

The Power of the Microbiome

A conversation with Denis Wahler, Ph.D, Global Manager
Technology Partnerships of Givaudan Active Beauty

EURO COSMETICS: Denis, Givaudan is a pioneer in microbiome research about the skin. What can you tell us about this?

Denis Wahler: Our Centre of Excellence in Applied Microbiomics, located in Toulouse, has over 15 years of experience in the field of microbiome research, and has been developing specific protocols and methods to explore and study the microbiota of the skin for more than 6 years now. Thus, our cutting-edge technological platform has been optimized and tested many times and under many conditions, and our team is constantly pioneering for new products. In particular, beyond the traditional “prebiotic approach”, our expert scientists were the first to discover “microbiome-activated” ingredients with cosmetic applications. This resulted in the launch, in 2015, of Brightenyl[®], the first microbiome-activated skin brightener, which won Gold and Bronze Innovation Awards at in-cosmetics Global and in-cosmetics Latin America, respectively, on the same year. Two years later we launched a new microbiome concept again, with the release of Revivyl[™], the first “microbiome protecting” cosmetic ingredient, that is furthermore the first holistic skin renewal accelerator agent for anti-ageing applications. This earned us the first cosmetic ingredient to win two Gold Innovation Awards, at in-Cosmetics Latin America and in-Cosmetics Asia in 2017.

EURO COSMETICS: How important is the microbiome for our skin?

Denis Wahler: Among our various microbiomes, the skin microbiota, which at Givaudan we call the *Stratum microbium*[™], is surely the most diverse. With an average surface of 1.8 m², our skin is indeed a vast continent with various climates and diversified countries. From deserts

(forearms, calves) to jungles (armpits, scalp), our skin provides many niches with different ecological conditions (humidity, pH, available nutrients). But skin is also exposed depending on our own environment, lifestyle, and fashion style, to a large variety of external parameters, such as outside temperature, UV-exposure, pollution ... and contact! This wide variety of skin ecosystems results in many differences in cutaneous microbial composition and abundance depending on the body area, and this is why we should talk about skin microbiomes. In fact all human beings are unique and our differences can be seen from our microbiome, which is as unique and personal to us as our DNA. These billions of microorganisms on our skin constantly communicate with our body, and play an important role in our immune system, protecting our health and wellbeing. In addition, and despite complexity and the lack of strong population surveys and skin epidemiologic studies, it has become clear that several skin disorders



Denis Wahler

were correlated with alterations in microbial communities. This was observed from differences in the microbes present in diseased skin versus those present in healthy skin. However, it is still not clear whether microbiome imbalance leads to skin pathologies, or whether underlying skin conditions result in a modification of microbial equilibrium.

As a conclusion, high diversity of the microbiota and protection of its balance prevail for a healthy skin microbiota.

EURO COSMETICS: You were the first to develop “microbiomically activated” active ingredients and “microbiome protecting” active ingredients. From these came the two prize-winning cosmetic ingredients Brightenyl[®] and Revivyl[™]. What is special about these active ingredients?

Denis Wahler: Brightenyl[®] activation by the skin microbiome is based on the pro-drug concept. Indeed, the active molecule, gallic acid, is protected and masked by glucose units attached on its alcohol functions. This is produced by Givaudan using unique biotechnology expertise on glycosylation. It provides high improvement in both stability towards air oxidation and water solubility to gallic acid molecule,

which allows formulating it very easily. However you lose its biological effect doing so. In order to recover cosmetic performance, you need then to release again gallic acid from its “protecting cover”, and remove the glucose units. Only skin microbiome specific enzymes are able to do it, as we do not possess the required metabolism into our skin cells.

Revivyl[™] effect is completely different. This plant extract has been demonstrated to protect our skin microbiome balance against dysbiosis effect of the rest of the cosmetic formula. Indeed a clinical study was run by our experts on a panel of 19 women over a period of 14 days, showing that if you were using a basic cosmetic vehicle twice a day your microbiota was imbalanced after that period. However, if you were using the same vehicle with our Revivyl[™] active in it in the same conditions, the balance was maintained. This is the first cosmetic active showing this kind of microbiome protection.

EURO COSMETICS: And for which applications are they suited?

