

# Oral probiotics, prebiotics and synbiotics for maintenance and optimisation of skin health and function throughout the life course: a systematic scoping review

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## Abstract

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Globally, the burden of skin diseases is considerable, being the fourth largest cause of disability <sup>(1)</sup>. Diet is a modifiable risk factor for many dermatological conditions and one of the mechanisms by which nutrition influences skin health is via the gut microbiome. Oral probiotics, prebiotics and synbiotics may have the potential to improve functional indicators of skin health and delay skin ageing <sup>(2)</sup>.

This scoping review aimed to map the body of literature on the role of oral probiotics, prebiotics and synbiotics in maintaining and optimising skin health and function, and preventing and managing skin conditions, through the life course. The first stage of the scoping review, reported here, was the mapping of systematic reviews. The ongoing second stage involves the mapping of experimental and observational studies.

The scoping review was conducted in accordance with the JBI methodology for scoping reviews <sup>(3)</sup>. Six electronic databases (MEDLINE, EMBASE, CENTRAL, CINAHL, Scopus and Web of Science) were systematically searched without limits on language or date, along with sources of grey literature. All sources were considered for inclusion by two reviewers based on previously established criteria using the participants, concept and context framework.

The titles and abstracts of 8,972 studies were screened and subsequently 1,034 full texts were retrieved. Finally, 521 studies were included in the scoping review of which 72 were systematic reviews and are analysed here.

Most reviews analysed the efficacy of oral probiotics (93%), with 13% and 18% of reviews considering oral prebiotics and oral synbiotics respectively. These interventions were most reviewed in infants aged 0-12 months (78%), pregnant mothers (47%), and/or younger children (43%) inclusively. Only 28% and 19% of reviews considered adults up to, and above, 60 years respectively. Most systematic reviews included participants who were either diagnosed with (42%), or at risk of a skin disease (28%) with just 4% reviewing effects in primarily healthy populations (24% did not confirm the included populations).

Outcomes related to preventing and managing a skin condition were studied by 97% of reviews; just 2 reviews examined optimising skin health and function (namely skin hydration, and epidermal thickness) in healthy populations. Atopic dermatitis (AD) was the most studied skin disease; 33 of 36 meta-analyses indicated a positive effect on its prevention, compared to 19 of 26 meta-analyses on AD severity. The remaining reviews investigated psoriasis (n=2), urticaria (n=2), and acne (n=2).

This review has identified a plethora of evidence synthesis on oral probiotics, prebiotics and synbiotics in AD, particularly in infants and children, and a paucity of evidence synthesis in healthy populations. The second stage of the review considering the underlying experimental and observational evidence will determine the scope for further evidence synthesis or confirm gaps in the experimental data to inform future research.

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