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EFFICACY AND SAFETY OF BIOLOGIC THERAPY IN MODERATE TO SEVERE ATOPIC DERMATITIS: A LITERATURE REVIEW

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ABSTRACT
Atopic dermatitis (AD) or atopic eczema (AE), is a long-lasting skin condition that frequently flares up. It is identified by extreme itchiness, small itchy bumps, red scaly patches, very dry skin, and a weakened outer skin layer. This condition commonly begins in early childhood, although it frequently persists into adulthood. Various assessment instruments are frequently applied in clinical settings to determine the severity of atopic dermatitis (AD), which is typically categorized into mild, moderate, or severe forms. Commonly used tools include the Eczema Area and Severity Index (EASI), Scoring Atopic Dermatitis (SCORAD), validated Investigator Global Assessment (vIGA), and body surface area (BSA) evaluation. The European Medicines Agency has authorized four biological treatments dupilumab, tralokinumab, lebrikizumab, and nemolizumab for managing moderate to severe atopic dermatitis. This skin condition is a complicated, hereditary disorder arising from a combination of genetic, immunological, and environmental influences The safety and success of AD treatment have improved greatly with biologics that target individual cytokines like IL-4, IL-13, or IL-31. This differs from traditional non-biological medications, which function as wide-ranging immunosuppressants rather than pinpointing and resolving the specific biological causes of the condition. Lately, specific biologic medicines have been introduced and cleared for use in treating advanced atopic dermatitis. Researchers carried out a review of academic literature to demonstrate the success and utility of these biological therapies in modern AD management.

KEYWORDS: Atopic Dermatitis, Biologic Therapy, Biologic Agents

INTRODUCTION

Atopic dermatitis, frequently called atopic eczema, is a long-term inflammatory skin disorder that interferes with the natural barrier of the skin. This condition is characterized by itching that often worsens at night, the appearance of recurrent eczema lesions or rashes, pain in certain areas of the skin, and a disease course that can vary from person to person (Abdel-Mageed, 2025). AD is currently recognized as one of the world's most widespread skin ailments. Estimates from the 2021 Global Burden of Disease report place the affected population at nearly 129 million, noting that prevalence has been climbing for over three decades (House, 2022). Research involving a meta-analysis of over 300 studies reveals that atopic dermatitis affects roughly 11% of children and 6% of adults. These results highlight that the condition is a major public health concern that impacts people of all ages and locations (Ivert et al., 2025). For patients dealing with more intense forms of atopic dermatitis, biological therapies are often a primary choice due to their ability to target the condition more effectively. In addition to causing physical skin symptoms, this condition also has significant psychosocial and economic impacts on those affected. Persistent itching, sleep disturbances, and changes in skin appearance can affect patients' emotional well-being, self-confidence, and quality of life, while the need for long-term treatment can also increase the financial burden of care for both individuals and their families (De Greef et al., 2023; Drucker et al., 2024).

Atopic dermatitis is characterized by intense itching, the appearance of prurigo, erythematous and eczematous plaques, dry skin (xerosis), and impaired skin barrier function. This condition typically begins in childhood but, in many cases, can persist into adulthood. These symptoms indicate that atopic dermatitis not only causes inflammation of the skin but also affects the skin's ability to retain moisture and protect the body from environmental irritants and allergens (Simpson et al., 2023). The presentation is heterogeneous and age-dependent infants commonly exhibit facial and extensor involvement with widespread involvement later in childhood and adulthood showing flexural and acral distribution, lichenification from chronic scratching, and variable acuity during flares (Passeron et al., 2021). A major feature of this disease is intense itching, which interferes with rest and decreases a person's quality of life across multiple levels, from psychological health to regular daily activities (Royeck, 2025; Saeki et al., 2025) .

