DECREASING CHRONIC DRY SKIN (XEROSIS)

Supporting Skin Health with Viniferamine® Small Molecule Technology

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VINIFERAMINE®

Small Molecule Technology Without Scientific Equal™
INTRODUCTION

Chronic dry skin (xerosis) is a common problem especially among older individuals\textsuperscript{1,2}. The prevalence in individuals aged 65 or older, has been reported in a multicenter study to be as high as 55.6%. Other studies have identified xerosis prevalence in the elderly as high as 75\%\textsuperscript{1}.

Xerosis is often associated with pruritus (itching) and it can have a profound affect on an individual’s quality of life\textsuperscript{2}. Xerosis is characterized by skin dehydration, slight to severe flaking and scaling, fine lines and cracks or fissures and sometimes, rough areas and/or skin redness\textsuperscript{3,4}. It can occur on various areas of the body including the forearms, hands, legs and neck\textsuperscript{5}. Severe xerosis can interfere with daily life especially when the hands are affected, and may lead to the onset of xerotic eczema characterized by intensely pruritic, fissured and cracked skin that is vulnerable to infections\textsuperscript{2,6}.

Xerosis is commonly associated with various diseases and medical conditions including diabetes, cancer, hepatitis, thyroid disorders and kidney disease\textsuperscript{5,7}. Factors that contribute to xerosis are varied including, exposure to ultraviolet radiation (UV) and other outdoor elements such as wind and climate, or central heating or air conditioning, excessive bathing (especially in hot water), viral infections (including HIV), cancer treatments (including chemotherapies and targeted therapies), certain medicines (including diuretics and hypocholesterol drugs), skin inflammation, aging and genetic predispositions including those involving atopic dermatitis\textsuperscript{1,3,5-9}.

The epidermis is the layer of skin most affected by processes involved with xerosis. The stratum corneum (SC) or uppermost layer of the epidermis is largely responsible for the barrier function of skin\textsuperscript{2}. The SC has been described as consisting of bricks and mortar where the bricks are the corneocytes or differentiated (matured) keratinocytes that are tightly connected by links called corneodesmosomes, and the mortar is the extracellular space composed of highly ordered lamellar lipids that form membranes\textsuperscript{10}. These lipids are secreted from lamellar bodies produced by keratinocytes as they differentiate into corneocytes and migrate up to the SC\textsuperscript{11}. Enzyme hydrolysis of the
comeodesmosomes facilitates epithelial desquamation (skin cell shedding) and is dependent on skin hydration, lipid content and pH. Abnormal desquamation that can occur with xerosis results in increased flaking of the skin. In fact, disruption of the orderly and regulated stacking of corneocytes is one of the main causes of dry skin.

Other factors that contribute to xerosis include decreased sweating that occurs in the elderly and in individuals with diabetes, and decreased production of sebum (produced by the sebaceous glands) that occurs with post-menopausal women and elderly men. Normally, sweat mixes with sebum that includes triglycerides, wax esters and squalene, forming a protective layer over the skin that helps prevent water evaporation through the skin. Sweat also moisturizes the skin and contains antimicrobial peptides (AMPs) as well as lactate and urea that enhance the slight acidity of the skin. For individuals with xerosis, the normal pH of skin is difficult to maintain.

HYDRATION AND TRANSEPIDERMAL WATER LOSS

In the course of epidermal development, keratinocytes transform into keratin-filled corneocytes in a process called keratinization. During keratinization, a structural protein called flaggrin is also formed, which is then broken down into natural moisturization factors (NMFs) by proteases. NMFs include amino acids, lactic acid, urea, sugars and mineral ions. As noted previously, lactic acid and urea contribute to the lower pH of the skin, which is important for inhibiting microbial contaminations. In addition, producing NMFs results in osmolytic forces that attract water to skin. NMFs also bind water tightly within corneocytes and low levels of certain NMFs have been correlated with xerosis.
The SC requires 10% to 13% water to maintain its barrier function properly. Water is distributed across the SC depending on the equilibrium between the water content of the keratinocytes and the relative humidity. Disruption of normal skin function occurs when the amount of water drops below 10%. When skin water content falls below 10%, visible scales form, and the skin becomes rough and dry. The skin's water content is composed of transepidermal water (TEW) and water that is retained. TEW derives from circulating blood and travels through the dermis into the epidermis where it evaporates from the skin surface in a process known as transepidermal water loss (TEWL). The SC controls TEWL and also captures water from the environment.

