Science Publications

World Journal of Medical Microbiology, 2022, 1, 413
www.scipublications.org/journal/index.php/wjmm
DOI: 10.31586/wjmm.2022.413

Mini Review

Role of Probiotics for Treatment of Psoriasis?

Amany Abdelrahman Kamel Mahmoud [1], Ghada Essam El-Din Amin [1], Marwa Abd El-Rahim Abdallah [2], Marwa Yassin Soltan [2], Mohamed Farouk Allam [1,*]

[1] Department of Family Medicine, Faculty of Medicine, Ain Shams University, Cairo, Egypt

[2] Department of Dermatology, Venerology and Andrology, Faculty of Medicine, Ain Shams University, Cairo, Egypt

*Correspondence: Mohamed Farouk Allam (farouk.allam@med.asu.edu.eg)

Abstract: Psoriasis is a multi-systemic chronic autoimmune inflammatory disorder affecting 125 million people worldwide. The most common type of psoriasis is plaque psoriasis affecting up to 90% of the patients and is characterized by well-demarcated, symmetric, and erythematous plaques with overlying silvery scales that may be painful or itchy. Psoriasis may also affect the joints; increase the risk of developing metabolic syndrome, diabetes, Crohn's disease, ulcerative colitis, uveitis, certain cancers and an increase in the risk of cardiovascular diseases. Both the skin and the gut microbiome can modulate the development and progression of psoriasis. A connection between the microbiome and immunological mechanisms are antimicrobial peptides, which regulate the microbiome at interfaces and, as antigens, can trigger psoriasis. Few studies were conducted to demonstrate the effect of probiotics on different diseases, as they are living microorganisms that confer a health benefit when administrated in adequate amounts. The effects of administering probiotics include the stabilization of the gut bacterial community and the restoration of "signature" of bacterial microbiota, which is a result of lowering the pH, producing bacteriocins, altering microRNA (miRNAs), competing with pathogens for certain nutrients and improving the gut barrier function. Probiotics counter weight aggressive commensals in the body and reinforce the barrier function of the epithelium while also contributing to the regulation of innate and adaptive immune responses of the host under healthy or pathogenic conditions. Several clinical trials were conducted based on those findings to examine the role of probiotics in psoriasis, but till now there is no evidence of their efficacy.

Keywords: Psoriasis, Plaques, Probiotics, Microbiota, Quality of Life, Review

How to cite this paper:
Mahmoud, A. A. K., Amin, G. E. E.-D., Abdallah, M. A. E.-R., Soltan, M. Y., & Allam, M. F. (2022). Role of Probiotics for Treatment of Psoriasis?. *World Journal of Medical Microbiology*, *1*(1), 15–17. Retrieved from https://www.scipublications.com/journal/index.php/wjmm/article/view/413

Received: August 3, 2022
Accepted September 10, 2022
Published: September 12, 2022

Mini Review

Psoriasis is a multi-systemic chronic autoimmune inflammatory disorder affecting 125 million people worldwide [1]. Its diagnosis is mainly clinical, dermoscopy and skin biopsy are used only in doubtful cases [2].

The most common type of psoriasis is plaque psoriasis affecting up to 90% of the patients and is characterized by well-demarcated, symmetric, and erythematous plaques with overlying silvery scales that may be painful or itchy. These plaques are located on the scalp, trunk, buttocks, and extremities and can be found anywhere on the body, and some patients also have nail involvement either alone or with skin involvement [3]. Psoriasis may also affect the joints; increase the risk of developing metabolic syndrome, diabetes, Crohn's disease, ulcerative colitis, uveitis, certain cancers and an increase in the risk of cardiovascular diseases [4]. Psoriasis has a great impact on the quality of life of the

patients and their families, being a disfiguring disease with social stigma, by causing them depression and anxiety [5].

The hallmark of psoriasis is sustained inflammation that leads to uncontrolled keratinocyte proliferation and dysfunctional differentiation [6]. There are many theories implicated with its pathogenesis and the factors that trigger it, including traumatic insult, stress and infection. One of the theories is the super antigen theory of guttate psoriasis. The association of guttate psoriasis with streptococcal infection has been recognized for more than 30 years as many as 80% of patients with guttate psoriasis have clinical or laboratory evidence of streptococcal infection usually in the form of tonsillopharyngitis, and this mechanism was supported by long-term remission of psoriatic skin inflammation after tonsillectomy [7].

Both the skin and the gut microbiome can modulate the development and progression of psoriasis. A connection between the microbiome and immunological mechanisms are antimicrobial peptides, which regulate the microbiome at interfaces and, as antigens, can trigger psoriasis [8].

Psoriasis is associated with dysbiosis, both directly and indirectly [9]. ***Scher and collaborators (2015)*** studied the difference in the gut microbiome of patients with psoriasis and psoriatic arthritis compared to healthy controls. As a result, the microbial diversity in the group of psoriatic and psoriatic arthritis patients was significantly reduced. In the psoriasis patients, the relative frequency of Actinobacteria and Bacteroidetes phylyms, Coprobacillus, Ruminococcus and Para Bacteroides were found to be reduced [10]. Another study by ***Eppinga and collaborators (2016)*** reported that the gut of psoriasis patients showed less abundant Faecali bacterium prausnitzii producing butyrate and exerting anti-inflammatory action, compared to controls [11]. ***Yeh and collaborators (2019)*** observed that the baseline microbiota composition in patients who responded well to secukinumab and non-responders varied significantly, suggesting a role in the treatment response [12].

