they play a critical role in skin health by creating a barrier that reduces infection and helps to retain the skin's moisture.²

All humans require the **permeability barrier** that skin provides, and this barrier is localized to the top layer of the skin called the *stratum corneum*, where extracellular matrix lipids inhibit loss of water.²⁷ Over a period of **4 weeks**, new cells created at the deepest epidermal layer migrate upwards to form the *stratum corneum*. By the time skin cells reach the skin's surface, most are technically dead. They become *cornified* ("horn-like"), transforming into protein-rich blocks tightly bound together by a layer of cement composed of various lipids, about **35-40%** of which are **ceramides**.²⁸

The primary function of the epidermis is to generate a relatively impermeable layer to protect living creatures from dehydration and environmental stress. Ceramides play a critical role in the barrier function and in the retention of water by the *stratum corneum*.

A reduction in the amount of ceramides in the epidermal layers contributes to dry skin and dermatitis, and is a **major cause of wrinkles**.² Studies have shown that optimal amounts of ceramides, in relation to other lipids, in the top layer of the skin are required to maintain healthy skin.²⁹

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