Denis Wahler: Brightenyl[®] offers various applications. Skin tone uniformity and skin color optimization (including reduc-

tion of pigmented spots) is among the highest consumers’ demands worldwide. Up to now, the only solutions to optimize skin complexion required several ingredients to deliver clinical benefits. Brightenyl[®] is a S.M.A.R.T. (Skin-Melanin-Active-Removal-Technology) ingredient. Far from probiotics, prebiotics and other traditional skin microbiota ingredients, it represents a new generation of multifunctional skin complexion optimizing molecule, which is activated in situ by the living veil called the *Stratum microbium*[™]. By targeting several biological pathways, Brightenyl[®] addresses all the different causes of uneven skin tone, redness and pigmentation issues simultaneously. Brightenyl[®] has a light yellow color that does not impact the color of the finished formula. Preservative free, odorless, water soluble and perfectly stable, Brightenyl[®] is compatible with all kind of cosmetic formulas containing water. Brightenyl[®] allows the cosmetic industry to create a new generation of “perfect skin tone and color” products, such as smooth whitening creams, intelligent brightening serums, lightening lotions or sprays, CC creams (color correction creams), skin tone enhancing gels, or anti-pigmented spots

serums.

Revivyl[™] is the first holistic skin renewal active ingredient. Superficial treatments as exfoliation, dermabrasion or the use of acids can help to stimulate superficial epidermis regeneration, but most of them are associated with local inflammation and redness. Revivyl[™] is the first cosmetic active ingredient which targets from bottom to top all the key steps of skin renewal cycle. From stem cells activation and protection to cellular differentiation and finally surface renewal by dead cells enzymatic elimination, Revivyl[™] synergistically reactivates all these processes at once. On the stratum corneum, Revivyl[™] has a unique capability to protect skin microbiota equilibrium during skin renewal cycle, which is a key feature as it is now well known that a healthy skin is a skin with a balanced microbiota.

Revivyl[™] efficacy has been exhaustively demonstrated by using genomic, proteomic, metagenomic, lipidomic and clinical evaluations.

This multifunctional active ingredient delivers benefits in 2 weeks, showing a better skin moisturization and a rejuvenation of skin surface with up to -30% wrinkles versus placebo. Water soluble, safe and from a natural source, Revivyl[™] is easy to formulate in all skin or body care formula. By reactivating the production of a new skin, Revivyl[™] is answering consumers’ expectations number one: “I want to look and feel younger”.

EURO COSMETICS: What are your new insights and developments in microbiome research?

Denis Wahler: Microbiome research is a very interesting approach to study the impact of cosmetic products on our skin microbiota, understand the link between microbiota and skin beauty, or use skin microbiota functional potential to provide benefits to skin beauty and wellness. However it is, first, a very complex system to tackle, and second, a young science, with really powerful new techniques, but still a lot of unraised questions. This is why we must proceed with care and in a meticulous manner. With our level of experience



and proven methodologies, we now move to extended panels and systemic analysis of skin microbiome diversity. And of course we continue to develop new actives for cosmetic applications, which remains our core business.

Finally, we don't forget that, if microbiome research is promising a lot of new considerations on our skin functioning and beauty, we also need to communicate it to the end consumers. We therefore also conduct consumer surveys on the topic to help our customers building their marketing stories.

EURO COSMETICS: *How can anti-aging aspects and the promotion of healthy skin flora be integrated cosmetically?*

Denis Wahler: During human evolution process, our cells and organs have naturally co-evolved with micro-organisms which appeared on Earth far before us. This co-evolution has been based on a balanced synergy between microbes and our body

in a win-win situation. We need microbes – they need us.

We have two major interfaces interacting with microbes: the internal one which is our digestive track and our external one which is our skin and mucosa. Our skin microbiota is inherited from our mother and our environment at birth, and then evolves during our life.

Ageing and the microbiota balance

Microbes on the skin live in harmony with skin cells: they find food provided by skin (lipids, proteins, salts, sugars, amino acids, urea ...) and they interact with our cells (stimulation of immune system, production of metabolites ...). As long as the homeostasis is maintained, we keep what is called a "healthy skin flora". This equilibrium of healthy status is unique to each of us, and can be damaged by lots of external or internal parameters: UV, chemicals, hormonal changes (puberty, feminine cycles ...).

