

HIGHLIGHTS OF A SYMPOSIUM

The Role of Natural Ingredients in Dermatology

HELD ON JULY 25, 2003, IN CHICAGO

Introduction

Today's dermatologic patients and consumers of skin care products are more health conscious than those of previous generations. Their quest is for products that are

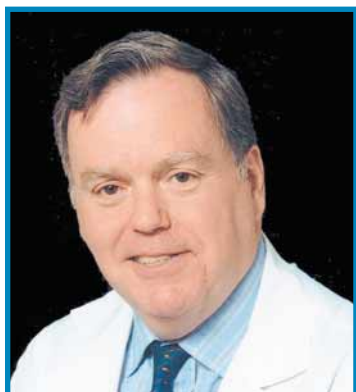
gentler to their skin yet active against such common problems as fine lines and wrinkling, hyperpigmentation, dryness, and sensitive skin. Many of these educated, involved

patients are looking to natural products because of the perception that they are environmentally friendly, safe, and active in their skin. But do these "natural ingredients"

actually confer benefits? A continuing medical education symposium titled "The Role of Natural Ingredients in Dermatology" was held to explore some of the active

naturals currently being added to skin care formulations. This supplement to *Skin & Allergy News* summarizes the four presentations given at the symposium.

Stratum Corneum Integrity is the Key to "Sensitive Skin"



James J. Leyden, MD

All dermatologists are confronted with patients who have difficulty tolerating skin care products, whether prescription or over-the-counter. This group of patients is typically classified as having sensitive skin, although they may actually be diagnosed with a wide range of cutaneous conditions including atopic dermatitis, rosacea, and acne. Those with an atopic background have difficulty down-regulating inflammatory stimuli, whereas those with rosacea have vascular lability and defective control of vascular responses. Yet, according to James J. Leyden, MD, Professor Emeritus of Dermatology at the University of Pennsylvania, Phila., whatever the underlying pathology, "the primary problem is an abnormal stratum corneum." A malfunctioning stratum corneum serves to amplify the background pathology. Ab-

normal stratum corneum function negatively affects normal barrier function. Environmental materials and topical treatments are able to penetrate into the viable epithelium, which is highly vulnerable to external insults.

Stratum Corneum Function

The normal stratum corneum is a compact protective membrane that serves as our interface with the environment to prevent fluid loss from within and invasion by microorganisms from without. The stratum corneum is constantly desquamating, regenerating and replenishing itself via an elegantly orchestrated process in which cells divide, migrate toward the surface, and undergo a series of differentiation processes.

Two distinct organelles of cell differentiation are of particular importance in stratum corneum barrier function. One, highly ordered lamellar-like structures, known as Odland bodies, migrate and fuse with the cell membrane, where they extrude into the intercellular spaces of stratum corneum cells to form a highly structured, alternating hydrophilic, aqueous environment with lipid bilayers. The structure of the lipids at the borders of these bilayers is composed predominantly of ceramides, fatty acids and cholesterol with a very small amount of cholesterol sulfate, which exist in an equimolar concentration. "If these lipids are not

present in the right amounts and are not the right kinds," Dr. Leyden said, "the environment is such that the normal breakdown of desmosomes, the attachment plaques between stratum corneum cells, is abnormal." If the normal water/lipid environment is not correct, rather than being digested by a trypsin-like enzyme, which causes the eventual separation of stratum corneum cells so that they

"In more severe forms of dry skin, significant decreases in levels of ceramides are associated with increases in levels of fatty acids and cholesterol."

can be ejected into the environment, these attachment plaques build up and normal desquamation does not occur.

At one time, Dr. Leyden said, it was believed that sebum trapped water and acted as a moisturizer. However, when sebaceous lipids are removed with ether, there is no effect on stratum corneum function. Thus, sebum appears to perform no barrier function. If the cholesterol sphingolipids, ceramides, and fatty acids are extracted with acetone, there is a rapid, 4- to 10-fold increase in transepidermal water loss. Repair occurs over 4 days. The first phase of repair occurs within 2 to

6 hours and consists initially of cholesterol replacement, followed by synthesis of sphingolipids within 6 to 24 hours. These repairs occur without any change in DNA synthesis in the basal layer of the epidermis. Interestingly, if the skin is occluded with an impermeable membrane, repair does not take place, because the skin reacts as if there were an intact stratum corneum.