Health professionals recommend utilizing validated tools to monitor atopic dermatitis both at the start of and throughout treatment. The condition's severity is usually labeled as mild, moderate, or severe based on various

evaluation techniques, including the EASI and SCORAD scales, the vIGA assessment, and the measurement of affected body surface area (BSA). The use of these measurement tools helps healthcare professionals assess the progression of a patient's condition, determine the effectiveness of therapy, and adjust treatment options according to the severity of the disease. From the patient's perspective, it is also important to assess pruritus intensity, for example through a numerical rating scale that records the highest itch intensity within the last 24 hours, as well as the impact on health-related quality of life using instruments such as the Dermatology Life Quality Index (Royeck, 2025 & Borroni, 2023).

The management of atopic dermatitis is largely determined by how severe the symptoms are. For cases that are mild or moderate, healthcare providers often use topical steroids, calcineurin inhibitors, or sometimes UV light treatment. Conversely, individuals with moderate to severe disease usually require systemic medications that suppress the immune system, such as cyclosporine or brief courses of oral steroids. Additionally, other medications like methotrexate, azathioprine, and mycophenolic acid may be considered as alternative therapies. As our understanding of the immunological mechanisms underlying atopic dermatitis evolves, opportunities to identify new therapeutic targets are expanding. These advancements are driving the development of more modern, targeted, and effective therapeutic strategies to control inflammation, alleviate symptoms, and improve patients' quality of life (Ferrucci et al., 2023).

For those with chronic moderate-to-severe atopic dermatitis, long-term therapeutic management is usually necessary to effectively regulate the condition. However, the continuous use of conventional systemic immunosuppressants has limitations because it can lead to safety concerns and a decline in treatment effectiveness over time. This situation highlights the need for the development of safer and more effective therapies for the long-term management of atopic dermatitis (Vignoli & Borroni, 2023).

The heterogeneity in individual responses and the established secondary adverse effects of existing medications justify the pursuit of new therapies that provide improved disease management while minimizing the risk of secondary adverse effects. Progress in researching the origins and biological mechanisms of atopic dermatitis has paved the way for innovative therapeutic targets. This is particularly true for biologic drugs, which offer a different path than conventional systemic therapies. In Europe, the EMA has approved four such biologics dupilumab, tralokinumab, lebrikizumab, and nemolizumab for patients with moderate-to-severe symptoms. The evolution of our understanding regarding atopic dermatitis has resulted in monoclonal antibody treatments that specifically interfere with the inflammation process. Dupilumab serves as the first biologic to inhibit IL-4 and IL-13 pathways, while tralokinumab and lebrikizumab provide more specific targeting of IL-13. Meanwhile, nemolizumab addresses the itch by blocking IL-31, a key cytokine in that symptom's progression (de Bruin-Weller et al., 2025) Although biologic therapies have shown promising results in the treatment of atopic dermatitis (AD), their use still faces several challenges. One of the main barriers is the relatively high cost of these therapies, which limits access to treatment, particularly in low-income countries. In addition, most biologic therapies are administered via periodic injections or infusions, which can cause discomfort and place a burden on patients requiring long-term treatment. Biologic treatments continue to be a vital alternative for individuals with moderate to severe atopic dermatitis who fail to achieve sufficient results from traditional therapies. Current research efforts continue to focus on the development of new biologic therapies with more specific and targeted mechanisms of action to improve the effectiveness and safety of treatment (Simpson et al., 2023; Thyssen et al., 2021).

As a result, this analysis seeks to measure how well EMA-approved biologics perform in treating atopic dermatitis, especially for those with moderate to severe cases. The study focuses on how these drugs alleviate clinical symptoms, enhance quality of life, and lower the rate of recurrence, while also checking for safety and how well patients tolerate long-term use. Furthermore, the review intends to present a current perspective on biologics as a more precise and successful substitute for traditional medical treatments.

