JOJ Dermatology & Cosmetics
ISSN: 2689-4610

Juniper Publishers
key to the Researchers

Opinion
Volume 2 Issue 1 -December 2019
DOI: 10.19080/JOJDC.2018.02.555580

JOJ Dermatol & Cosmet
Copyright © All rights are reserved by Ia Khmaladze

Dead or Alive? A New Dilemma of Probiotic Skin Care for Healthier Skin

Ia Khmaladze* and Susanne Fabre

Oriflame Cosmetics AB, Skin Research Institute, Stockholm, Sweden

Submission: December 04, 2019; **Published:** December 10, 2019

***Corresponding author:** Ia Khmaladze, Principal Scientist Skin Health, Mäster Samuelsgatan 56; Stockholm, Sweden

Abstract

Our microbiota, a collection of micro-organisms is a living ecosystem inside (gut) and outside (skin) of our body. As a part of the inner and outer barrier of the body, it plays an important role in maintaining health. One attractive approach to enhance health and combat certain gut and skin inflammatory diseases is to modulate our microbiome using probiotics (live bacteria). Probiotics benefits on gut health is widely accepted, but we just started to understand health benefits of their use in skin care formulations. The formats already adopted in topical applications are live bacteria (probiotic) and dead bacteria, either inactivated or homogenized or ferments (postbiotics, or also called lysates or ferments). It is still a dilemma which format is the most suitable for skin care inventions but considering challenges in formulation design, development, manufacturing, and life cycle management of live bacteria in topical formulation, the focus is now shifted more toward postbiotic research to obtain similar claims as their alive counter partners. But still, the question remains, what are these additional benefits of having live bacteria in skin health care and if this is something worth the extra effort? Our first comparative study on both dead and live *L. reuteri* DSM 17938 indicated that probiotic in both formats could be used in management of skin inflammation related to photoaging and skin barrier claims like dry/sensitive skin. Additionally, the live format could be suitable for the management of pathogenic bacterial overgrowth such as in acne/sensitive skin conditions.

Keywords: Skin; Microbiome; Probiotics; Postbiotics; Ferments; UV; Inflammation; Skin Barrier; Lysate; Health; Aging; Bacteria

Abbrevations: S.A: *Staphylococcus Aureus;* C.A: *Cutibacterium Acnes; L Reuteri: Lactobacillus Reuteri*; UV: Ultraviolet; UVB: Ultraviolet B

Introduction

Our microbiota, a collection of micro-organisms such as bacteria, viruses and fungi are a living ecosystem inside (gut) and outside (skin) of our body. As a part of the inner and outer barrier of the body, it plays an important role in maintaining health [1,2]. Microbiota impact in gut health and disease is widely accepted, but we are just starting to understand the role of cutaneous microbiota and its influence on skin health and aging. Clearly, there is a strong tête-à-tête between our gut and the skin, where healthy gut contributes to beautiful skin appearance too [3]. A recent study showed interesting inverse relation, where skin exposure to external stressor, such as Narrow Band Ultraviolet B (NB-UVB) light impacted the human intestinal microbiome [4]. This novel study opens a new vision between two barrier organ bidirectional interactions. How does the microbiota influence our skin health? As an outermost layer of the skin barrier, our microbiota is involved in regulating host inflammation, skin barrier, wound healing and premature skin aging process [5-8]. There are many skin concerns associated with dysbiotic (imbalanced) microbiota such as psoriasis, rosacea, atopic dermatitis, acne [9,7]. Thus, keeping the microbiota diverse and in a good balance is crucial for maintaining healthy skin. One attractive approach to enhance health and combat certain gut and skin inflammatory diseases is the use of probiotics [10], defined as "live microorganisms that, when administered in adequate amounts, confer a health benefit on the host" [11].

Probiotics, when taken orally, can transiently colonize the human gut mucosa, influence the intestinal microbiota and exert their effects not only in the gut [12], but also impact on overall skin health [13]. Based on recent in vivo studies, oral probiotics could be considered for the management of acne, rosacea, and as a protection against photodamage/premature skin aging [10, 14,15]. Due to these effects, it was reasonable to consider that the same/similar probiotics could also benefit skin when administered topically. The formats already adopted in topical applications are live bacteria (probiotic) and dead bacteria either inactivated or homogenized or ferments of probiotics (postbiotic, or also called lysates or ferments). It is still a dilemma which format is the most

suitable for skin care inventions, but considering challenges in formulation design, development, manufacturing, and life cycle management of live bacteria in topical formulation, the focus is now shifted more toward postbiotic research to obtain similar claims as their live counter partners. To date, many skincare brands have started to incorporate lysates and ferments in their formulations with skin health claims such as strengthening skin barrier, boosting skin´s natural defense, support healthy microbiome growth, photo/pollution protection, soothe the skin and etc. But still, the question remains, what are these additional benefits of having live bacteria in skin care and if this is something worth extra effort? To tackle the dilemma, we have performed the first comparative study of dead and live bacterias´ of *L. reuteri* DSM 17938 using skin equivalent ex vivo models [16]. This specific strain of *L. reuteri* is widely studied for gut health improvement [17-19], but there are limited studies in topical applications for cutaneous health. Interestingly, our results showed that live both forms of *L. reuteri*, dead and live, possessed anti-inflammatory effects toward UV induced inflammatory cytokines (IL-6 and IL-8) at protein level and a positive impact on skin barrier. Additionally, and differently from lysate, live *L. reuteri* had an inhibitory action against pathogenic skin bacteria such as *Staphylococcus aureus (S.A)* and *Cutibacterium acnes (C.A)* [16]. In conclusion, both dead and live formats of *L. reuteri* DSM 17938 could be used in management of skin inflammation related to photoaging and skin barrier claims like dry/sensitive skin. Additionally, the live format or probiotic ferments could be suitable for the management of pathogenic bacterial overgrowth such as in acne/sensitive skin conditions due to the anti-microbial activity of such formats [16].

