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Daily Defense: Moisturization as a Cornerstone of Atopic Dermatitis Therapy

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Abstract

Atopic dermatitis (AD) is a complex skin condition characterized by chronic inflammation and impaired skin barrier function, necessitating a treatment approach that addresses both immune dysregulation and structural vulnerability. Although targeted therapies have transformed the management of AD, daily moisturization remains essential to care. Moisturizers containing evidence-based ingredients can help restore hydration, support microbial balance, and address an overactive immune system. However, patients face significant challenges in selecting optimal products due to the overwhelming number of over-the-counter options with varying ingredient formulations and evidence-based claims.

Clinicians play a critical role in guiding product selection and translating ingredient knowledge into practical recommendations. This review offers a framework to support the appropriate selection of moisturizers that are aligned with patient needs. Moisturizers can function both as an effective monotherapy or a complement to topical or systemic treatments in more advanced disease. By using evidence-based ingredients with a patient-centered approach, moisturizers can serve as a cornerstone for long-term AD control.

Introduction

Atopic dermatitis (AD) is a prevalent, chronic inflammatory skin disorder characterized by impaired epidermal barrier function and immune system dysregulation. While often initially presenting in childhood, AD can persist or develop in adulthood and affects millions worldwide.[1,2] Clinical features such as pruritus, xerosis, and recurrent eczematous lesions can disrupt sleep, impact daily functioning, and contribute to psychological distress.[3,4,5] Although recent therapeutic advances have expanded treatment options, long-term management remains challenging due to heterogeneity in disease expression and response to intervention.[1,5] As AD presents a significant burden in both pediatric and adult populations, understanding its pathophysiology remains central to improving care.[5]

The pathogenesis of AD involves an interplay between barrier dysfunction and immune dysregulation. While earlier hypotheses framed this as a debate between primary barrier defects ('outside-in') or immune dysregulation ('inside-out'), contemporary models recognize their interdependence. The outside-in model suggests that a weakened skin barrier allows allergens, irritants, and microbes to enter the skin, triggering inflammation.[6,7] The inside-out model focuses on immune system dysfunction as the primary issue, with inflammation leading to damage to the barrier.[5,7] These perspectives reflect the complex barrier disruption and inflammation cycle that defines AD.[6,7]

Early onset of AD, particularly in childhood, has also been associated with the atopic march. This term describes the characteristic onset of other atopic comorbidities following eczema, ie, food allergies, asthma, and allergic rhinitis.[5] While the exact mechanisms linking these conditions continue to be studied, the pathogenic barrier factors associated with AD are believed to play an important role.[1,5,7,8]

Treatment options for AD include topical corticosteroids, calcineurin inhibitors, phototherapy, systemic immunosuppressants, and, more recently, targeted immunologic therapies such as topical small molecule inhibitors, injectable biologics, and oral JAK inhibitors.[1] These therapies are generally chosen based on features such as disease severity, patient response, and comorbidities. While these approaches are practical for managing inflammation and flares, they often fail to directly and primarily address the persistent skin barrier.[7,10]

Although moisturization has long been part of AD standard-of-care, its therapeutic potential continues to be refined. This article reviews current evidence on the role of moisturizers, like Eucerin Eczema Relief Cream, in supporting skin health in AD. We explore how over-the-counter formulations may contribute to disease control, examine the ingredients that make them effective, and consider how moisturizers complement prescription therapies. This review highlights clinical evidence and underlying mechanisms to better define the role of moisturizers in the long-term management of AD.

The Skin Barrier and Microbiome

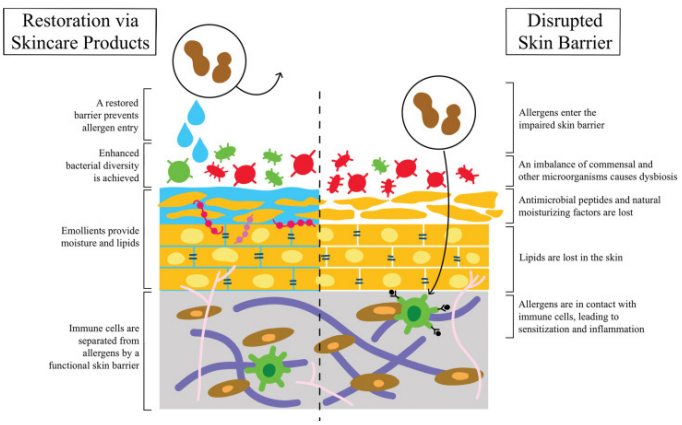
The skin serves as a protective barrier that regulates water loss, defends against environmental insults, and maintains immune balance. This barrier comprises physical, chemical, and microbial components that work together to maintain skin health.[6,9]

