A cosmeceutical area that has seen intense development over the past years is related to vitamin B₃. This vitamin is generally considered to occur in two forms, niacin (nicotinic acid) and niacinamide (nicotinamide). The interest in vitamin B₃ was based on two aspects of its function relevant to skin, namely the involvement of the intracellular bioactive form of the vitamin, NAD, in cellular energy generation and in DNA repair processes through the action of enzymes called poly (ADP-ribose) polymerases (PARPs). The continuous proliferation of the epidermal layer of skin necessary for the generation of the skin barrier constitutes a significant energy requirement and skin exposure to sunlight results in DNA damage in need of repair, making an optimal skin content of NAD important for both skin barrier formation and DNA repair. These considerations have led to the development of cosmeceutical skin care products that utilize either niacinamide or niacin in skin care products. It should be noted that the use of niacin involves a niacin derivative that delivers niacin to skin in a way that avoids the skin flushing side effects long known for this form of the vitamin.

In addition to the functions of vitamin B₃ described above, recent discoveries in two areas have provided additional new information that promise to keep vitamin B₃ an area of intense interest for cosmeceuticals.

1. A niacin receptor that has a high abundance in skin has been recently reported (Bermudez, et al., PLOS ONE, vol. 6, e20487, 2011). This receptor binds the niacin but not niacinamide, and its properties suggest that it plays a fundamental role in epidermal differentiation required for skin barrier formation. The implications of this receptor are also of interest in other respects. First, it appears to be inactivated in cells derived from squamous cell skin cancers, suggesting a strategy for use of niacin for prevention of actinic keratosis lesions and skin cancer. Second, the receptor is present in high abundance in the hair follicle, the site of skin stem cells, raising the possibility that the receptor may be present in stem cells.
2. A new category of NAD utilizing proteins termed sirtuins has been recently discovered. The sirtuins were first discovered as being required for life span extension in lower organisms, but they are present in humans as well. The presence of these proteins raises additional possibilities for anti-aging benefits of vitamin B3. While the sirtuins utilize NAD, they are also inhibited by niacinamide, which potentially adds a complication for use of this form of vitamin B3 in skin care.

DIANE RANGER, FOUNDER AND PRESIDENT
Colorescience Mineral Makeup

There has been much conversation in the media about physical sunscreen products containing ultra-small particles referred to as nano-particles. The concern with these particles is that they are so small they can penetrate the skin barrier and trigger potential harmful reactions. Nano-particles are sized between 1 and 100 nanometers. This attention has led to some confusion in the mainstream media regarding their potential benefits or dangers to human health, versus micronized particles used in topical applications. Micronizing is the process of reducing the average diameter of solid particles. Topical products often choose to micronize or make their sunscreen particles smaller because these particles are transparent and do not give cosmetics the white, chalky appearance that coarser preparations did.

Many cosmetic companies sheer their sunscreen particles into various sizes that are well above the considered nano-particle range. Colorescience is a mineral makeup line, for example, that formulates its mineral sunscreens with micronized titanium dioxide (TiO2) or zinc oxide (Z0) because of their advantages over chemical sunscreens. Physical sunscreen particles, as opposed to chemical sunscreens, lie on top of the skin, reflecting UV rays before they cause damage rather than being absorbed into the skin (allowing the sun’s energy and heat to transfer and absorb into the surrounding tissue). Colorescience takes that concept to a new level by sheering particles to varying micronized sizes to get more thorough coverage on the surface of the skin.

Colorescience micronizes powders into a targeted range from 100 nanometers to 1,000 microns in order to provide the most comprehensive barrier of protection on the surface of the skin for superior defense against UVA/UVB rays and environmental contaminants. To get a picture of how these varied particle sizes accomplish that, picture a billiard table completely covered with billiard balls. If you were to look down on the table, you would see the green felt surface between the balls. Similarly, some areas of the skin may be exposed if only one size molecule is used for sun protection. Colorescience products layer different size particles, like adding smaller balls to fill in the opening, thereby insuring complete protection. The combination of mineral particle sizes are uniquely prepared to hold together and to stay on the skin and form a tight barrier.

The most important thing a consumer can do is inquire about the particle size of a sunscreen product. There are many companies, like Colorescience, that properly formulate their cosmetics with varying sizes of particles (above the nano-particle level) to offer superior sun protection and ease the fears the media has reported.