Another interesting structure in the stratum corneum, Dr. Leyden noted, are highly charged 300,000-molecular-weight protein granules that contain high levels of arginines and phosphates. Dephosphorylation and cleavage of this large protein into filaggrin or filament-aggregating proteins are essential for flattening of cells as they enter the stratum corneum layer. These proteins are further metabolized into what has been termed *natural moisturizing factor*, a mixture of amino acids with hygroscopic properties. This further metabolism of filaggrin occurs only at the most superficial layers of the stratum corneum in the setting of excessive hydration, but it occurs much deeper in a low-humidity environment. Ultraviolet (UV) light injury will also block this metabolism into natural moisturizing factor. In dry skin, perhaps better termed flaky skin, Dr. Leyden said, this process can continue and lead to clinical inflammation. When desquamation is abnormal, stra-

tum corneum cells accumulate and, as they become less hydrated at the skin surface, micro-fissures develop and clumps of cells become apparent clinically as flakes. Even in areas where the skin may appear clinically normal, these micro-fissures permit the "dumping" of potentially irritating substances into the epidermis and in and around the superficial cutaneous nerve plexus.

In more severe forms of dry skin, significant decreases in levels of ceramides are associated with increases in levels of fatty acids and cholesterol. Instead of maintaining an intact bilayer system throughout the layers of the skin, the lipid disruption worsens, leading to an imbalance of lipid composition and abnormal water content in the surface layers and disorganization of the normal morphology (Figure on bottom of page 2). It has been demonstrated that these lipid changes, particularly decreasing ceramide levels, create an environment that is less favorable for normal enzymatic digestion, leading to abnormal desquamation and cracking.

Maintaining Barrier Function

The most important message for clinicians and their patients, Dr. Leyden said, is not to disrupt the barrier. If it is already compromised, the goal is to support

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Cosmeceuticals: A New Category of Skin Care Agents



Leslie S. Baumann, MD

“Cosmeceuticals are topical agents somewhere between pure cosmetics and pure drugs, and they do something beyond improving appearance,” said Leslie S. Baumann, MD, Chief of the Division of Cosmetic Dermatology at the University of Miami. Cosmeceuticals, a term coined by Dr. Albert Kligman, are regulated as cosmetics but have biological activity.

Understanding the Claims

When evaluating the utility of topical cosmeceuticals, Dr. Baumann noted, it is extremely important to review the studies carefully, because the relevance of laboratory data to patient care depends to a large degree on study methodology. For example, she noted, not all *in vitro* data correlate well with *in vivo* application. She cautioned against claims made for cosmeceuticals that are based on hypotheses or laboratory data but have not been tested in humans. As an example, she noted claims made by several companies that their topical products are as efficacious as botulinum toxin injections. In fact, she said, these com-

panies are not misrepresenting their products. The scientific basis for their data results from *in vitro* observations that the hexapeptides and oligopeptides in these topical products inhibit the formation of 25-kDa synaptosome-associated protein (SNAP-25), the protein that botulinum toxin acts on to cause muscle paralysis. However, putting these peptides on the surface of the skin is unlikely to deliver them into the muscle through the epidermal barrier, the dermis, and the subcutaneous fat without their being absorbed into the bloodstream. Therefore, she suggested it is essential to review the details of the studies carefully to better evaluate the claims made.

She noted some specific difficulties inherent in skin research. For example, placebo-controlled, double-blind studies, although reliable in most areas of medicine, are seldom performed in cosmetic dermatologic research. This

may be because many researchers do not possess the necessary equipment to perform objective cosmetic dermatology research. Another problem can be that even though a gold standard method such as optical profilometry is used for assessing results, any product that irritates and inflames the skin can temporarily improve the appearance of wrinkles. Again, a careful reading of the data will help clinicians understand exactly which benefits they may realistically expect.

