

Society of Cosmetic Chemists  
Carolina Chapter

May 2020  
Volume 119

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MAY 20, 2020  
1-2 PM EST



Optimizing Your Formulation with  
Natural Ingredients

Howard Epstein, PhD

**\*Registration information for SCC Members to follow in email  
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MEET OUR SPEAKER ON PAGE 3

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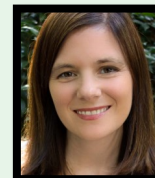
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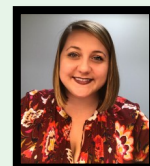
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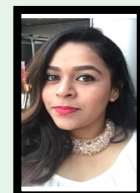
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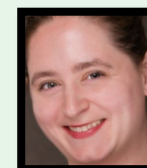


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# Society of Cosmetic Chemists

Carolina Chapter

## LETTER FROM THE CHAIR: STEVE O'CONNOR

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Hello Everyone,

What a few months it has been for all of us. Like for us individually, our chapter has faced some challenges that nobody could have predicted. We appreciate everyone for being patient with us as we have worked hard to reorganize our events.

In preparing this version of the letter from the chair, I decided to look back at our first newsletter sent out in February. The letter mentioned that it would be an exciting year and how true that statement has proved. Of course, at the time of that writing we were scheduled to have a chapter meeting on February 20 to be held at Elon University and featuring a presentation from Dr. Vince Gruber, Director of New Technologies, Jeen International. With his talk on fermentation technology, we were expecting a nice turnout at Elon thanks in part to Professor Nyote Calixte and the expected attendance of her students. Then of all things, a snowstorm hit North Carolina, which, after much staring at the radar, forced us to cancel the event. We attempted to reschedule for

April but with social restrictions in place, that was not possible.

As you all know by now, the CCSCC board has cancelled all chapter meetings for 2020. This includes the 2020 Naturally Kiawah Symposium scheduled for Sep 30 – Oct 2. The decision for Naturally Kiawah was difficult and a special thanks to Erica O'Grady Executive Director/CEO of the SCC for her assistance and to Michelle Linscott. We appreciate also the helpfulness of the Kiawah event staff as they were very understanding of our situation. We are looking at other methods to provide events for education and to connect our members. Announcements will be sent with more information as our schedule for 2020 develops.

Our first event is May 20 and we are very pleased that Howard Epstein, PhD has found time to deliver a webinar. Howard has been a consistent presence at our Kiawah events and we are thrilled to find another forum for him to present. This webinar is co-sponsored by the Southeast Chapter and we have worked with National SCC to organize. This is a learning experience but I think you all will enjoy the presentation and the chance to attend an event from the CCSCC. The event is free, our way to say thanks for sticking with us. We will bring more events to the chapter and if things permit, we will organize chapter events where we all can attend in person.

Hoping you and your families are healthy and safe.

Best regards,

*Steve O'Connor*

Chair, Carolina Chapter



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# Society of Cosmetic Chemists Carolina Chapter

## Meet our Speaker: Howard Epstein, PhD



Dr. Howard Epstein is Director, Technical Services for EMD Performance Materials Corporation, an affiliate of Merck, KGaA, Darmstadt, Germany. He was a scholar in residence at the University of Cincinnati department of dermatology and received his Ph.D. in Pharmacognasy from the Union Institute & University in Cincinnati, Ohio during that time. Howard has authored chapters in various cosmetic technology textbooks including Apply Topically, and a chapter in the Manual of Gender Dermatology. He was editor of the Journal of Cosmetic Science and authored and edited various chapters in Harry's Cosmeticology, ninth edition recently published. Howard has extensive experience in the cosmetic industry, formulating for Estee Lauder, Maybelline, Bausch & Lomb and KAO brands.

Howard has six formulation-related patents and currently serves on the editorial board of the dermatological journal SKINmed, representing the cosmetics industry to dermatologists.