The stratum corneum's integrity relies on a tightly organized lipid matrix that binds corneocytes. This arrangement helps the skin stay hydrated and maintain its low surface pH, which supports normal enzymatic processes and promotes the growth of healthy microorganisms. In AD, deficits in ceramides and other lipids disrupt this architecture, creating gaps that permit allergen penetration and water loss.[7,9,11]

The skin also relies on a diverse population of microbes to maintain its defenses. This microbial layer, comprising bacteria, fungi, and viruses, supports the barrier by preventing the overgrowth of harmful species, helping to regulate inflammation, and maintaining surface pH.[4] A diverse and stable microbiome helps maintain immune tolerance and prevents excessive activation.

The stratum corneum and microbiome are closely interconnected. Changes in barrier composition can alter microbial communities, and microbial imbalances can impact how the barrier responds and repairs itself. Both systems are often disrupted in AD, contributing to inflammation and reduced resilience.[4,6,8] Figure 1 illustrates how these elements interact in the broader pathophysiology of the disease.

Figure 1. Interaction between epidermal barrier dysfunction, microbiome disruption, and immune activation in atopic dermatitis. Adapted with permission.[1]



These changes contribute to the hallmark features of AD, including xerosis, increased sensitivity to external stimuli, and impaired recovery following irritation. While anti-inflammatory therapies address immune activation, they do not directly correct underlying abnormalities in barrier structure or skin surface function. Moisturizers serve a fundamental role in management by enhancing hydration, replenishing intercellular lipids, and helping to stabilize the cutaneous environment.[6,7,14]

Preserving barrier health also requires supporting the cellular processes that maintain its structure. During their upward differentiation from the stratum granulosum to the stratum corneum, keratinocytes synthesize lipids and proteins that form an effective barrier.[7,9] Inflammatory signals, mechanical damage, and environmental stress can disrupt this maturation process. Moisturizers can help restore homeostasis by reinforcing the stratum corneum, supporting hydration, and promoting an environment conducive to barrier renewal.[3,6,10,14]

Therapeutic Moisturizers as the Foundation of AD Treatment

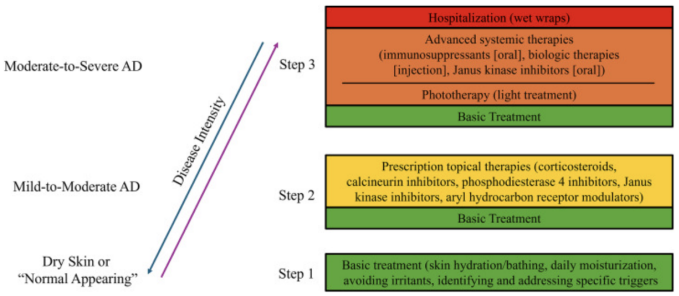
Many emerging treatments for AD have been developed, including targeted therapies that address immune dysregulation and

inflammation. While these options have expanded management strategies for moderate to severe disease, they do not directly repair the skin barrier. Barrier dysfunction remains a defining feature of AD. Without addressing it, symptoms such as dryness, irritation, and sensitivity may persist despite treatment.

Therapeutic moisturizers are central to care because they target the structural and functional deficits of the skin itself. By restoring hydration, replenishing surface lipids, and supporting the skin's protective functions, moisturizers provide essential support that is foundational to prescription treatments and contributes to long-term stability.[6,7,10]

This foundational role is reflected in current treatment guidelines. As shown in Figure 2, daily moisturization is recommended at every stage of AD severity. Whether used alone for mild disease or in combination with topical and systemic agents for more severe presentations, moisturizers remain a consistent element of management.[1,12,15]

Figure 2. Moisturizers and basic skin care are recommended across all stages of atopic dermatitis severity. Adapted with permission.[1]



Therapeutic moisturizers, like Eucerin Eczema Relief (Cream and Hydrogel), can also help soothe sensitive or reactive skin and improve overall skin quality, making prescription treatments more tolerable. Patients are more likely to adhere to their regimen when their skin is less irritated or uncomfortable. For this reason, moisturizers are an important part of care even when topical or systemic medications are used. They address needs that prescription therapies often do not and help maintain treatment success over time.[9,12]