Dr. Baumann noted other considerations in product evaluations. Are the ingredients stable to ultraviolet (UV) light, air, heat, and other ingredients within the formulation? Is the active ingredient in the proper form, and can it reach its target tissue? For example, vitamin C is not easily absorbed and is unstable. Retinol has to be packaged in light-protected conditions to ensure

stability. Products containing retinols must be formulated in an environment free of light or oxygen. Retinol-containing products should be packaged in aluminum tubes or other packaging that ensures stability and activity. There are many ceramides, not all of which are equally effective, she said. The correct soy components must be used for specific activities. For example, genistein, the soy isoflavone with its antioxidant and potential estrogenic effects, comes from fermented soy products, such as tofu. The small soy proteins, which influence pigmentation and hair growth, must be nondenatured and available to the skin and must come from the whole soybean. Products containing green tea must deliver the active form of epigallocatechin-3-gallate (EGCG), which is expensive. Inexpensive products may not have adequate amounts of green tea extracts.

These caveats aside, Dr. Baumann noted that there are data to suggest that some cosmeceuticals deliver measurable benefits in terms of preventing, although not necessarily reversing, free radical damage and thus the cutaneous stigmata of photoaging. Many topicals that prevent UV-induced free radical damage to the skin do so by preventing the formation of collagenase. (*Cosmetic Dermatology: Principles and Practice*. New York, NY: McGraw-Hill; April 2002).

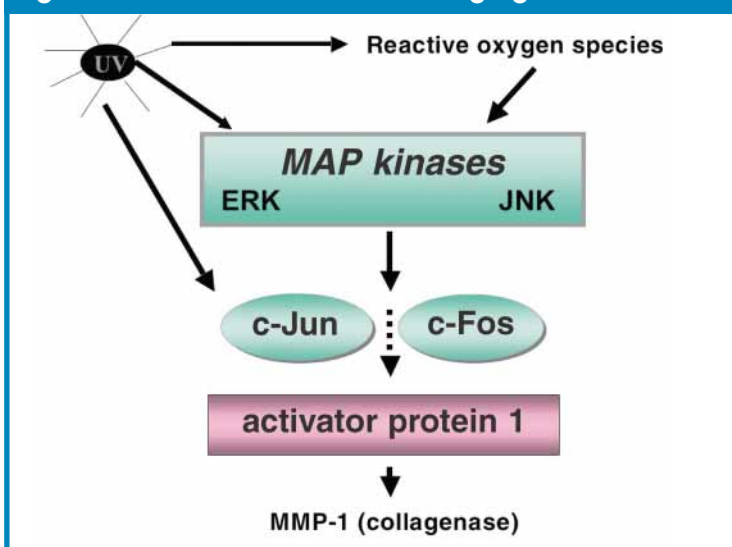
Newest Findings on Free Radical Damage and Skin Protection

Dr. Baumann gave a brief overview of some of the newest findings with regard to free radical damage and wrinkle formation

based on effects on the c-Jun and c-Fos genes. C-Jun levels increase following insults such as UV radiation or smoking. When enough c-Jun is expressed to heterodimerize with c-Fos, activator protein 1 (AP-1) is formed. (*Photochem Photobiol*. 1999; 69:154-157). This results in the formation of collagenase and other enzymes. It is now known that retinoids block the upregulation of c-Jun and inhibit this pathway. She cited a recent study (*J Invest Dermatol*. 2003; 120:835-841) showing that the soy isoflavone, genistein, interrupted this cascade by blocking c-Jun activation as retinoids also do. When keratinocytes treated with the EGCG fraction of green tea or with vitamin C were irradiated with UVB, the activity of the mitogen-activated protein (MAP) kinase genes JNK and ERK was decreased (*Photodermatol Photoimmunol Photomed*. 2003; 19:56-72). These MAP kinases are formed following UV radiation and the generation of reactive oxygen species, and are involved in the pathway that leads to AP-1 activation of collagenase production (Figure). These new findings give a solid basis for understanding how the formation of free radicals can lead to photoaging and how antioxidants may prevent photoaging.