RESEARCH METHOD

To explore the application of biologic therapies for atopic dermatitis, this literature review was performed. The research involved selecting and analyzing 30 academic articles that focused on four different biologic treatment options. The articles were sourced from several scientific databases, such as PubMed, ScienceDirect, and Google Scholar. The search process utilized several keywords, including "biological agents," "biological therapy," and "atopic dermatitis," to identify studies relevant to the discussed topic. To ensure the study's findings remain aligned with the latest scientific advancements, the literature search was restricted to articles published between 2019 and 2026. This restriction was implemented to ensure that the data and findings used remain relevant to current advancements in biological therapy. The goal of this review is to provide a more thorough understanding of how effective biologic treatments are, the specific ways they manage inflammation in atopic dermatitis, and their role as a contemporary choice for patients with moderate to severe symptoms.

RESULT AND DISCUSSION

Pathogenesis of Atopic Dermatitis

Atopic dermatitis has a complicated origin involving a combination of factors, including a weakened epidermal barrier, irregular immune responses, and alterations to the microbiome of the skin. These three factors play a role in triggering persistent skin inflammation and chronic itching, which are the hallmark symptoms of atopic dermatitis (Navarro Triviño et al., 2025; Radi et al., 2022). Disruption of the stratum corneum's structure is a

result of irregular skin protein management, altered lipid profiles, and imbalanced pH levels, leading to a weakened skin barrier. This condition makes it easier for allergens, irritants, and microorganisms to penetrate the skin, thereby triggering an inflammatory immune response dominated by the T helper 2 (Th2) pathway (Gościńska et al., 2023). As a result, the skin becomes more sensitive, prone to dryness, and susceptible to recurrent inflammation.

Atopic dermatitis involves a complex immune reaction where cytokines like IL-4, IL-13, and IL-31 play central roles in causing inflammation and the sensation of itching. These molecules recruit various immune cells and simultaneously hinder the development of a healthy skin barrier. In addition to the Th2 response, other pathways involving IL-17 and IL-22 may also contribute to the chronic nature of the skin lesions across different populations (Eric L. Simpson, 2019; Joura et al., 2025). A decrease in filaggrin further disrupts the skin's protective function, making it more prone to moisture loss and irritation. Research also indicates that inhibiting the IL-4 and IL-13 pathways can improve atopic dermatitis while reducing the activity of IL-23 and IL-17 in affected skin. As the disease progresses from the acute to the chronic phase, the immune response in atopic dermatitis changes with increased levels of Th1 cytokines, such as interferon gamma (INF-γ), which exacerbate the skin's inflammatory process. Experimental studies indicate that prior exposure to IL-4 and IL-13 can reduce the response to interferon and IL-17, suggesting the presence of persistent immunological changes in early-stage atopic dermatitis lesions. In chronic allergic dermatitis, elevated levels of IL-5 also play a role in supporting the growth and survival of eosinophils, inflammatory cells associated with allergic reactions and chronic inflammation (Gościńska et al., 2023; Hagihara et al., n.d.).

Comparison of Biologic Therapy with Non-Biologic Therapy

There are various treatment options available for the management of atopic dermatitis (AD), ranging from the use of emollients and phototherapy to systemic therapies, which are further divided into non-biological and biological therapies (Shergill et al., 2024). Standard care for mild atopic dermatitis typically involves using emollients for hydration along with topical steroids or calcineurin inhibitors to manage inflammation. For more advanced cases, systemic medications like methotrexate, cyclosporine, and azathioprine are frequently prescribed to dampen immune responses. Furthermore, recent immunological progress has introduced biologic treatments, which are now authorized for patients with moderate to severe symptoms. The diversity of clinical manifestations and severity levels of atopic dermatitis necessitates a wider range of effective therapeutic options for long-term disease management (Simpson et al., 2023).

Prior to the availability of biologics, individuals with atopic dermatitis who failed to respond to strong topical steroids or light therapy were usually treated with broad immunosuppressants. These traditional drugs often face limitations due to gradual toxicity, long-term health risks, and decreasing effectiveness, which frequently causes patients to stop use. In contrast, biologic treatments provide a more precise approach by focusing on specific cytokines like IL-4, IL-13, and IL-31, resulting in better safety and more successful outcomes than older systemic options (de Bruin-Weller et al., 2025).