Formulation Importance in AD Care

Moisturizers are a core element of AD care, but their effectiveness depends on their formulation. While some products support skin repair and inflammation control, others provide limited benefits and may even disrupt the barrier when poorly composed or improperly balanced.[6,9,12] Therapeutic moisturizers designed for AD should target the condition's underlying pathology by replenishing lipids, enhancing hydration, supporting surface acidification, and calming inflammation.[1,2,3,6,7,14]

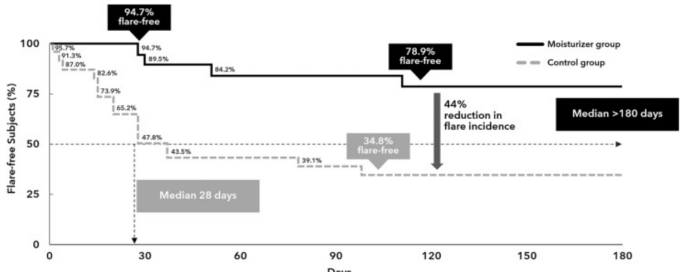
Ceramides are essential for repairing the stratum corneum, particularly when provided alongside cholesterol and free fatty acids. These 3 lipids form the foundation of the extracellular matrix, helping restore cohesion between corneocytes and reduce transepidermal water loss, an essential function in the context of AD's barrier dysfunction. When delivered in the appropriate ratio, they improve skin structure and resilience. In contrast, formulations lacking lipid balance may fail to support repair and can even worsen barrier integrity.[7,11]

Colloidal oatmeal is a multifunctional ingredient with demonstrated benefits in AD. As a skin protectant and anti-inflammatory agent, it helps soothe irritation, maintain the skin surface pH, and support microbiome balance, all of which are often compromised in AD.[4,10] By supporting both physical and microbial aspects of the barrier, colloidal oatmeal contributes to improved skin comfort and recovery, especially in patients with xerosis or pruritus.

Licochalcone A, a flavonoid derived from licorice root, addresses subclinical and visible inflammation. It reduces the expression of pro-inflammatory cytokines and helps alleviate erythema and sensory irritation during active flares.[1,2] In combination with ceramides and colloidal oatmeal, licochalcone A enhances the anti-inflammatory profile of moisturizers and supports skin recovery between episodes.

Formulations that combine these ingredients have been studied in clinical settings. In a pediatric trial, Eucerin Eczema Relief Cream containing colloidal oatmeal, ceramides, and licochalcone A was associated with a significantly lower flare rate. At the 6-month mark, 94.7% of children in the moisturizer group remained flare-free, compared with just 35% in the control group. The median time to flare in the control group was 28 days, while an estimate could not be obtained for the moisturizer group, suggesting a prolonged remission period (Figure 3).[1,15] These findings highlight the prophylactic potential of properly formulated moisturizers, particularly in pediatric populations with frequent flares.

Figure 3. Moisturizer use prolongs the time to flare in pediatric atopic dermatitis. Adapted with permission.[1]



Another popular ingredient, Dimethicone, offers cosmetic hydration benefits, although concentrations in most over-the-counter products may not be optimal for therapeutic use in AD.[6,13] Moreover, without concurrent barrier-restorative or anti-inflammatory agents, dimethicone-only formulations may provide short-term hydration but fail to address the core disease drivers.

Given the variability in product effectiveness, selecting moisturizers based on both ingredient composition and clinical presentation is critical. Skin features, such as dryness, sensitivity, pH imbalance, or recurrent flares, should inform product choice, favoring those with evidence-based ingredients that align with the specific needs of each patient's skin.[1,3,4]

Matching Moisturizer Formulation to Patient Needs

With so many over-the-counter moisturizers and few regulations on marketing language, patients often struggle to identify products that effectively meet their needs. Some may end up using formulations that are ineffective or worsen irritation. Healthcare providers can alleviate this issue by helping to match product ingredients with specific skin conditions.

A patient-centered approach is crucial for AD management, as it fosters shared decision-making, promotes long-term use, and enhances treatment outcomes. Table 1 outlines common goals in moisturizer selection, including barrier repair, hydration, protection, and pH balance support. These categories can be linked to clinical presentations commonly seen in AD. For example, patients with visible xerosis or barrier disruption may benefit from ceramide-rich formulations, while those experiencing frequent itching or redness may respond better to ingredients that soothe inflammation or reduce sensory irritation.