Dr. Baumann closed by underscoring the importance of carefully reading the data that support the claims made for cosmeceuticals. Many of the natural ingredients that are used are topically active and give visible clinical benefits. However, only a careful understanding of the study conditions, methods, and materials will allow clinicians to distinguish among products. ■

Figure. Genes Involved in Photoaging



MAP=mitogen-activated protein; MMP-1=matrix metalloproteinase-1
Source: L. Baumann, MD

Stratum Corneum Integrity

Continued from previous page

and, if possible, restore it. Patients must be taught which products to avoid to prevent the further disruption of the barrier, which only makes it more difficult for them to tolerate prescribed drugs and which makes their skin look irritated and feel uncomfortable. For example, surfactants used in cleansers have traditionally disrupted the barrier by extracting lipids and interacting with stratum corneum proteins. However, he noted, the newer generation of surfactants actually deposits lipids

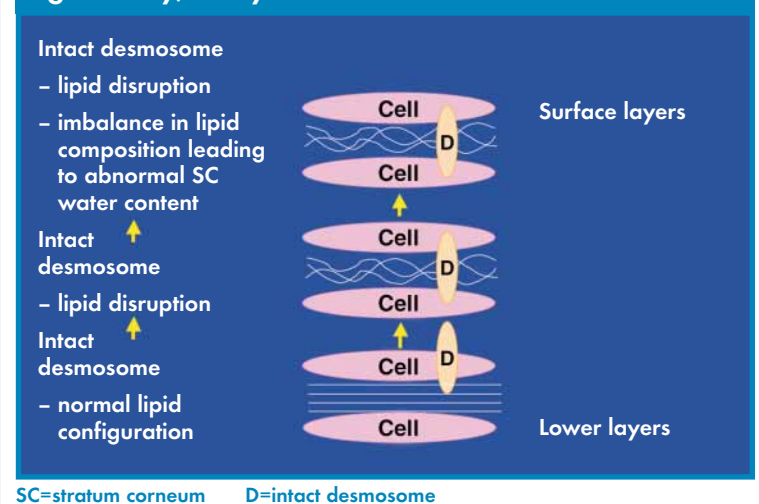
or petrolatum, which helps protect the skin and minimizes the leaching of intracellular lipids.

Patient Messages

The most important general principles of skin care for everyone, but especially for those with “sensitive” skin, are (1) gentle cleansing, (2) hydration by means of either humectants or emollients, (3) replenishment of lipids, preferably natural skin lipids, and (4) protection against photodamage with an appropriate sun protective factor (SPF)-containing product. Specifically, acne patients with sensitive skin should be en-

couraged to use a non-comedogenic moisturizer in addition to gentle cleansing and UV light protection. Those with dermatitis should use mild cleansers and minimize the use of astringents and other products that can extract lipids from the stratum corneum. They should use moisturizers that deposit appropriate lipids. Those with photodamaged skin should be given the same advice with regard to cleansing and moisturizing and using the right SPF for UV protection, but they also may require retinoids or alpha-hydroxy acids to help promote normal desquamation. ■

Figure. Dry, Flaky Skin Conditions



Ancient Skin Remedies Come of Age for Today's Health-Conscious Consumers



Jeanine B. Downie, MD

The earliest uses of natural ingredients in skin and hair care date back to 2000 BC in Arabia and Egypt where oatmeal was used to soothe and cleanse skin. Cleopatra even took oatmeal and sometimes milk baths, which we now know contain lactic acid that sloughs skin cells, giving a smoother appearance. "Natural ingredients are being reexamined now as part of consumers' overall quest for a healthy lifestyle," said Jeanine B. Downie, MD, Director of image Dermatology in Montclair, N.J. She noted that many of her patients perceive products containing natural ingredients to be safer and more environmentally friendly, as well as gentler for sensitive or sun-damaged skin. Although approximately 40% of patients describe their skin as "sensitive," there is no established definition of the term, Dr. Downie noted. Patients with sensitive skin typically complain of stinging, burning, itching, and tightness following environmental stimuli. Objective criteria often used to ascertain the degree of sensitivity include heightened vascular reactivity, impaired barrier function, atopy, and increased neurosensory input.