Biological therapies work by blocking specific cytokine pathways or receptors involved in the inflammatory process of atopic dermatitis (AD), thereby helping to control the excessive immune response and reduce skin inflammation, erythema, and itching (Shergill et al., 2024). Unlike conventional immunosuppressive therapies, which have a broad spectrum of action, biologic therapies target specific molecules involved in the pathogenesis of the disease; as a result, they are considered more targeted and have a better safety profile. European guidelines recommend systemic therapy for patients with severe atopic dermatitis, particularly if topical treatment is no longer able to control the disease and the patient's condition has begun to interfere with daily activities and quality of life, for example, when the SCORAD score is >50 (Royeck, 2025a). In addition to reducing clinical symptoms, biologic therapy also helps target the underlying pathophysiological mechanisms of atopic dermatitis through its multimodal effects, thereby supporting long-term disease control and reducing the frequency of flare-ups (de Bruin-Weller et al., 2025).

Biologic Therapy for Dermatitis Atopic

This section discusses dupilumab, tralokinumab, lebrikizumab, and nemolizumab, the four classes of biologics used to treat dermatitis atopic moderate to severe approved by the EMA.

Dupilumab

Dupilumab is the first commercially available human IgG4 monoclonal antibody for the treatment of atopic dermatitis (AD) and has been used in adult patients in various countries for more than six years. Currently, dupilumab has also been approved for use in children 6 months of age and older. This biologic therapy works by targeting the interleukin-4 receptor alpha subunit (IL-4Rα), a key component shared by the IL-4 and IL-13 receptors, thereby inhibiting the primary inflammatory pathway involved in the pathogenesis of atopic dermatitis (Wollenberg et al., 2025). By inhibiting this pathway, dupilumab can disrupt IL-4 and IL-13 signaling through both type 1 and type 2 receptors, which contribute to the inflammatory process in the skin. Blocking these receptors leads to a reduction in inflammatory mediators and epidermal proliferation activity, while simultaneously increasing the expression of genes associated with the skin's barrier function. In addition to helping reduce inflammation and itching, this therapy also plays a role in improving skin integrity and reducing

the frequency of flare-ups, thereby significantly improving the quality of life for patients with moderate to severe atopic dermatitis (Elgharably Noura, 2026; Harb & Chatila, 2020).
Dupilumab is administered to adult patients at an initial subcutaneous dose of 600 mg, followed by a maintenance dose of 300 mg every two weeks (Q2W) (Royeck, 2025; Wollenberg et al., 2025). This biologic therapy has demonstrated good efficacy in the treatment of moderate-to-severe atopic dermatitis. In the SOLO-1 and SOLO-2 studies, dupilumab monotherapy produced significantly better results than placebo in achieving EASI-50, EASI-75, and EASI-90 responses at week 16. The percentage of patients achieving EASI-75 was 51% and 44% in the dupilumab groups, compared to only 14% and 11% in the placebo groups. These results indicate that dupilumab provides clinically meaningful improvements in disease severity, including reductions in the extent of skin lesions, inflammation, and itching in patients with atopic dermatitis (Elgharably Noura, 2026).
In addition to improving patients' clinical condition, dupilumab also helps improve the quality of life for people with atopic dermatitis, which is often compromised by chronic pruritus and sleep disturbances. Dupilumab's safety profile is considered quite good, as most reported side effects are mild and tolerable. The most common side effects are injection site reactions, such as local itching, swelling, and discomfort, with an incidence of approximately 34.6%. Additionally, some patients also experienced cough, fever, nausea, headache, oropharyngeal discomfort, and conjunctivitis, which were more frequently observed in the dupilumab group compared to the control group (Beck et al., 2024; Tian et al., 2025).

