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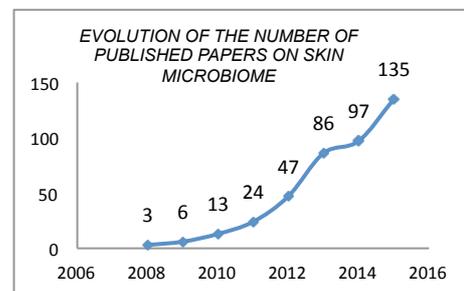
Skin microbiome - The development of a science that will transform the cosmetics industry

The booming research on skin microbiome is the source of important discoveries on its role in the maintenance of healthy skin. These findings open up possibilities for innovation in cosmetics, with products that will ensure a proper balance of this ecosystem.

Alcimed, consulting company in innovation and development of new markets, highlights the latest developments in cosmetics and care that target the skin microbiome.

Paris, April 8th, 2016 - For ten years, genetic sequencing technologies have made remarkable progress in understanding the human microbiome by mapping its bacterial components.

The number of research publications has grown exponentially. The US holds more than half of the total number of publications; and are the source of the largest research project on the microbiome: *the Human Microbiome Project*. The study, funded 153 million euros contribution of the *National Institute of Health* of the United States, enabled the characterization and analysis of different microbiomes in order to determine their role for our health.



The Company *Markets & Markets* predicts a global market value reaching 265 million euro by 2019 and to over 574 million euros by 2023. After focusing on the gut microbiome, researchers and industrials are turning their interest toward the skin microbiome.

Skin microbiome: a crucial protective role for health

The bacteria of the skin microbiome have a crucial protective effect in many ways. They help maintain the immune system, repair damages, protect against allergens and UV rays exposure, limit the damages caused by oxidation and improve the hydration and elasticity of the skin. However, an unbalanced microbiome is linked to many skin conditions such as eczema, allergies, dandruff, acne or dermatitis.

Conventional care products, that are responsible for 90% of chemicals on the skin according to the *Human Microbiome Project* analysis, are implicated in the increasing number of skin problems in the Western world. Common moisturizers, soaps and shampoos can undermine the skin microbiome, due to the antimicrobial preservatives they contain or their alkaline pH.

An increasing number of industrials have seized this market opportunity and developed care products adapted to the skin microbiome.

Industrial development of new products targeting skin microbiome

Largely present in the market for the intestinal microbiome, Healthcare Industrials already have some products that impact the skin microbiome. These products are in the form of either probiotic tablets used to increase the number of beneficial bacteria in the microbiomes or prebiotics, that are short chain oligosaccharides or polysaccharides that promote growth of targeted bacteria. Among those

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products, there is the prebiotic Lactofiltrum RUS AVVA which treats atopic dermatitis; the Antibacterial and antimicrobial probiotic *Lacidofil* of the Institut *Rosell-Lallemand* and *Perocur Forte* of *HEXAL AG*, a probiotic that reduces acne.

The cosmetics industry is not left out, especially with the emergence of product lines targeting the skin microbiome. Indeed, a dozen specialist moisturizers containing probiotics are already on sale. Behind these products, one can find large cosmetic manufacturers such as L'Oreal, who sells *Lipikar Baume* under the brand *Laroche Posay*, which integrates the bacterium *Vitreoscilla filiformis* to support microbial diversity. There is also *Avene* with its *XeraCalm* range that claims stimulation of antimicrobial peptides production.

Smaller players are also engaged in the development of products for the skin microbiome. We can cite the range *Melatogenine AOX Probiotics* of *Gatineau Paris*, the *Super Facialist's* cream *Probiotic* or the facial cream *Acidophilus Probiotic* of *Epicuren*.

Today, formulas containing prebiotics ingredients are less developed. The British company *REN* made a hands moisturizer, the *Citrus Limonum Prebiotic Hand Cream*. It contains alpha-glucan oligosaccharide, a prebiotic that prevents disease caused by pathogenic bacteria. The Belgian company, *Gova Ingredients*, sells *BIOLIN* a prebiotic based on gluco-oligosaccharide.

AOBiome, an American leading startup in the skin microbiome market, is a pioneer in the development of products that modulate the skin microbiome by chemical reactions. The company won the Shark Tank -an entrepreneurship contest- on dermatology, and launched the *Mother Dirt* range. It contains bacteria that oxidize ammonia found in perspiration and releases nitrite and nitric oxide, two beneficial molecules for skin health. In 2015, the phase 2 clinical tests on adult acne products were started.

Towards tailored skin health technologies for the future?

PROCTER & GAMBLE	L'OREAL	JOHNSON & JOHNSON
<p>Publication of a patent in December 31st, 2015 on a cosmetic formula containing <i>galacooligosaccharide</i>, a prebiotic agent to improve the condition and appearance of skin.</p> <p>Published in November 2015 a study which characterizes bacteria responsible for dandruff and that identifies the conditions that make them thrive in order to control them.</p>	<p>Richard Martin, director of the division <i>Biotechnology</i>, announced in March 2016 that the Group is conducting research on skin microbiome. This is to develop new products that will regulate the balance of the microbiome.</p> <p>Research is also conducted on new products to reduce acne by increasing the proportion of beneficial strains of microorganisms.</p>	<p>Janssen opened in 2015 the <i>Janssen Human Microbiome Institute</i> in order to impact human health through technologies targeting microbiomes.</p> <p><i>Johnson & Johnson Consumer Inc.</i> announced early 2016 a partnership with the startup <i>ProdermIQ</i>, owner of an analytical tool named <i>Skindex</i>, which measures skin health through the study of the microbiome.</p>

Large industrial such as Procter & Gamble, L'Oreal and Johnson & Johnson continue to push studies to increase the knowledge on the skin microbiome and to develop new products. In particular, Johnson & Johnson announced early 2016 a partnership with the startup *ProdermIQ* that owns *Skindex*, an analytical tool that measures skin health through the study of the microbiome.

"This dynamic is a promising step towards developing customized cosmetic products specific to every individual's microbiome" Vincent PESSEY, Project Manager at ALCIMED.

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ABOUT ALCIMED

ALCIMED (www.alcimed.com) is a consultancy firm specialising in innovation and the development of new markets, particularly in life sciences (health, biotech, agri-food), chemistry, materials, and energy, as well as aeronautics, space, defence, and Public Policy. ALCIMED relies on a team of 180 employees, each specialising in a particular sector and able to handle an extremely varied array of assignments, from marketing and sales (market analysis, targeting of new needs, positioning of a new product, etc.) to strategic issues (development strategy, identifying and evaluating acquisition targets, organising an activity, design / evaluation / deployment of public policy, etc.). The company has its headquarters in Paris as well as sites in Lyon, Toulouse, Germany, Belgium, Switzerland, England, and the USA.

Press contact :

Marie-Caroline Saro – +33 1 58 18 32 58 / +33 6 88 84 81 74 - mcsaro@comcorp.fr