Oatmeal in Skin Care

The history of oats in skin care, Dr. Downie explained, goes back

to ancient times when whole or rolled oats were used in soothing baths for dry, itchy, irritated skin. The development of colloidal oatmeal, which is prepared from de-hulled oat kernels that are ground to a fine powder to retain the value of the entire oat grain, permits better formulation characteristics in topical skin care products and better dispersion in baths. Colloidal oatmeal contains about 10% to 18% proteins and 60% to 64% polysaccharides as well as lipids, enzymes, saponins, prostaglandin synthesis inhibitors, vitamins, and flavonoids (*Oats: Chemistry and Technology*. St. Paul, MN: American Association of Cereal Chemists, Inc;1986). Proteins carry water and water-insoluble occlusive agents to the skin. Positively charged sites on proteins help oatmeal bind to negatively charged components in the skin and anchor moisturizers. Polysaccharides have a high hydrophilic capacity and carry water and water-soluble humectants to the skin as well as attracting atmospheric moisture. Oat beta-glucan, a water-soluble polysaccharide, leaves a protective film. These different moisturization properties all help maintain barrier integrity, prevent cutaneous water loss, and alleviate itch. Antiinflammatory components of colloidal oatmeal also relate to its antipruritic activity. Oat lipids assist in providing and maintaining cutaneous lipids. Oat proteins have the ability to buffer both acids and bases, which helps maintain barrier integrity. The cleansing ability of oatmeal is due to the saponin component that helps absorb dirt, oil, and sebaceous secretions. The hydrophilic and lipophilic properties assist in the absorption and solubilization of aqueous debris.

Colloidal oatmeal is one of the few natural ingredients regulated by the U.S. Food and Drug Administration (FDA). The FDA has determined that colloidal oatmeal is a skin protectant that provides tem-

porary skin protection and relieves minor itching and irritation due to rashes, eczema, poison ivy, poison oak, poison sumac, and insect bites (Skin Protectant Drug Products for Over-the-Counter Human Use; Final Monograph, Federal Register. June 4, 2003; 68:107, 33362). Other clinical indications for colloidal oatmeal include atopic dermatitis, diaper rash, prickly heat, and cutaneous manifestations of chickenpox. Dr. Downie attested that colloidal oatmeal had decreased pain and itching in patients with epidermolysis bullosa she had attended as well as those with psoriasis.

Dr. Downie showed images of ashen skin from a 2-week investigator-blinded study of patients with Fitzpatrick skin types IV to VI who used a colloidal oatmeal formulation to moisturize the skin and reduce skin ash. As seen in these images, at a magnification of 20x, skin ash was significantly reduced following use of the oatmeal-containing lotion for 1 day (Figure 1). For the future, she noted, new products are being developed to extend the benefits of colloidal oatmeal, including oat protein, oat beta-glucan, oat starch, and oat oils.

Soy in the Care of Sensitive Skin

"Soy is one of the things I call a 'smart' moisturizer," Dr. Downie said. "Because of its balanced spectrum of nutrients and actives, the natural, total soybean can selectively increase moisturization in dry areas while reducing oiliness in others." Several components of total soybean and soy extracts are useful in the care of skin and hair. The small proteins, Bowman Birk inhibitor (BBI) and soy trypsin inhibitor (STI), are biologically active ingredients of the natural soybean. Soy also contains isoflavones, essential fatty acids and essential amino acids.

