

DERMASCOPE

The Encyclopedia of Aesthetics

August 2011



Age Management


The Official Publication of Aesthetics International Association



What is New in Age Control Topicals?

by Ivana Veljkovic, Ph.D.





Americans are fascinated with all things 'new.' This fascination is especially strong with regard to products designed to reduce the visible signs of aging. The anti-aging topical product industry has capitalized on not only our desire to have the newest, biggest, fastest and best, but also our insatiable yearning for youth. It is critical to guide patients toward products that are backed by scientific data and not just the most compelling commercial or marketing claims. This can be challenging, but consumers that are willing to depend on scientific proof will gain the ultimate positive outcome – more youthful-looking skin.

Rush to Judgment

In the U.S., \$1.6 billion was spent on skin care in 2007. This dollar amount decreased only slightly during the recession of 2008/2009. A plethora of new ingredients and products fuel this growth, although not all innovations to hit the market are scientifically proven to deliver on their promises. Only a select few of these new anti-aging topicals have been sufficiently studied to substantiate their claims. Until there is proof of an ingredient's mechanism of action and efficacy, it is prudent to wait to make recommendations to your patients about its use. When a new and seemingly efficacious ingredient hits the market claiming to erase the visible signs of aging, patients will typically rush in asking for your opinion – or to purchase the product from you. Turning down revenue can be counterintuitive, but it is simply not possible to ensure a new product or ingredient is safe or effective before there is credible science available. An example of an ingredient that became highly popular prior to its full scientific evaluation is dimethylethanolamine (DMAE). This ingredient quickly became the most desired new offering when it hit the market in the mid 1990s. The dramatic descriptions of the effects of using this ingredient were hard to ignore. It became known as the 'instant facelift.' Although this ingredient's exact mechanism of action remained undiscovered, a plethora of products containing DMAE providing the heralded instantaneous plumping and firming of the skin quickly began appearing on retail shelves, and in physician's offices, around the country.

Science is Essential

In 2007, a pivotal study was published in the *British Journal of Dermatology*. After investigation, it was determined that the anti-wrinkle activity of DMAE was due to the ingredient causing vacuolar cytotoxicity. The study also determined that it destroyed the collagen-producing fibroblasts at a rate of 25 percent after 24 hours of application. Although these conclusions did nothing to remove DMAE from the market, they did provide an unpleasant conclusion to the mystery surrounding this popular ingredient's function. Even with this science now available, many DMAE-containing products still crowd retail shelves. Even when negative information surfaces the suspect ingredient may still be widely available. This highlights why having credible science behind an ingredient's mechanism of action available for assessment is critical before recommending a new product or ingredient to your patients.

Protection from Plants

One category that appears to show promise in skin care is stem cells. Human embryonic stem cells cannot be formulated into skin care topicals, and their use also poses ethical question. Many stem cell components from plants are now being harvested and used in skin care products. Unlike human stem cells that can differentiate into another type of cell, plant-derived stem cells are intriguing, as they also have the ability to create an entire new plant. The goal of most of these ingredients is to protect existing human stem cells residing in the basal layer of human skin from DNA damage due to multiple radical species. Several types of plant stem cells have potent radical quenching activity supported by compelling science. Verbascocides, from the stem cells of syringe vulgaris (lilac) leaf, have demonstrated not only potent radical quenching action, but also the ability to repair dAMP hydroxyl adducts following DNA damage. In addition to providing powerful antioxidant and MMPi activity, the stem cells of red grapes provide antitumor activity and the ability to protect epidermal stem cells from UV damage. Other plants are also showing potential and are worth further examination.

Protecting Genes

Another category stimulating curiosity is DNA repair and protection. As we age, our DNA strands become damaged and shortened. Ingredients that stimulate the sirtuins that regulate cell activity are being investigated. There is also discussion of using



topical telomerase to stabilize the telomeres that cap and protect the tails, or telomeres, of DNA strands, and to mobilize epidermal stem cells. Although it is exciting to think that we could potentially protect and repair aging strands of DNA and literally keep it, and our skin, young, these types of topicals need substantial additional scientific study prior to our being able to confidently support or recommend them for the treatment of aging skin. DNA, telomeres and basic cellular function are a perfect representation of the critical importance of homeostasis to our overall health. Prior to deeper study, it could be premature and cavalier to tamper with this delicate balance.

New Technology for Proven Ingredients

Some time-tested and proven ingredients have long posed challenges in formulation. Two such examples are L-ascorbic acid (vitamin C) and retinol (vitamin A). Although these ingredients' positive effects on the skin are extensively studied and substantiated, they are inherently unstable. Without advances in formulation technology, creating stable products with acceptable shelf lives that can protect and deliver these ingredients to the skin, their scientifically proven efficacy is irrelevant. But, by employing advanced stabilization and delivery technology, some newer products are successful.



- L-ascorbic acid (vitamin C) is a water-soluble antioxidant that itself is highly susceptible to oxidation. Although water-based vitamin C products can be effective, their shelf life is typically not more than one year. An ideal formulation technique for protecting this important melanogenesis-inhibiting, collagen-building anti-inflammatory vitamin is to create an anhydrous product. In order for oxidation to occur, there must be water, air and light present. By removing water from the equation, packaging the finished product in opaque materials and limiting oxygen contact with the finished good through an airless container or nasal-tipped orifice, this beneficial active can preserve its efficacy. Anhydrous L-ascorbic acid topicals typically have a substantially longer shelf life than those in a water base.
- Retinoids represent the family of vitamin A ingredients including retinoic acid, retinaldehyde, retinol and retinyl esters. Vitamin A, like vitamin C is inherently unstable in formulation. Similarly, it is necessary to limit the raw material's exposure to water, air and light. When producing effective retinoid topicals, a nitrogen blanket technology is often required to minimize the material's contact with oxygen. This is a specialized technology that is not frequently employed in the cosmetic industry, but without its use the active is often at least partially oxidized prior to packaging. Now, new polymer delivery

systems protect retinoid raw ingredients, making it possible to manufacture effective topicals without the use of a nitrogen blanket. These new systems also make longer shelf lives possible for these critical anti-aging products.

Advances in the anti-aging topical sector will surely be seen in both the discovery of new molecules, and in the bases and delivery systems developed to make their benefits of use to patients' skin. Although certainly we will continue to be introduced to many products and ingredients that claim to be the new fountain of youth, rely on scientific proof to help you sort out fact from fiction and you will be sure to provide your patients with positive outcomes.



Ivana Veljkovic, PhD, manages product development, regulatory and clinical trials for PCA skin®. She received her doctorate in organic chemistry from Freie Universität Berlin, and her master's of science degree in chemistry from the University of Belgrade in Yugoslavia. Veljkovic has previously worked as a research scientist specializing in the synthesis and purification of organic compounds before joining a health care company in Canada that represented PCA Skin. In her role, she worked directly with physicians, nurses and aestheticians, educating them about skin physiology, ingredients and proper treatments for specific skin conditions.