PHILIPPE BURNHAM, DIRECTOR OF TOPICAL COSMECEUTICALS
Valeant Pharmaceuticals

There has been relatively little innovation seen in dispensed cosmetic topical products. The overall absence of clinically relevant innovation has engendered a sense of complacency amongst practitioners and patients alike. There are very few new ingredients, and the safety and efficacy of these ingredients and their formulations is rarely demonstrated in well-designed clinical trials that are published in peer-reviewed journals. There are many “ingredients du jour,” but how clinically meaningful are they? To date, there have been no breakthrough ingredient delivery systems beyond conventional liposomes.

In today’s challenging environment, manufacturers will have to address critical unmet needs that practices face, especially those regarding relevant innovation and physician exclusivity. Valeant Pharmaceuticals is ready to address these concerns and challenges. We have developed
In “At-home Skin Care Devices 2011: U.S. Market Analysis and Opportunities,” Kline & Company measured the skin care device market at close to $1 billion at the retail level for 2011, with exceptional growth expected for the next five years.

Pro+Therapy MD, a new line of physician-exclusive cosmetic topical products. Addressing key unmet needs critical to a practice’s success influenced our innovation selection process. In order to optimize the delivery of Kinetin and Zeatin, Valeant’s clinically proven plant-derived growth factors, the company licensed an exclusive novel liposome that encapsulates 85 to 90 percent of ingredients, versus using conventional liposomes which encapsulate only 50 percent of ingredients.

This technology delivers growth factors in unprecedented levels through the stratum corneum, and releases them over 12 hours. Other technologies were chosen to engage patients to help support compliance (i.e., an eye cream with immediate visible benefit to encourage daily use that helps lead to subsequent mid-term and long-term benefit). Valeant developed the first skin polishing exfoliator, which turns “off” in about three minutes, minimizing trauma risk to the stratum corneum. A number of practical exclusive breakthrough technologies will debut later this year.

JACKIE MILLS, NATIONAL RETAIL SALES DIRECTOR
Tria Beauty

The market for hand-held devices is only expected to increase, as companies are meeting consumer demands for at-home tools that mirror similar technology found at physician offices. In At-home Skin Care Devices 2011: U.S. Market Analysis and Opportunities, Kline & Company measured the skin care device market at close to $1 billion at the retail level for 2011, with exceptional growth expected for the next five years. More and more individuals are seeking the benefits of permanent skin care solutions with the convenience, privacy, and affordability of home use.

Consumers are driven to purchase a product that combines cutting edge technology, safety, and superior results. Tria Beauty, Inc. creates light-based skincare products that deliver professional results at home. The clinically proven Tria Hair Removal Laser is the first and only FDA-cleared laser hair removal system available for at-home use. The Tria Hair Removal Laser uses the same laser technology that is used by professionals for in-clinic laser hair removal and is clinically proven safe and effective. Consumers will begin to see results in as little as two treatments, with freedom from endless shaving and waxing in as little as six months.

The Tria Skin Perfecting Blue Light treatment for acne is a clinically proven blue light device that uses high intensity light to destroy bacteria in the skin, rapidly clearing acne outbreaks and improving overall complexion. Recently, a single-center, open-label eight-week study was conducted for the Tria Skin Perfecting Blue Light for acne, showcasing the overall effectiveness of the device in significantly reducing the amount of acne, as well as the frequency, severity, and redness of acne flares. Participants in the study included 32 men and women between the ages of 13 and 45 with mild-to-moderate facial acne vulgaris. Treatment of breakout areas with the Skin Perfecting Blue Light resulted in a statistically significant (P≤0.01) reduction in inflammatory lesions as early as week 1 vs. baseline. Further, 100 percent of subjects reported improvement in the frequency and severity of their flares after eight weeks of using the Tria Skin Perfecting Blue Light, as compared with baseline. A majority of study participants also reported significant improvements in skin clarity, tone, texture, and smoothness after using Tria’s blue light device.

CONCLUSION
The field of cosmeceuticals and hand-held devices continues to grow and it is likely that in the future, this market will expand even more. The science behind these novel treatments will also mature and this will further energize our specialty and the options we have for patients. As cosmetic surgery editor for Practical Dermatology, I intend to bring these developments to you as they occur.

Dr. Schlessinger is an advisory board/consultant, researcher, or stockholder with Allergan, Stiefel/GSK, Galderma, Obagi, Ortho Pharma (Johnson & Johnson), Medicis, and Revance. He is also President of FixMySkin, which recently introduced the 1% Hydrocortisone FixMySkin balm line.

Joel Schlessinger, MD is Founder and Course Director of Cosmetic Surgery Forum. He practices in Omaha, NE. The 2012 Cosmetic Surgery Forum will be held from Nov. 29 – Dec. 1 at the Venetian/Palazzo in Las Vegas, NV. For more information and to register, visit www.CosmeticSurgeryForum.com