Soy has been clinically proven to provide another valuable skin care benefit, improving the appearance of unwanted facial and body hair. In fact, 41% of all women have unwanted facial hair, a problem that increases at menopause. Women are also very concerned about their unwanted body hair, with approximately 80% of women shaving their legs at least once a week. (Gallup Focus Report on Women's Hair Removal Practices-Strategies and Projections for the Future. Multi-sponsor Surveys, Inc., Princeton, NJ. May 2001) Figure 2 shows

Figure 2. Improvement of Appearance of Unwanted Facial Hair With Natural Soy Moisturizer



Source: Greenspan A, et al. Poster presented at the 61st annual meeting of the American Academy of Dermatology; March 21-26, 2003; San Francisco, Calif.

an untreated upper lip of an adult woman with visible, dark terminal hairs and very dark pigmented follicles. The upper lip area was shaved weekly and then a topical moisturizer containing natural soy was applied twice daily for 8 weeks. After 4, 6, and 8 weeks of treatment, the visible hairs were less apparent to dermatologists. This effect may be related to the small soy proteins, STI and BBI, serine protease inhibitors that affect the protease-activated receptor-2 pathway as well as skin conditioners and other components in the formulation.

In contrast, the soy isoflavones are present in other fermented soy products that are consumed widely in Asia. "Soy isoflavones may also possess beneficial properties similar to estrogens relative to skin thinning and collagen loss in postmenopausal women not on hormone replace-

ment therapy," she noted. "That will be an extremely interesting area of research."

Green Tea Extracts in Skin Care

"As we all know," Dr. Downie said, "green tea has previously been used as a home remedy for coughs, colds, and breathing ailments. Now, green tea extracts have been shown to provide photoprotection of the skin as well as significant antioxidant protection." Of particular interest in the care of sensitive skin are laboratory studies that suggest green tea extracts may even be effective in reducing signs of inflammation.

Other Active Naturals

Dr. Downie closed by listing some of her other favorite active natural ingredients. See Table below. ■

Table. Other Natural Ingredients

Active Natural Ingredient	Activity/Benefit to Skin
Wheat germ	Helps dissolve dirt and makeup
Glycerin	Helps prevent moisture loss
Jajoba beads	Ensures gentle exfoliation
Horse chestnut	Antiinflammatory
Caffeine	Antiinflammatory
White tea	Blocks oxidation and soothes skin
White birch	Decreases fine lines
Seaweed extract	A "smart" ingredient
Kaolin	Absorbs and reduces oil
Kojic acid	A fungal metabolic product that penetrates the upper layers of the skin and may help inhibit pigment formation and function as an antioxidant
Licorice and grape extracts	Help restore brightness
Myrtle, chamomile and rosemary	Calming and soothing

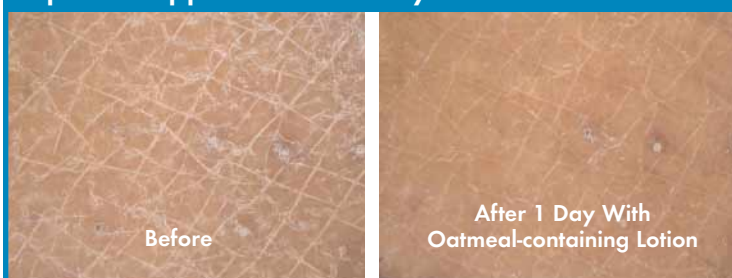
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Figure 1. Oatmeal-containing Lotion Improves Appearance of Ashy Skin



Source: Nebus J, et al. Poster to be presented at the 62nd annual meeting of the American Academy of Dermatology; February 6-11, 2004; Washington, D.C.

Several Active Naturals Aid in the Prevention of Photoaging



Zoe D. Draelos, MD

Although many patients believe that wrinkling, changes in tone and texture, and pigmentary changes are a normal part of aging, in fact they are caused by photodamage from ultraviolet (UV) radiation, explained Zoe D. Draelos, MD, Clinical Associate Professor at Wake Forest School of Medicine, Winston-Salem, N.C. Beneath those outward changes in appearance, she said, lie telangiectasias, increased ground substance, elastosis, and the disappearance of collagen bundles. Of benefit to patients is that, to a certain extent, we can reverse some of the outward changes. At the same time, it is clear that the skin changes of intrinsic aging, such as deepening expression lines, skin laxity, neoplastic changes, loss of ground substance, degeneration of elastic fibers, changes in collagen bundles, papillary dermal retraction and fibroblast decrease and shrinkage, also contribute to an aged appearance and cannot be reversed. Certain cosmeceuticals, Dr. Draelos said, can have a very important effect on photodamaged skin.