Few studies were conducted to demonstrate the effect of probiotics on different diseases as they are living microorganisms that confer a health benefit when administrated in adequate amounts [13]. The effects of administering probiotics include the stabilization of the gut bacterial community and the restoration of "signature" of bacterial microbiota, which is a result of lowering the pH, producing bacteriocins, altering microRNA [miRNAs], competing with pathogens for certain nutrients and improving the gut barrier function [14]. Probiotics counter weight aggressive commensals in the body and reinforce the barrier function of the epithelium while also contributing to the regulation of innate and adaptive immune responses of the host under healthy or pathogenic conditions. Probiotics could be used for prevention or treatment of chronic allergic and inflammatory diseases, such as in inflammatory bowel disease and atopic dermatitis [15]. Some microbes and their metabolites enter circulation and can reach the skin, and coordinate epidermal differentiation, restore skin barrier, and balance the immune responses [16]. Several clinical trials were conducted based on those findings to examine the role of probiotics in psoriasis, but till now there is no evidence of their efficacy.

New randomized controlled clinical trials to assess the effectiveness of probiotics in the management of psoriasis are strongly and urgently needed.

References

[1] Mease PJ, Gladman DD, Papp KA, et al. Prevalence of rheumatologist-diagnosed psoriatic arthritis in patients with psoriasis in European/North American dermatology clinics. J Am Acad Dermatol 2013; 69(5):729-735.

[2] Kim WB, Jerome D, Yeung J, et al. Diagnosis and management of psoriasis. Can Fam Physician 2017; 63(4):278-285.

[3] Yiu ZZ, Warren RB, et al. Ustekinumab for the treatment of psoriasis: an evidence update. Semin Cutan Med Surg 2018;37(3):143-147.

[4] Takeshita J, Grewal S, et al. Psoriasis and comorbid diseases: Epidemiology. J Am Acad Dermatol 2017;76: 377-390. doi: 10.1016/j.jaad.2016.07.064.
[5] Sampogna F, Tabolli S, et al. Living with psoriasis: Prevalence of shame, anger, worry, and problems in daily activities and social life. Acta Derm Venereol 2012; 92:299-303. doi: 10.2340/00015555-1273.
[6] Rendon A, Schäkel K, et al. Psoriasis Pathogenesis and Treatment. Int J Mol Sci 2019;20(6):1475. doi:10.3390/ijms20061475
[7] Diluvio L, Vollmer S, Besgen P, et al. Identical TCR beta-chain rearrangements in streptococcal angina and skin lesions of patients with psoriasis vulgaris. J Immunol 2006; 176(11):7104-7111.
[8] Chen L, Li J, Zhu W, et al. Skin and Gut Microbiome in Psoriasis: Gaining Insight into the Pathophysiology of It and Finding Novel Therapeutic Strategies. Front Microbiol 2020; 11:589726. doi: 10.3389/fmicb.2020.589726.
[9] Codoñer FM, Ramírez-Bosca A, Climent E, et al. Gut microbial composition in patients with psoriasis. Sci Rep 2018; 8:3812.
[10] Scher JU, Ubeda C, Artacho A, et al. Decreased bacterial diversity characterizes the altered gut microbiota in patients with psoriatic arthritis, resembling dysbiosis in inflammatory bowel disease. Arthritis Rheumatol 2015;67:128-139.
[11] Eppinga H, Sperna Weiland CJ, Thio HB, et al. Similar depletion of protective Faecalibacterium prausnitzii in psoriasis and inflammatory bowel disease, but not in hidradenitis suppurativa. J Crohns Colitis 2016;10:1067-1075.
[12] Yeh, NL, Hsu CY, Tsai TF, et al. Gut Microbiome in Psoriasis is Perturbed Differently during Secukinumab and Ustekinumab Therapy and Associated with Response to Treatment. Clin Drug Investig 2019;39:1195-1203.
[13] Sanders ME, et al. Probiotics: Definition, Sources, Selection, and Uses. Clinical Infectious Diseases 2008;46(Supplement 2):S58-S61.
[14] Zhao Y, Zeng Y, Zeng D, Wang H, Zhou M, Sun N, Xin J, Khaique A, Rajput D, Pan K. et al. Probiotics and MicroRNA: Their Roles in the Host-Microbe Interactions. Front Microbiol 2021; 11: 604462. doi: 10.3389/fmicb.2020.604462.
[15] Navarro-López V et al. Probiotics in the Therapeutic Arsenal of Dermatologists. Microorganisms 2021;9(7):1513. doi:10.3390/microorganisms9071513.
[16] Salem I, et al. The Gut Microbiome as a Major Regulator of the Gut-Skin Axis. Front Microbiol 2018;9:1459. doi:10.3389/fmicb.2018.01459.