Conclusion

Based on consumer's growing interest in having natural, probiotic derived active ingredients in skin care formulation, we performed the first comparative study on a dead and alive bacterial strain of *L. reuteri* DSM 17938 and propose the use of dead (lysate, postbiotics) bacteria of *L. reuteri* in topical applications when UVB protection and skin barrier improvements are desired. However, live bacteria, probiotics, exert additional anti-microbial effect toward pathogenic/opportunistic bacterias´ on the skin, compared to postbiotics. Our findings open for more exploration to consider probiotics for enhanced skin health to mitigate or treat diverse skin inflammatory conditions and/or dysbiosis.

References

1. Valdes AM, Walter J, Segal E, Spector TD (2018) Role of the gut microbiota in nutrition and health. BMJ 361: k2179.
2. (2012) Structure, function and diversity of the healthy human microbiome. Nature 486(7402): 207-214.
3. Salem I, Ramser A, Isham N, Ghannoum MA (2018) The Gut Microbiome as a Major Regulator of the Gut-Skin Axis. Front Microbiol 9:1459.
4. Bosman ES, Albert AY, Lui H, Dutz JP, Vallance BA (2019) Skin Exposure to Narrow Band Ultraviolet (UVB) Light Modulates the Human Intestinal Microbiome. Front Microbiol 10: 2410.
5. Johnson T, Gómez B, McIntyre M, Dubick M, Christy R, et al. (2018) The Cutaneous Microbiome and Wounds: New Molecular Targets to Promote Wound Healing. Int J Mol Sci 19(9): 2699.
6. Kim HJ, Kim JJ, Myeong NR, Kim T, Kim D, An S, et al. Segregation of age-related skin microbiome characteristics by functionality. Sci Rep 9(1): 16748.
7. Grice EA, Segre JA (2019) The skin microbiome. Nat Rev Microbiol 9(4): 244-253.
8. Jugé R, Rouaud Tinguely P, Breugnot J, Servaes K, Grimaldi C, et al. (2018) Shift in skin microbiota of Western European women across aging. J Appl Microbiol 125(3): 907-916.
9. Ellis SR, Nguyen M, Vaughn AR, Notay M, Burney WA, et al. (2019) The Skin and Gut Microbiome and Its Role in Common Dermatologic Conditions. Microorganisms 7(11): 550.
10. Szántó M, Dózsa A, Antal D, Szabó K, Kemény L, Bai P (2019) Targeting the gut-skin axis—Probiotics as new tools for skin disorder management? Exp Dermatol 14016.
11. Hill C, Guarner F, Reid G, Gibson GR, Merenstein DJ, et al. (2014) The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic. Nat Rev Gastroenterol Hepatol 11(8):506-514.
12. Hemarajata P, Versalovic J (2013) Effects of probiotics on gut microbiota: mechanisms of intestinal immunomodulation and neuromodulation. Therap Adv Gastroenterol 6(1): 39-51.
13. Kober MM, Bowe WP (2015) The effect of probiotics on immune regulation, acne, and photoaging. Int J Women's Dermatology 1(2): 85-89.
14. Ishii Y, Sugimoto S, Izawa N, Sone T, Chiba K, et al. (2014) Oral administration of Bifidobacterium breve attenuates UV-induced barrier perturbation and oxidative stress in hairless mice skin. Arch Dermatol Res [Internet]. 306(5): 467-473.
15. Guéniche A, David P, Philippe B, Stephanie B, Elif B, et al. (2009) Probiotics for photoprotection. Dermatoendocrinol 1(5):275-279.
16. Khmaladze I, Butler É, Fabre S, Gillbro JM (2019) Lactobacillus reuteri DSM 17938-A comparative study on the effect of probiotics and lysates on human skin. Exp Dermatol 28(7): 822-828.
17. Szajewska H, Guarino A, Hojsak I, Indrio F, Kolacek S, et al. (2014) Use of Probiotics for Management of Acute Gastroenteritis. J Pediatr Gastroenterol Nutr 58(4): 531-539.
18. Urbańska M, Gieruszczak-Białek D, Szajewska H (2016)Systematic review with meta-analysis: Lactobacillus reuteri DSM 17938 for diarrhoeal diseases in children. Aliment Pharmacol Ther 43(10): 1025-1034.
19. Savino F, Cordisco L, Tarasco V, Palumeri E, Calabrese R, et al. (2010) Lactobacillus reuteri DSM 17938 in Infantile Colic: A Randomized, Double-Blind, Placebo-Controlled Trial. Pediatrics 126(3): e526-533.

How to cite this article: Ia Khmaladze, Susanne Fabre. Dead or Alive? A New Dilemma of Probiotic Skin Care for Healthier Skin. JOJ Dermatol & Cosmet. 2019; 2(1): 555580. DOI: 10.19080/JOJDC.2018.02.555580

This work is licensed under Creative Commons Attribution 4.0 License
DOI: 10.19080/JOJDC.2019.02.555580

Your next submission with Juniper Publishers will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats
  (Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission
https://juniperpublishers.com/online-submission.php

How to cite this article: Ia Khmaladze, Susanne Fabre. Dead or Alive? A New Dilemma of Probiotic Skin Care for Healthier Skin. JOJ Dermatol & Cosmet. 2019; 2(1): 555580. DOI: 10.19080/JOJDC.2018.02.555580