**SKIN LIPIDS AND THE SKIN BARRIER**

Skin barrier function and skin hydration depend on various lipids found in the extracellular space of the SC and on the levels of those lipids, as well as NMFs. As described previously, NMFs derive from the protein, filaggrin. Not so surprisingly, filaggrin gene mutations are associated with xerosis and atopic dermatitis (eczema). The lipids found in the extracellular spaces are arranged in bilayers between the corneocytes. These lipids help provide a barrier to moisture and electrolyte loss from the skin and include ceramides, cholesterol, and fatty acids. They are originally formed in lamellar bodies and are secreted by keratinocytes as they migrate up into the SC during keratinization.
Normally, when the skin barrier is disrupted, increased water movement through the SC causes decreased calcium in the lower levels of the epidermis that stimulates lamellar body synthesis and the secretion of lipids including ceramides. Typically, seasonal changes are found in lipid levels and in the types of lipids found in the SC, which is why dry skin is more common in the winter. In addition, bathing with soap can decrease the SC levels of ceramides leading to moisture loss in the skin that can result in xerosis. Low ceramide levels are also associated with eczema, dermatitis and aging\textsuperscript{11,15,16}.

**SUPPORTING SKIN HEALTH WITH VINIFERAMINE® SMALL MOLECULE TECHNOLOGY**

A consistent skin care regimen is essential for reducing xerosis. Viniferamine\textsuperscript{®}, a comprehensive pH balanced skin and wound care line, contains beneficial ingredients including vital skin nutrients to help reduce inflammation and pruritus, and decrease chronic dry skin.

**MORE ABOUT HOW VINIFERAMINE® CAN HELP**

Viniferamine\textsuperscript{®} skin care products can increase hydration in chronic dry skin and help keep skin hydrated, as well as provide nutrition to skin to help decrease inflammation and strengthen the skin barrier. The Viniferamine\textsuperscript{®} At Home\textsuperscript{™} products are designed for use in caring for skin in the comfort of the home, where healing happens.

Individuals with chronic dry skin can easily apply the products to help decrease chronic dry skin, inflammation and pruritus. The Viniferamine\textsuperscript{®} skin and wound care products contain small molecule nutrients including antioxidants, vitamins and amino acids that help decrease inflammation, improve skin hydration and strengthen the skin barrier to reduce the risk of infections. Certified organic and pharmaceutical grade ingredients in Viniferamine\textsuperscript{®} products ensure that pesticides and contaminants are excluded. In fact, Viniferamine\textsuperscript{®} skin and wound care products are non-sensitizing and non-irritating.
VINIFERAMINE® INGREDIENTS HELP IMPROVE SKIN HYDRATION

Hyaluronic acid (HA) is critical for skin hydration. HA is a structural component of the extracellular matrix (ECM), a complex interlocking meshwork found outside of skin cells that includes fibrous proteins such as collagens, elastin and fibronectin. Hyaluronic acid consists of numerous repeating disaccharide units of glucuronic acid and N-acetylglucosamine. Due to its negative charge, HA has a high capacity for binding water, which greatly enhances skin hydration.\textsuperscript{17,18}

Viniferamine® skin care products contain ingredients that help keep in skin moisture including dipotassium glycyrrhizate and aloe vera, which promote skin hydration by maintaining levels of HA that are normally decreased during aging. Another important ingredient found in the cleansing lotion and moisturizing cream, dimethicone, provides a protective barrier to maintain skin moisture. The silicone in dimethicone topical applications is one of the most consistently successful hydrating agents used in skin care.

VINIFERAMINE® INGREDIENTS HELP DECREASE INFLAMMATION AND PRURITUS

Xerosis frequently involves inflammation that is associated with pruritus. Many of the small molecule nutrients found in the Viniferamine® skin and wound care products reduce inflammation. Decreasing inflammation and pruritus is critical for individuals with xerosis. Scratching pruritic skin can easily lead to wounding and skin infections in individuals with xerosis due to the fact that they have weakened skin barriers.