Tralokinumab
Tralokinumab is a human IgG4 monoclonal antibody that specifically targets interleukin-13 (IL-13), one of the key cytokines involved in the pathogenesis of atopic dermatitis. This medication works by binding to IL-13, thereby inhibiting the formation of the IL-4Rα/IL-13Rα1 heterodimer receptor complex and preventing the activation of IL-13Rα2. This mechanism disrupts the IL-13 signaling pathway, thereby suppressing the inflammatory process involved in atopic dermatitis (Elgharably Noura, 2026; Merola et al., 2023). Because IL-13 plays a key role in skin inflammation, skin barrier damage, and chronic itching in atopic dermatitis, inhibiting this cytokine may help reduce disease symptoms and improve patients' skin condition.Tralokinumab is administered via subcutaneous injection, with a recommended starting dose of 600 mg for adult patients, followed by a maintenance dose of 300 mg every two weeks. In patients who show significant improvement, such as clear or nearly clear skin after sixteen weeks of biweekly therapy, the dosing interval may be extended to every four weeks. However, this adjustment to the dosing interval may not be appropriate for patients weighing more than 100 kg, as drug requirements may differ in individuals with higher body weight.
Tralokinumab is a biologic therapy approved by the FDA and EMA for the treatment of moderate-to-severe atopic dermatitis (AD) in adults and adolescents aged 12 years and older who have not responded adequately to topical therapy (Shergill et al., 2024). Evidence for tralokinumab's success comes from the ECZTRA 1, 2, and 3 research series, where patients using the drug outperformed the placebo group in clinical measures at the 16-week mark. Specifically, ECZTRA 1 and 2 showed that EASI-75 was achieved by 33.9% of tralokinumab patients compared to 4.8% for placebo, while IGA 0/1 scores were 16.9% versus 0%. Results were even more pronounced in ECZTRA 3 when tralokinumab was used with topical corticosteroids, reaching EASI-75 and IGA 0/1 levels of 62.5% and 50.0%, significantly higher than the 37.5% and 25.0% seen in the control group. These findings indicate that tralokinumab is effective in reducing the severity of skin lesions and improving the clinical condition of patients with moderate-to-severe atopic dermatitis, including those aged 65 years and older (Merola et al., 2023).
In addition to its good efficacy, various studies have also shown that tralokinumab has a fairly positive safety profile, with no life-threatening side effects reported. The most commonly reported systemic side effects include upper respiratory tract infections, drowsiness, toothache, conjunctivitis, pruritus, fever, nasopharyngitis, and acne. Local reactions at the injection site, such as pain and erythema, may also occur in some patients (Teixeira et al., 2024).

Lebrikizumab
Lebrikizumab is a humanized IgG4κ monoclonal antibody that selectively targets interleukin-13 (IL-13), one of the key cytokines involved in the inflammatory process of atopic dermatitis. Unlike tralokinumab, lebrikizumab targets a different IL-13 epitope; thus, it does not directly inhibit the binding of IL-13 to its receptor, but rather inhibits the IL-4Rα/IL-13Rα1 heterodimerization process required for the activation of downstream inflammatory signaling pathways (Bernardo et al., 2023; Lin et al., 2024). Through this mechanism, lebrikizumab is able to suppress the inflammatory processes associated with atopic dermatitis, including skin inflammation, skin barrier dysfunction, and chronic itching. The drug has been approved by the FDA and the EMA for the treatment of adults and adolescents aged 12 years and older who weigh at least 40 kg (Elgharably Noura, 2026). The lebrikizumab dosing regimen begins with an induction therapy of 500 mg administered at weeks 0 and 2, followed by a 250 mg dose every two weeks (Q2W) through week 16. In patients who still show a partial response during the early phase of treatment, the 250 mg every two weeks regimen may be continued through week 24. Once a satisfactory clinical response is achieved, the recommended maintenance dose is 250 mg every four weeks (Wollenberg et al., 2025).