## Optimizing Your Formulation with Natural Ingredients

There is a history of the use of folk medicine on every continent. The doctor/priest/shaman/medicine man was very powerful and influential in his community. Throughout time medicine, religion and botanicals have been closely integrated in many societies. Today the relationship between people and plants remains just as intimate as it was in the past.

There are numerous explanations for the strong spiritual bond between plants and humans. Perhaps the most significant connection is the common language we share. We know this language as gene expression, not so much a spoken language, rather a language of molecular cell biology. Gene expression techniques developed during the past twenty years are used to understand the complex biological process that enables a plant to defend itself against aggressive attack from insects, harsh weather and plant eating animals. Similar techniques are used to study gene expression in humans.

This webinar will discuss our relationship with plants in a fundamental way with the aim of explaining how a formulator can use the common language of people and plants to select optimal natural ingredients.



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# Society of Cosmetic Chemists

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## NATIONAL NEWS



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**January 7, 2020 – New York, NY** — This is a very special year for the Society of Cosmetic Chemists (SCC) as the organization celebrates its Diamond Jubilee. Founded in 1945, the SCC is the oldest and largest membership organization focused exclusively on cosmetic science education.

*“After 75 years, the Society boasts one of the biggest footprints in the cosmetics and personal care industry,”* said Erica O’Grady, CAE, Executive Director/CEO of the Society. *“With our international, national and local events, we are proud to represent the industry and the greater scientific community as a well-respected organization that has never strayed from its mission: to advance cosmetic science.”*

This past year, the SCC acquired a record 5,700+ members globally – with some of those memberships spanning as many as five decades – which speaks directly to the value of SCC membership. The last 75 years have featured seventy-three annual scientific meetings, two US-hosted international congresses with the International Federation of Societies of Cosmetic Chemists (IFSCC), two co-hosted intercontinental conferences with the Italian SCC, multiple industry partnership collaborations, and hundreds of education events presented domestically.

*“When you reflect back on our history it is evident that education, innovation and collaboration are very important to the SCC,”* said Mindy Goldstein, the 74<sup>th</sup> SCC President and owner of Mindy S. Goldstein, PhD Consulting. *“I am sure that our founder, Maison G. deNavarre, would be very proud of all his predecessors’ accomplishments in pursuit of realizing his vision for the Society.”* she added.

To commemorate the occasion, a new 75<sup>th</sup> Anniversary logo was unveiled at the SCC’s 2019 Annual Scientific Meeting & Technology Showcase on December 18<sup>th</sup> in New York City.

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# Society of Cosmetic Chemists Carolina Chapter

## Society of Cosmetic Chemists Launches Digital Resource Hub



Today, the Society of Cosmetic Chemists (SCC) launched its Media Library and Resource Center ([www.sconline.org/library](http://www.sconline.org/library)), a digital platform poised to be the industry's go-to resource for the latest scientific research, education and information.

Content on this new hub includes: digital issues of the peer-reviewed research presented in the Journal of Cosmetic Science; an archive of recent SCC Webinars on important advancements, topics and trends in the cosmetic and personal

care industry; videos/slide-syncs of the scientific presentations delivered at recent Annual Scientific Meetings; and other resources.


"After nearly a year in development, we are excited to launch this new industry resource," said Erica O'Grady, CAE, Executive Director/CEO of the Society. "Given current global events, the need for on-demand, remote access to resources is greater than ever, and we're pleased to be able to provide that."

And, new for 2020, the Journal of Cosmetic Science has been redesigned and migrated to a digital-only format. Access to all issues of the Journal is free to SCC members, and issues dated 1947-2017 are now open access for the industry.

The Media Library & Resource Center includes a sophisticated keyword search of all available content types on the hub – articles, presentations, newsletters, webinars and more. On-demand purchase options for all types of content is available and select content access is included free as a benefit of SCC membership.

"I am delighted that the SCC is leveraging technology investments to develop these types of products and services which are core to our mission," said Mindy Goldstein, SCC President and owner of Mindy S. Goldstein, PhD Consulting. "Our strategic focus as an organization is to continue to create valuable tools for our members to assist in their professional development and knowledge in an ever-changing industry."