Viniferamine® ingredient anti-inflammatory activities have been found for the important small molecule polyphenols oleuropein, resveratrol, and EGCG (from olives, grapes and green tea respectively), as well as the important small molecules, melatonin, and L-glutathione\textsuperscript{19-23}. In fact, oleuropein has been shown to inhibit mast cell degranulation\textsuperscript{24}. In addition, dipotassium glycyrrhizate from licorice, avenanthramides from oats, aloe vera and shea butter were discovered to possess anti-inflammatory activities\textsuperscript{25-28}. 
Measuring TEWL is a way to assess the quality of the skin barrier and how well it functions. Oleuropein has been shown to reduce TEWL indicating its ability to increase skin barrier function. Evidence also demonstrates that melatonin has a stimulatory role in building and maintaining the epidermal barrier. Moreover, the advanced silicone complex in the moisturizing cream and cleansing lotion provides a breathable barrier to protect skin and promote skin repair. Furthermore, phospholipids in the cleansing lotion are capable of forming lamellar lipid phases, which is beneficial for decreasing dry skin.

The proper balance of ceramides, cholesterol and fatty acids are also important for maintaining the barrier function of the skin. Scientific studies have shown that niacinamide (nicotinamide), found in Viniferamine® skin and wound care products, can increase the biosynthesis of ceramides as well as other SC lipids and improve the epidermal barrier. Ceramides generated during skin barrier stress stimulate antimicrobial peptide (AMP) production to help protect the skin. Amazingly, another important ingredient, resveratrol, also stimulates AMP production, leading to enhanced antimicrobial defense against pathogens.

The Viniferamine® At Home™ Chronic Dry Skin Care Kit includes two highly beneficial products: Renewal Skin Moisturizer and Clean N Moist as well as a Chronic Dry Skin Care Booklet written by professionals to guide patients with xerosis on the care of their skin. Renewal Skin Moisturizer contains the most potent doses of Viniferamine® and the scientific ingredients to enhance skin hydration as well as nourish and protect the skin of individuals with chronic dry skin. Each ingredient in this scientifically advanced product is perfectly balanced to achieve maximum skin restoration. Clean N Moist cleanses, moisturizes, nourishes, provides a protective barrier, and is perfectly pH balanced to ensure the most fragile skin is gently cleansed without causing irritation.
SUMMARY

In summary, xerosis involves a weakened skin barrier and is often associated with inflammation and pruritus that can lead to scratching, wounding and infections. Viniferamine® skin and wound care products include beneficial ingredients that help decrease inflammation and pruritus, as well as improve the skin barrier. The Viniferamine® Chronic Dry Skin Care Kit was created for individuals with chronic dry skin to help them moisturize and maintain skin hydration, as well as nourish, strengthen and protect their skin to help decrease their risk of developing wounds and infections.
REFERENCES


ABOUT THE AUTHORS

D. Elizabeth McCord, Ph.D., FAPWCA
Dr. McCord is a renowned biochemist that has worked in the field of skin and wound care for over 30 years. She has been awarded six patents and two medical devices in the field. She currently has more than 60 health products marketed around the world and her most current product line is Viniferamine®. Previously, Dr. McCord commercialized skin and wound care products under the Remedy® Olivamine® brand, which has held a dominant position in the medical marketplace for many years. Both product lines are based on proprietary blends of small molecules that provide corneotherapeutic support, with Viniferamine® incorporating over 10 years of further scientific advancements and improvements.

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Dr. Ray is the Science Officer at McCord Research. Dr. Ray currently writes articles and provides presentations concerning diabetes skin care and other health issues for McCord Research to advance skin care and wound healing awareness. She received her PhD in Biochemistry and Biophysics at Oregon State University and was a postdoctoral fellow at NIH, Harvard University and Dana-Farber Cancer Institute, and the University of Iowa. She also earned B.S. degrees in Chemistry and Microbiology from the University of Montana.