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Eczema Treatments: A Review of Their Effectiveness, Limitations and Future Directions

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Abstract

There are currently a myriad of available choices for eczema treatment, each possessing different efficacies, potencies and mechanisms of action. There are currently three main categories of eczema treatments: traditional, alternative and modern approaches. However, there are many debates over which treatments are the most effective and offer the greatest benefits. For instance, biologics are a promising avenue of research due to their potency and efficacy, though they are associated with more severe adverse effects than other treatments. Conversely, topical corticosteroids possess a wide range of potencies and are highly effective, but carry drawbacks related to application frequency or possible local side effects. Therefore, this literature review examines the most common eczema treatments across traditional, modern and alternative medicines, compares them, and evaluates possible future directions for the research and innovation of eczema treatments and their potential contribution towards the advancement in medical research. Overall findings dictate that modern and traditional eczema treatments remain the forefront for general usage due to reliability, accessibility and safety.

Keywords: atopic dermatitis, eczema treatment, topical corticosteroids, emollients, JAK inhibitors, biologics, dupilumab, lebrikizumab, ruxolitinib, upadacitinib

1. Introduction

Since around 400 BC, when eczema was first described and labelled, it has persisted as a significant irritant and major health issue worldwide. During this time period, Hippocrates became the first to describe the condition now known as eczema, having described a patient with dry and scaly skin, as well as a chronic itch throughout the patient's body. Although considerable research and investment have been made to investigate treatments, the issue remains an unrelenting problem affecting approximately 1.5 million adults in the UK (*Change* AD UK), underscoring its widespread impact throughout the country. Key treatments currently used most commonly include emollients, general improvements to hygiene and sanitary standards, topical corticosteroids, and some modern innovations, such as Janus Kinase (JAK) inhibitors and biologics (Santer et al., 2024). Emollients are compounds which form a film on the outer surface of the skin, which aids in soothing irritation

and hydrating the skin. JAK Inhibitors are a classification of medical compounds which reduce the transduction of cytokine signalling through the JAK-STAT pathway and as a result reduce the transcription of genes related to the causation of inflammation and swelling. Biologics function as compounds which are composed of biological material, are grown in living cell structures, and are known for their potent efficacy in treating diseases. Though the common treatments are effective on a wide scale, being more cost-effective and easily accessible, they do have some disadvantages, such as side effects like lichenification (thickening of skin with leathery texture arising) or erythema (redness of skin due to increased blood flow to blood vessels near surface of skin) (Bhanot et al., 2019) with prolonged use of certain emollients and also skin thinning and stretching as side effects for topical corticosteroids. The newer innovations seem more promising, being long-lasting and highly effective at treating eczema, though a new issue arises: costs and malignancies (Mansilla-Polo & Morgado-Carrasco, 2024). This is especially prevalent in JAK inhibitors, due to the effectiveness of their immunosuppressive nature, resulting in the weakening of the immune system, leading to greater vulnerabilities in the body, which eventually culminates in a greater risk for cancer. This vulnerability causes infections to develop within the body, particularly in the respiratory and urinary tracts (Klein et al., 2022). Biologics also have a few adverse side effects, including but not limited to conjunctivitis (inflammation of the conjunctiva), injection site reactions and eosinophilia (*Long-Term Safety and Efficacy Study of Lebrikizumab* (LY3650150) *in Participants With Moderate-to-Severe Atopic Dermatitis* (ADjoin) (ADjoin), 2025). Therefore, while both traditional and newer innovations in eczema treatments have demonstrated various successes in terms of effectiveness in resolving eczema, they still have drawbacks in multiple ways, including side effects and costs. However, whilst these newer innovations do have drawbacks, further investment into them should be investigated to assess the assumptions that adverse side effects may be mitigated and eventually eliminated. This is evident in the possibility of investment into the mass production of biologics, slowly minimising costs and making them more affordable to the average person. This article ultimately aims to discuss various eczema treatments, some more well-known than others, evaluating their outlooks, various benefits and drawbacks. The key treatments discussed will include the most common traditional approaches and modern innovations, as well as some discussion on the prospect of alternative medicine. The key way in which this literature review differs from others is that it not only takes into account treatments which are very commercialised and recognised, but it also acknowledges the possibility of alternative medicine in its treatments and provides comprehensive comparisons to traditional and modern treatments for eczema.

2. Methodology

2.1. Search strategy

The primary strategy utilized for the identification of relevant literature reviews was through the thorough evaluation of key sources found on Google Scholar or ClinicalTrials.gov. The searching strategy was conducted using MeSH filtering and evidence-based analysis for clinical trials. It is important to note that included studies were not formally appraised for risk of bias and may therefore be subject to bias. Including terms such as “Biologics” and “Emollient efficacy” was vital in being able to filter relevant information when using keyword searching for Google Scholar. The reason for which a third database was not used during the research into the manuscript was because Google scholar already yields many of the journals which are indexed in PubMed, thus its usage as a third database would yield nearly completely similar results, as a result usage of PubMed was used slightly in the initial research phase, though nearly similar papers would also appear on google scholar, as a result citations were primarily present on google scholar.