Green Tea Extracts: Many Benefits to Photodamaged Skin

Green tea contains several polyphenols that modulate biochemical pathways involved in inflammation, cell proliferation, tumor promotion, and photoprotection. Green tea polyphenols (GTPs) act as electron donors and function as antioxidants. GTPs can also help prevent UV-induced depletion of Langerhans' cells and, by stabilizing reactive oxygen species, can stop DNA damage and thus prevent gene activation of defective DNA messages and the resultant tumorigenesis.

GTPs appear to confer novel protection against UV radiation. Dr. Draelos summarized the in-

triguing findings of a study in which the forearms of study subjects were treated with either GTPs or vehicle and then irradiated with UV light or treated with GTPs and not irradiated (*J Am Acad Dermatol.* 2001;44:425-432). When GTPs were applied 30 minutes prior to irradiation, erythema was reduced. Histologically, skin treated with GTPs produced a 66% reduction in sunburn cells, whereas because of the reduction in inflammation, there was a 58% reconstitution of Langerhans' cells compared to controls. Patients treated with vehicle showed erythema and other evidence of UV damage, whereas those treated with GTPs who were not irradiated showed no changes. Moreover, Dr. Draelos noted, increasing concentrations of GTPs resulted in a decreased inflammatory response, evidenced by decreased erythema. "It's interesting to note," she said, "that the protection starts 24 hours following irradiation and continues to have an effect at 48 and 72 hours. Most current sunscreens don't provide this longevity of effect." (*J Am Acad Dermatol.* 2001;44:425-432). Chemical sunscreens like the cinnamates, oxybenzone, and avobenzone act by absorbing light and transforming it to heat energy. Physical sunscreens, such as zinc oxide and titanium dioxide, reflect or scatter light energy. "Green tea provides photoprotection by a third method outside our familiar armamentarium," Dr. Draelos said.

In a recent study by Hsu and coworkers (*Pharm Exp Ther.* 2003;23:1533-1539), a mixture of green tea polyphenols actually elicited differentiation in growing keratinocytes, which may be one of the mechanisms for green tea's antitumorigenic effect. This study also showed renewed DNA synthesis in aging keratinocytes and a 7-fold activation of succinate dehydrogenase on exposure to epigallocatechin-3-gallate or GTPs. Thus, GTPs may be beneficial in wound healing as well as in the treatment of psoriasis, rosacea, and actinic keratosis.

Soy Benefits for Photoaging and Unwanted Hair

The natural soybean is a mixture of many components that are active in skin. These include the small proteins Bowman Birk inhibitor (BBI) and soybean

trypsin inhibitor (STI), which are involved in pigment transfer, essential fatty acids such as alpha-linolenic acid necessary for skin barrier maintenance and repair, and isoflavones, which appear to have weak estrogenic effects. The soy isoflavones genistein, daidzein, and glycitein, are contained in fermented soy products that are widely consumed in Asia. Orally, they may function *in vivo* as weak phytoestrogens, which may partially account for the reduced incidence of breast cancer and cellulite due to reduced endogenous estrogen production and end-organ receptor binding.

Other soy products, containing nondenatured, stabilized soybean components including STI and BBI as well as lecithins, saponins, and mono- and polyunsaturated acids, have been shown to provide many benefits to the skin. These total soy formulations have been successfully used to topically improve the appearance of mottled hyperpigmentation and solar lentigines. Dr. Draelos explained the proposed mechanism of action of how this soy effect takes place (Figure 1).