Lebrikizumab demonstrated good efficacy in the treatment of moderate-to-severe atopic dermatitis based on the Advocate 1 and 2 studies, which involved 851 patients. At week 16, the proportion of patients achieving an Investigator Global Assessment (IGA) response of 0/1 was significantly higher in the lebrikizumab group compared to the placebo group, at 43.1% and 33.2%, respectively, while in the placebo group it was only 12.7% and 10.8%. Similar results were also observed for EASI-75 achievement, where the lebrikizumab group reached 59% and 52%, while the placebo group reached only 18% and 6% (Elgharably Noura, 2026). The findings indicate that lebrikizumab is capable of producing greater clinical improvement in reducing the extent and severity of skin lesions, reducing inflammation, and helping to control the symptoms of atopic dermatitis compared to placebo. In addition, the specific inhibition of IL-13 also contributes to improving skin barrier function and reducing the chronic itching frequently experienced by patients. Although lebrikizumab is highly effective, its use may still be associated with certain side effects. The most commonly reported side effects include infections, conjunctivitis, nasopharyngitis, headaches, herpes infections, skin infections, injection site reactions, dry eyes, potential opportunistic infections, and eosinophilia (Lin et al., 2024)**.**

Nemolizumab

Nemolizumab is a biologic therapy that works by inhibiting the interleukin-31 (IL-31) pathway, a cytokine that plays a key role in the development of itching in atopic dermatitis. This medication works by blocking the IL-31R-alpha receptor, thereby inhibiting IL-31 signaling and the non-histaminergic itching pathway involved in the pathogenesis of atopic dermatitis (Elgharably Noura, 2026). Mechanistically, IL-31 is produced primarily by T helper 2 (Th2) cells and certain other innate immune cells, and then transmits signals through a heterodimeric receptor composed of the IL-31 receptor (IL-31RA) and the oncostatin M β receptor (OSMRβ). Nemolizumab blocks the interaction at this receptor, thereby reducing sensory nerve stimulation and neurogenic inflammation in the skin (Kabashima & Irie, 2021).

Nemolizumab has been approved for use in adults and adolescents aged 12 years and older with moderate-to-severe atopic dermatitis that has not been adequately controlled with topical therapy. The recommended initial regimen begins with a 60 mg subcutaneous injection, followed by a 30 mg dose administered once monthly for up to 16 weeks or until a satisfactory clinical response is achieved. After the initial treatment phase is complete, maintenance therapy is administered at a dose of 30 mg every 8 weeks via subcutaneous injection (Elgharably Noura, 2026).

Nemolizumab demonstrated good efficacy, particularly in patients with atopic dermatitis whose primary symptom was itching. By week 12 of treatment, nemolizumab reduced itching by up to 66% and improved the EASI score by 78%, with statistically significant results ($p < 0.001$), particularly when used in combination with topical corticosteroids (Biliński et al., 2025). These results indicate that nemolizumab has a rapid and specific antipruritic effect because it acts directly on the IL-31 pathway, which plays a key role in the itch mechanism of atopic dermatitis. In addition to reducing pruritus, this therapy also helps improve the extent and severity of skin lesions, leading to more optimal disease control. Long-term effectiveness is also evident in the ability to maintain an EASI-75 response, with approximately 75% of patients receiving monthly therapy and 77% of patients receiving treatment twice a month continuing to maintain this clinical improvement (Elgharably Noura, 2026).

Although it offers significant clinical benefits, the use of nemolizumab can still cause some side effects. About 30% of patients in the study were found to have a history of asthma, suggesting a link between atopic dermatitis and other atopic diseases. Hypersensitivity reactions such as urticaria were reported in both studies, with about 1% of patients experiencing moderate urticaria. In addition, about 2% of patients experienced mild to moderate reactions at the injection site, while upper respiratory tract infections were among the most common side effects (Shergill et al., 2024; Wollenberg et al., 2025).