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## How to improve the bioavailability and efficacy of skin care actives

By: George Deckner

Improving active bioavailability is key to improving the efficacy of skin care formulations. When products are clinically tested, subjects can normally be grouped into low, medium and high responders. By decreasing the number of low responders and increasing high responders, clinical efficacy can be dramatically improved.

I believe that much of the subject variability can be attributed to poor bioavailability of low responders. For example, benzophenone skin penetration has a subject variability of 6 ug/cm<sup>2</sup> to 40 ug/cm<sup>2</sup> penetrating in 48 hours on the same skin site. Best in class skin repair actives can reduce wrinkle depth in high responders by up to 60%, but only approximately 30% when averaged with low and medium responders. This suggests that improving bioavailability of an existing active by increasing the number of high responders may be a better strategy than developing new actives.

### What is “bioavailability?”

Bioavailability is defined as the penetration rate for an active to reach its site of action. This is also referred to as the flux rate or the amount of active penetrating over time (micrograms/cm<sup>2</sup>/hour). For cosmetic actives, the target usually is the lower epidermis. However, for ingredients like sunscreens, the goal is to stay on the surface of skin to assure maximum UV absorption. The challenge in formulating highly effective skin care products is getting superior bioavailability while minimizing irritation caused by other formulation ingredients that may also have penetrated. In pharmaceuticals this is referred to as the therapeutic index or the benefit/risk ratio. For skin care products, unlike drugs, only an extremely low level of risk is acceptable.

### Three factors that control the penetration rate of actives

The three most important factors that control the skin penetration of actives are molecular weight, C log P and charge (anionic or cationic). The highest molecular weight that an uncharged active can normally penetrate is approximately 500 Daltons. C log P is a measure of the hydrophobicity of a molecule as measured by the log of its solubility in Octanol divided by its solubility in water. Low or too high hydrophilicities can cause poor penetration. It has been shown for compounds to have a reasonable probability of penetrating, their C log P value must be between 1 and 5(1).

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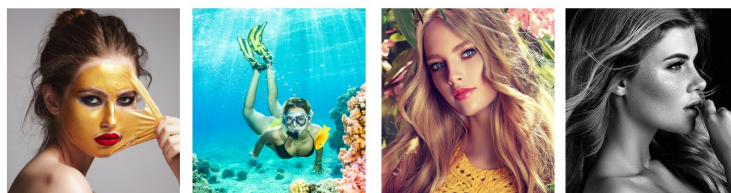
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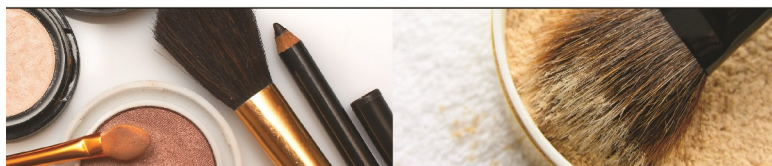
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## CONTINUED FROM PAGE 6

### WHAT FORMULATIONS AFFECT BIOAVAILABILITY?

Different types of formulations can demonstrate significant differences in bioavailability. These include oil in water, water in oil, water in oil in water, polyol in oil emulsions and hydrogels.

Most methods that increase bioavailability cause a disruption of the skin's barrier function or work by increasing active solubility in water or oil.