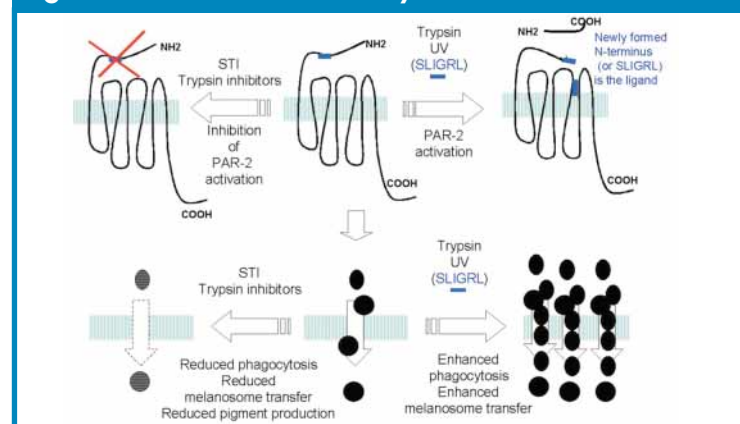
The serine protease inhibitors found in the natural, total soybean inhibit the protease-activated receptor-2 pathway, reducing the phagocytosis of melanosomes by keratinocytes and, therefore, melanin transfer. She showed clinical photographs illustrating improvement in the appearance of mottled hyperpigmentation/solar lentigines after 12 weeks of twice-daily application of total soy-containing moisturizer (Figure 2).

Total soy offers something different, Dr. Draelos said. "It doesn't work like hydroquinone by inhibiting melanin production and it's different from kojic acid and azelaic acid." In addition to its possible beneficial effect on improving the appearance of mottled hyperpigmentation, other components in soy have estrogenic effects, and soy has been shown *in vitro* to increase collagen synthesis.

Colloidal Oatmeal Prevents Transepidermal Water Loss

The ancient skin remedy oatmeal has been rediscovered. Dr. Draelos summarized the mode of action of existing moisturizers. Occlusives, such as petrolatum and mineral oil, stay on the skin after

Figure 1. The PAR-2 Pathway



PAR-2=protease-activated receptor-2; STI=soybean trypsin inhibitor; UV=ultraviolet; SLIGRL=PAR-2 activating peptide. Source: Adapted with permission from Seiberg M. *Pigment Cell Res.* 2001; 14:236-242.

bathing and decrease transepidermal water loss, whereas humectants, such as glycerine, sorbitol, and sodium-2-pyrrolidone carbonate (PCA), attract water to the skin. Colloidal oatmeal is a hydrocolloid. When suspended in bath water, it forms large particles that sit on the skin surface and physically retard water loss from the skin. The other hydrocolloid that is commonly used in moisturizers is hyaluronic acid. Colloidal oatmeal has cleansing properties as well as skin-protectant and barrier-function properties. Because of the hydrocolloid it forms in water, it has antipruritic, emollient, and soothing properties.

Vitamins in Skin Care Products

Vitamins are also topically active. Three antioxidant vitamins are A, E, and C. The vitamin A retinoids have received renewed interest. Retinol, the naturally occurring form of vitamin A, and the retinol esters (retinol palmitate and retinol propionate) have recently received more attention. These forms of vitamin A theoretically can help normalize keratinization, regulate growth and differentiation, and reverse the appearance of

photodamage similar to tretinoin, but to a much lesser degree.

Vitamin C is a mild antioxidant and free radical quencher and is a necessary co-factor in the production of collagen. Vitamin C is most important in the skin, Dr. Draelos said, because it converts oxidized vitamin E to its active alpha-tocopherol form by functioning as a secondary antioxidant. As in foods and skin care products where it is added as a lipid preservative, vitamin E prevents the peroxidation of membrane lipids and protects against oxidative damage caused by UV exposure.

Summary

An increasing number of natural ingredients are now being included in formulations for the care and treatment of skin and hair. Oatmeal, green tea, total soy, several soy components, and vitamins A, C, and E are among those ingredients currently popular in a variety of topical products that may provide skin care benefits. ■

Figure 2. Improvement in Appearance of Mottled Hyperpigmentation With Total Soy Moisturizer



Source: Kollias N, et al. Poster presented at the 61st annual meeting of the American Academy of Dermatology; March 21-26, 2003; San Francisco, Calif.