Biologic Agents	**Dose Recommended for AD**	**Effectiveness**	**Notes**
Dupilumab	Approved dosing for adults: 600mg subcutaneous loading dose, maintenance doses:300 mg biweekly (Q2W)	Clinical data from week 16 indicates that dupilumab monotherapy surpassed placebo treatments in achieving EASI-50, EASI-75, and EASI-90 benchmarks. Specifically, 51% and 44% of dupilumab users reached an EASI-75 response, while the placebo groups lagged at 14% and 11%. This confirms the heightened efficacy of dupilumab	Following six years of use in adult patients, the regulatory scope has broadened, allowing the treatment to be administered to infants and children starting at six months of age.

		over placebo in treating atopic dermatitis.	
Tralokinumab	Adults typically start treatment with a 600 mg loading dose via subcutaneous injection, followed by biweekly doses of 300 mg. For those showing significant skin clearance after 16 weeks, the healthcare provider has the discretion to reduce the frequency of administration to a single dose every four weeks.	By week 16, older patients treated with tralokinumab in the ECZTRA 1, 2, and 3 studies achieved EASI-75 and IGA 0/1 more frequently than those receiving a placebo. Data for patients aged 65 and up showed that tralokinumab was more effective, with ECZTRA 1 and 2 reporting EASI-75 at 33.9% and IGA 0/1 at 16.9%, whereas the placebo group stood at 4.8% and 0%, respectively. Results from ECZTRA 3 further supported this, as tralokinumab combined with TCS led to a 62.5% EASI-75 rate and a 50.0% IGA 0/1 rate, outperforming the placebo outcomes of 37.5% and 25.0%.	Regulatory approval from the FDA and EMA has been granted for adults and adolescents at least 12 years of age suffering from moderate-to-severe atopic dermatitis. This applies to cases where topical treatments have failed to provide a sufficient response.
Lebrikizumab	Tralokinumab is typically started with 600 mg injections on day 1 and day 15, transitioning to a biweekly 300 mg subcutaneous regimen. For patients achieving significant skin clearance after 16 weeks, the prescribing doctor may consider extending the time between doses to a four-week interval.	Success rates for EASI-75 were notably higher among those treated with lebrikizumab, hitting 59% and 52%, while the placebo groups only saw 18% and 6%. This data suggests that lebrikizumab offers a more substantial clinical benefit for individuals with moderate-to-severe atopic dermatitis compared to a placebo.	Approval has been granted by the FDA and EMA for use in adult and adolescent patients who are at least 12 years old and have a body weight of no less than 40 kg.
Nemolizumab	The recommended protocol for nemolizumab in patients 12 and up involves a starting dose of 60 mg, followed by monthly 30 mg subcutaneous injections for the first 16 weeks or longer. Once the clinical response is established, the frequency shifts to a maintenance dose of 30 mg every eight weeks.	Likewise, 75% of individuals administered the treatment monthly sustained their EASI-75 reaction, and 77% of those receiving it bi-monthly preserved their EASI-75 response	This therapy is now cleared by the FDA for adults and adolescents at least 12 years of age whose moderate-to-severe atopic dermatitis does not improve enough with standard topical medications.

CONCLUSION

After evaluating all available options, it is evident that each biologic agent has its own advantages and limitations. Overall, the findings confirm that targeted biologic therapies have significantly transformed the management of moderate-to-severe atopic dermatitis, as all agents demonstrate meaningful clinical benefits compared to placebo. However, subtle distinctions in efficacy and dosing convenience. Among the options, dupilumab remains the most established and broadly validated therapy, with consistent EASI-50/75/90 responses and long-term safety data

across a wide age range, making it a reliable first-line biologic. Tralokinumab shows solid efficacy as well, particularly in improving EASI-75 and IGA outcomes, though its performance appears slightly more modest and may be better suited for patients who do not respond optimally to first-line therapy. Lebrikizumab demonstrates promising efficacy, with relatively high EASI-75 response rates, suggesting strong potential as a competitive alternative, especially as more real-world data emerge. Meanwhile, nemolizumab appears more niche, with a unique mechanism targeting pruritus pathways and meaningful symptom control, but comparatively less robust data on overall disease clearance, positioning it as a more specialized option rather than a primary choice. In summary, dupilumab stands as the most reliable and versatile option, lebrikizumab as a strong emerging competitor, tralokinumab as a solid alternative, and nemolizumab as a more targeted, adjunctive therapy.

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