- Skin barrier disruption—the Stratum Corneum is comprised of layers of keratinocytes coated with epidermal lipids. Removing, penetrating, or changing the crystallinity or structure of this lipid layer will increase active penetration.
- Solvents: Dimethyl isosorbide, ethoxydiglycol, ethanol, oleic acid
- Phospholipids have consistently been shown to increase the skin penetration of both oil and water-soluble actives. Examples include lecithin, hydrogenated lecithin, lysolecithin, and tocopheryl phosphate.
- Surfactant vesicles: Surfactants can form multilamellar and unilamellar vesicles with actives. Liposomes produced using phospholipids, cationic and nonionic surfactants are examples.
- Hydration can reversibly swell corneocytes and change the structure of skin lipids and increase penetration<sup>(2)</sup>. Examples include the use of humectants in formulations and the multilamellar liquid crystal based oil in water emulsions.
- Occlusion: Dermatologists frequently recommend using Saran wrap to increase the efficacy of steroid creams on skin. The use of drugs with a polyethylene/mineral gel has also been used for this purpose (Plastibase).
- Physical or chemical exfoliation: Exfoliating skin before applying an active or using with an active can frequently increase product efficacy<sup>(3)</sup>.
- Examples of chemical exfoliants include lactic, glycolic, salicylic acids, and N acetyl glucosamine. Physical products include abrasive creams, sponges and electric or mechanical brushes.
- Increased solubility
- Molecular complexation: Cyclodextrins (alpha, gamma, hydroxypropyl beta cyclodextrin) have a molecular cavity that can encapsulate actives improving their water solubility. The complexation is very specific to the chemical composition and shape of the active.
- Phytoglycogen has a cavity which can encapsulate many different types of actives. The complexation doesn't appear to be as specific on the chemical properties of the active like Cyclodextrin.
- Micro/nano emulsions, micellar solutions and high shear processing can be used to significantly reduce the particle size of an active.
- Highly polar emollients are frequently needed to solubilize water insoluble actives since few are non-polar. Examples include isopropyl lauroyl sarcosinate, lauryl lactate, phenyl ethyl benzoate, dioctyl maleate, and dioctyl isosorbide. Many sunscreens have also been shown to be penetration enhancers<sup>(11)</sup>.
- Increase the partitioning of active out of the formulation into skin: If an active is too compatible in the formulation, there is no driving force for it to leave the product film and penetrate. The easiest way to accomplish this is to formulate the active at its saturation point in the water or oil phase. When Retinol, for example, is formulated using a polar emollient, its irritation potential is lower versus using a non-polar emollient. This is due to slower skin penetration caused by the Retinol not partitioning as rapidly from the formulation film into skin.

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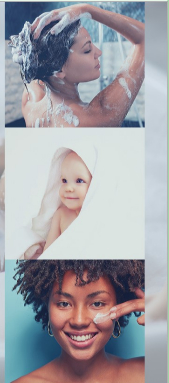
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### CONTINUED FROM PAGE 7

- Prodrug approach: Chemically modifying the active and using skin enzymatic skin activity to convert to the active form once it penetrates
- Acylation of skin repair peptides is claimed to improve skin penetration by a factor 100 to 1000. This also increases the C log P.
- 
- Charge neutralization Frequently, the bioavailability of charged actives can be increased by complexing an anionic or cationic active with a material that has an opposite charge. This is referred to as an ion pair formation and results in the charge being neutralized.
  - Miscellaneous methods
- Iontophoresis is the process of enhancing the permeation of topically applied therapeutic agents through the skin by the application of electric current<sup>(4)</sup>.
- Electroporation is an electrical enhancement method which involves the application of short (microsecond or millisecond), high voltage (50-1000 volts) pulses to the skin<sup>(5)</sup>.
- Microporation involves the use of microneedles that are applied to the skin so that they pierce only the stratum corneum and increase skin permeability<sup>(5)</sup>.
- Heat enhances the skin permeation of drugs by circulation, blood vessel wall permeability, rate-limiting membrane permeability and drug solubility<sup>(6)</sup>.
- Pressure waves generated by intense laser radiation can make the stratum corneum more permeable. It is only applied for a very short time (100ns-1µs)<sup>(7)</sup>.
- Sonophoresis is a technique which involves the use of ultrasonic energy to enhance skin penetration of active substances<sup>(8)</sup>.
- Magnetophoresis is the application of a magnetic field to enhance drug delivery across the skin<sup>(9)</sup>.
- Radiofrequency involves exposure of the skin to a high frequency alternating current of 100 KHz that results in the formation of heat-induced microchannels in the Stratum Corneum<sup>(10)</sup>.



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