

Correspondence

Olive oil is for eating and not skin moisturization

To the Editor:

Skin barrier dysfunction is thought to play an important role in the pathogenesis of atopic dermatitis (AD) and food allergy (FA). This has led to the hypothesis that moisturizer use in early infancy could prevent the development of FA. Use of moisturizers in birth cohorts has resulted in variable effects on AD prevention, ranging from significant prevention to lack of efficacy. In the March 2021 issue of the *Journal of Allergy and Clinical Immunology*, investigators reported an association of frequent moisturizer use in early infancy with the development of FA.¹ We want to highlight several important considerations regarding this study.

First, the babies that were receiving frequent moisturizer applications likely had the worst AD, potentially leading to more frequent moisturizer treatment. Although frequent moisturizer use was seen in the FA non-AD group, a recent study reported skin abnormalities in FA without AD despite normal transepidermal water loss (TEWL).² Moreover, this study could have introduced a hidden selection bias, because AD predisposes to FA and enrollment at 3 months may have introduced a hidden selection bias due to inaccurate recall. Furthermore, whether the moisturizers predisposed to *Staphylococcus aureus* colonization, which is another potential contributor to FA, is unclear.

Second, not all moisturizers are created equal. A recent study found that more than 95% of over-the-counter moisturizers were harmful to the barrier in atopic skin, although they are generally tolerated by nonatopics.³ Indeed, frequent use of natural oil-based moisturizers can result in unwanted consequences. One such negative outcome can be disruption of tightly packed and uniformly organized lamellar membranes in the stratum corneum. When applied to the skin, vegetable oil triglycerides will be hydrolyzed by endogenous lipases into their constituent free fatty acids that in turn will integrate into the highly rigid structure of the lipid lamellae, which are composed of ceramides with mostly saturated very-long-chain fatty acids, free fatty acids, and cholesterol. This induces phase separation with discontinuities in the extracellular matrix. Furthermore, unsaturated fatty acids in natural oils can be easily oxidized and bring additional disorder into lamellae lipid membranes. Finally, natural oils such as olive oil are known to facilitate penetration of allergens across the stratum corneum into the deeper skin regions.⁴

The concept that moisturizers do not all uniformly benefit the skin barrier in the same way was recently described by Sindher et al.⁵ In this study, EpiCeram (Primus Pharmaceuticals, Scottsdale, Ariz), a trilipid cream that mimics skin lipids, was superior to a petrolatum-based emollient in reducing TEWL. What we can conclude from the Perkin et al article is that more work needs to be done. Routine moisturizers can damage the atopic skin barrier even in patients without overt AD. Therefore, too frequent applications of a harmful oil on the skin could destabilize the barrier. Skin barrier formulations that benefit the skin, as well as skin measures beyond TEWL that allow detection of skin barrier abnormalities predisposing to FA, must be identified. Alternatively, should AD- and FA-prone infants be avoiding moisturizer use? This remains to be resolved.

Donald Y. M. Leung, MD, PhD^a

Peter M. Elias, MD^b

Kari Christine Nadeau, MD, PhD^c

Evgeny Berdyshev, PhD^d

From ^athe Department of Pediatrics and ^dthe Department of Medicine, National Jewish Health, Denver, Colo; ^bthe Department of Dermatology, University of California San Francisco and Veterans Affairs Medical Center, San Francisco, Calif, and ^cthe Division of Allergy, Immunology and Rheumatology, Stanford University School of Medicine, Stanford, Calif. E-mail: leungd@njhealth.org.

Supported by the National Institute of Allergy and Infectious Diseases grant SEAL (Stopping Atopic dermatitis and ALlergy) Study: Prevent allergy by enhancing the skin barrier (grant 1U01AI147462-01A1 [to K.C.N. and D.Y.M.L.]) and by the National Institutes of Health (grant AR19098 [to P.M.E.]).

Disclosure of potential conflict of interest: P. M. Elias discloses that he is a coinventor of the formulation in EpiCream and a consultant to Primus Rx, which markets this product. The rest of the authors declare that they have no relevant conflicts of interest.

REFERENCES

1. Perkin MR, Logan K, Marrs T, Radulovic S, Craven J, Boyle RJ, et al. Association of frequent moisturizer use in early infancy with the development of food allergy. *J Allergy Clin Immunol* 2021;147:967-76.
2. Berdyshev E, Goleva E, Bronova I, Bronoff AS, Hoffman BC, Ramirez-Gama MA, et al. Unique skin abnormality in patients with peanut allergy but no atopic dermatitis. *J Allergy Clin Immunol* 2021;147:361-7.e1.
3. Elias PM, Wakefield JS, Man MQ. Moisturizers versus current and next-generation barrier repair therapy for the management of atopic dermatitis. *Skin Pharmacol Physiol* 2019;32:1-7.
4. Viljoen JM, Cowley A, du Preez J, Gerber M, du Plessis J. Penetration enhancing effects of selected natural oils utilized in topical dosage forms. *Drug Dev Ind Pharm* 2015;41:2045-54.
5. Sindher S, Alkotob SS, Shojinaga MN, Brough HA, Bahnson HT, Chan S, et al. Pilot study measuring transepidermal water loss (TEWL) in children suggests trilipid cream is more effective than a paraffin-based emollient. *Allergy* 2020;75:2662-4.

<https://doi.org/10.1016/j.jaci.2021.04.037>