Matching a moisturizer's formulation to the patient's needs strengthens its role in AD care. Healthcare professionals must understand the function of common ingredients and apply that

TABLE 1. Considerations for Moisturizer Choice in Atopic Dermatitis

Adapted with permission.[1]

Moisturizer Property	Purpose	Mechanism	Example Ingredients
Barrier Repair	A healthy skin barrier retains moisture and protects against allergen penetration.	Stratum corneum lipid barrier dysfunction, a hallmark of AD, is associated with increased TEWL and allergen infiltration.[3,4] Moisturizers that supplement endogenous lipids and/or stimulate synthesis and secretion of SC lipids can repair the skin barrier.	Ceramides (key barrier lipids, promote barrier repair); lactic acid (NMF, cellular turnover to promote barrier repair); urea (NMF, keratolytic properties, moisture binding, itch-relieving)
Hydration	A well-hydrated SC is intact and healthy.	Loss of hydration from the SC results in increased permeability, leading to inflammation and abnormal keratinization.	Ceramides (key barrier lipids, promote barrier repair); dimethicone (emollient); lactic acid (NMF, cellular turnover to promote barrier repair); petrolatum (occlusive agent, skin protectant); pyrrolidine carboxylic acid (NMF, increases skin hydration); urocanic acid (NMF, skin pH buffer)
Protection	When skin is damaged, temporary protection can be used to prevent further damage and allow the damaged skin to heal.	Protectant ingredients can create an occlusive barrier that reduces TEWL and blocks external irritants.	Colloidal oatmeal (skin protectant, anti-pruritic, anti-inflammatory); dimethicone (emollient); lanolin (occlusive agent); mineral oil (humectant, occlusive agent); petrolatum (occlusive agent, skin protectant)
Anti-pruritic	Dysfunction of the skin barrier, coupled with immune dysregulation, leads to inflammation and activation of sensory neurons.	Anti-pruritic ingredients can reduce itching sensation, leading to a lower scratch drive. This in turn prevents additional irritation and damage from scratching.	Ceramides (key barrier lipids, promote barrier repair); colloidal oatmeal (skin protectant, anti-pruritic, anti-inflammatory)
Anti-inflammatory	Dysfunction of the skin barrier as a result of AD leads to the release of inflammatory cytokines.	Anti-inflammatory ingredients can inhibit the release of cytokines and reduce the downstream inflammatory response.	Colloidal oatmeal (skin protectant, anti-pruritic, anti-inflammatory); licochalcone A (anti-inflammatory)
pH Stabilization	A healthy skin has a pH between 4 and 6. An acidic environment promotes optimal SC enzyme function and a healthy microbial environment.	Alkaline washes, soaps, and moisturizers raise the pH of the skin, and patients with AD have a higher skin pH than in controls, with highest pH in lesional skin. Moisturizers with mildly acidic ingredients can restore pH balance.	Citric acid (pH stabilizer); lactic acid (NMF, cellular turnover to promote barrier repair); pyrrolidine carboxylic acid (NMF, increases skin hydration); urea (NMF, keratolytic properties, moisture binding, itch-relieving); urocanic acid (NMF, skin pH buffer)

knowledge through a patient-centered lens. When product selection is guided by formulation and clinical presentation, moisturization becomes a more targeted and reliable part of AD management.[1,6]

Conclusion

Although targeted immunomodulators have transformed the management of AD, moisturizers remain fundamental and directly address underlying barrier dysfunction. In milder disease, consistent moisturization may reduce the need for prescription therapy, while in more severe cases, it can function adjunctively to pharmacologic treatments.

Clinicians must tailor therapeutic moisturizer recommendations to each patient's unique clinical presentation, considering both the scientific evidence behind key ingredients and the patient's preferences, tolerability, and likelihood of adherence. While future innovation lies in personalized care, where molecular analysis of individual skin types may drive ingredient selection, a patient-centered approach that incorporates clinical judgment, formulation knowledge, and individual barriers to use can significantly improve both treatment adherence and AD management.

Disclosure

RC has served as an advisor, consultant, speaker, and/or investigator for AbbVie, Acelyrin, Alumis, Amgen, AnaptysBio, Apogee Therapeutics, Arcutis Biotherapeutics Inc., Argenx, Astria Therapeutics Inc., Avalere Health, Beiersdorf, Boehringer Ingelheim, Bristol Myers Squibb, Cara Therapeutics, Castle Biosciences, Celldex CLn Skin Care, Dermavant, Eli Lilly and Company, EMD Serono, Formation Bio, Galderma, Genentech, GSK, Incyte, Johnson & Johnson, Kenvue, LEO Pharma, L'Oréal, Nektar Therapeutics, Novartis, Opsidio, Pfizer Inc., RAPT, Regeneron, Sanofi, Sitryx, Takeda, TRex Bio, UCB, Zai Lab. AF has no disclosures to report.

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