

5th International Conference on **Pediatrics and Neonatal Care**

July 21-22, 2026 | Vienna, Austria



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Short-Term Emollient Intervention Promotes Beneficial Skin Microbiome Changes Linked to Reduced Atopic Dermatitis Incidence

The increasing prevalence of atopic dermatitis (AD) in infants has prompted investigation into early-life risk factors beyond genetic predisposition, particularly the role of the skin microbiome. This study aimed to determine whether microbial shifts at two months of age are associated with AD development by 12 months and to assess the impact of short-term emollient use from birth on these patterns. In a randomized controlled trial (STOP AD), 86 high-risk infants (defined by parental atopy) were assigned to daily emollient application or standard care for the first eight weeks. Skin microbiome samples from the cheek and antecubital fossa were collected at birth, two months, and 12 months, and analyzed using metagenomic sequencing. Results showed that early emollient use induced significant and persistent shifts in microbial composition, favoring taxa negatively associated with AD (e.g., Cutibacterium, Actinobacteria, Anaerococcus, Gammaproteobacteria, and Malassezia), while standard care was linked to enrichment of taxa positively associated with AD (e.g., Staphylococcus epidermidis, Corynebacterium, Streptococcus). Notably, Staphylococcus aureus abundance remained low and was not predictive of AD onset. Functional analysis revealed enrichment of metabolic pathways related to phosphotransferase system, peptide and nickel transport, and methane metabolism among infants who developed AD, particularly in carriers of FLG mutations; these pathways were attenuated by emollient use. In conclusion, early-life skin microbiome shifts are associated with AD risk, and short-term emollient intervention promotes protective microbial profiles, suggesting a potential mechanism for reducing AD incidence and informing personalized prevention strategies.

Keywords: Skin health, atopic dermatitis, emollient, skin microbiome

Biography

Dr. Stamatas brings over 25 years of international experience in the Health Care industry translating scientific discovery into actionable insights. His research focuses on skin physiology and the effects of topical skin care products, driving innovation across multiple domains including microbiome, metabolome, computational biology, and non-invasive clinical methods. He has led pioneering work that resulted in several global “firsts,” notably a paradigm shift in our understanding of infant skin maturation and new insights into the mechanisms of cutaneous adverse reactions during oncology therapy. Dr. Stamatas holds a PhD in Chemical/Biomedical Engineering and has authored over 115 peer-reviewed publications and 14 patents.