Upon ageing, the skin cells' metabolism is altered (mainly due to a lack of energy and a lower efficiency to fight free radicals): the "cellular factory" gets slower and becomes less efficient. As a result, the nutrients given to the skin microbiota can be changed (not the same composition, not the same components). This can directly impact the composition of the skin microbiota: some microbes will no more be able to stay on the skin surface, or their ratio might change. This is the reason why protecting the skin flora first and balancing the skin flora second are fundamental elements to maintain a healthy skin status upon ageing.

Cosmetic solutions

Different cosmetic solutions can be used for this purpose: obviously skin pre-biotics such as yoghurt hydrolysate which will "give food" to the "good" bacteria. But nowadays, innovative solutions appear on the market based on the most recent mi-

crobiome discoveries: ingredients designed to protect the skin flora (such as the extract of the chlorophyll-free flower *Orobancherapum* – Revivyl™), or specific grades of hyaluronic acid stimulating skin cells to re-balance skin flora (PrimalHyal® P300). The microbiome science is still in its infancy for cosmetic applications, but this will for sure be a revolution as we can no more ignore this living veil at the surface of our skin (the *Stratum microbium*™).

EURO COSMETICS: *You were the first perfume company to create a personalized perfume that protects the microbiota of the skin. How exactly does this work?*

Denis Wahler: Fine fragrance is at the heart of Givaudan. We have a rich history of creating fragrances that strike an emotional chord with consumers. We are inspired by our rich heritage and our contribution to defining the evolution of the trends over time.

As creators of beautiful cosmetics and part of the Fragrance Division, Active Beauty often looks at the natural world for inspiration. We draw upon the extraordinary benefits and properties of plants, microorganisms and vegetable sources, translating these with the latest sustainable biotech-

nologies into highly functional, high-performance products.

According to these unique and powerful capabilities within the Givaudan group, we were very thrilled to present our world premiere concept called [Yu] (patent-pending), an innovative fine fragrance featuring our latest active ingredient Revivyl™, a holistic skin renewal accelerator, enabling to express and protect your uniqueness, during our VIP Party in London in 2017. [Yu] is a perfect example of our way we craft synergies between Fragrances and more especially Fine Fragrances and Active Beauty: to be an innovative ideas' incubator inspiring our customers to develop new products for the future.

[Yu] is born from the premise that you are all unique. Our uniqueness is written in your genome but even more in your microbiome. That is the main reason we decided to offer a new way of protecting the skin while using a sensory, enhancing and daily gesture: the perfume.

This is a concentrate of technology beautified by an incredible floral musky notes, with a fresh start neroli, a floral blooming heart with green, pink, iridescent and watery facets while bringing a soft and comfortable sensation.



EURO COSMETICS: *You have made new investments in your competence center for applied microbiomics in Toulouse. What were your reasons for this and what is the goal?*

Denis Wahler: As our wish for more understanding and more microbiome clinical studies is growing, we need more throughput as well as more manpower. Therefore our experts' team in Toulouse was reinforced recently by a gene sequencing specialist, and we invested in new state-of-the-art automation equipment to accelerate our protocols. We are thus ready to address more requests from our customers, as well as increase our internal developments projects.

EURO COSMETICS: *What progress in microbiomics have you achieved?*

Denis Wahler: Microbiomics is an old story for us; our Centre of Excellence in Toulouse was created on these techniques many years ago, and we evolved according to the apparition of new techniques and new equipment. Keeping up-to-date on the methodologies allows us to stay ahead on skin microbiome studies. But what is really making the difference is that we master the whole story: from the idea to the product, we create new and ground-breaking concepts and offer corresponding ingredients, while adapting the microbiome study to the exact needs. This has been recognized by the market and by several awards, and we are very proud to be at the forefront of this exciting area!

EURO COSMETICS: *In order to further advance research-driven innovations on the market, you created the company strategy 2020. What are your specific goals?*

Denis Wahler: Health and well-being remains a key pillar of Givaudan's corporate 2020 strategy, and lies at the heart of our sustainability efforts. Our microbiomics platform is a fundamental pillar of this strategy which enables us to shape a new era of active ingredients.

EURO COSMETICS: *Thank you for the conversation.* ■