Additional relevant terms were used during the evaluation of different treatments, including: Abrocitinib, Ruxolitinib, Upadacitinib, Dupilumab, Lebikizumab, Hydrocortisone and Betamethasone Valerate. Additionally, the date range of the literature search had no restrictions applied. EASI, IGA and other clinical endpoints were systematically extracted.

2.2. Inclusion and exclusion criteria

Key criteria that were required for the consideration to use the source included:

- Sufficient data for analysis for clinical trials
- Peer-reviewed academic journals in terms of literature review evaluation

Exclusion criteria:

- Lack of empirical data
- Published as an editorial commentary

2.3. Study selection and data extraction

Screening was performed throughout the writing of this literature review, and each citation was independently reviewed and assessed. Ultimately, through the process of writing, a large proportion of literature reviews and clinical trials met all inclusion criteria to be included in the literature review.

Data extraction was conducted through a comprehensive organisation through Zotero software to record the author, year of publication and area of eczema research, helping categorise research effectively through keyword searching within the software.

3. Analysis

3.1. Mild-to-moderate eczema

The most common treatments prescribed are emollients. The main emollients prescribed by the NHS are creams and ointments, such as Aveeno creams and Cetraben cream. Aveeno creams and some Cetraben creams use colloidal oatmeal as a base, due to its natural healing acceleration benefits, which act as a barrier to retain moisture and gently cleanse the skin to optimise the reduction of eczema flaring and gradually help build up a natural barrier against eczema. The key chemical components contained within this colloidal oatmeal are known as avenanthramides, which contain anti-inflammatory and anti-itch properties (Fig. 1) (Sur et al., 2008). Moreover, it also reduces hypersensitivity and thus is a very strong combatant against irritants. Avenanthramides act via inhibition of NF-κB, responsible for governing immune response and inflammation (Yang et al., 2014).

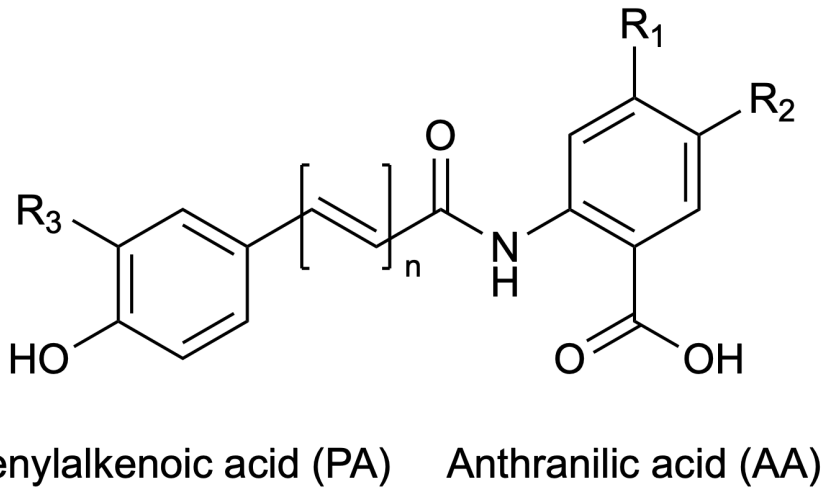


Figure 1: *Chemical structure of avenanthramides* (*n* = 1 *or* 2; R_1 = H, R_2 = OH, R_3 = H, OCH_3, *or* OH).

Note. Avenanthramides are formed by the N-acylation reaction between anthranilic acid (AA) and a phenylalkenoic acid (PA) to create an amide linkage.

Cetraben creams use soft paraffin and liquid paraffin as bases, which act as key chemical compounds for anti-inflammatory and anti-irritant properties. In a study, the SCORing Atopic Dermatitis index (SCORAD) score in patients using a paraffin-based cream was significantly lower than in those using a control cream, indicating a notable reduction in eczema severity. It indicated a 28.6% decrease compared to the original SCORAD score. Therefore, it was concluded that the paraffin-based creams and ointments were effective in reducing the severity of eczema symptoms (Waked & Ibrahim, 2020). The key chemical compounds used in the creams are petrolatum, which is a mix of hydrocarbons. Studies have shown that it helps regulate antimicrobials and maintain the skin's epidermal barrier to help the retention of moisture and prevent irritants from coming into contact with the skin, which demonstrates its effectiveness in combating eczema in patients. One of the key chemical compounds in petrolatum is alkanes such as octadecane (Rogers & Skanupong, 1974). Petrolatum acts by forming a protective barrier on the skin, helping retain moisture and smooth the skin, making it both a comfortable and effective emollient.

Emollients have shown promising results, as evidenced by numerous clinical trials testing the effectiveness of colloidal oatmeal creams (*Study Results | NCT02691507 | Trial to Determine the Therapeutic Benefit of an OTC Cream on Dry, Itchy Skin of Adults and Children With Eczema | ClinicalTrials.Gov*, 2017). Results indicated a significant increase in hydration and a substantial decrease in itchiness, with an average of 4.07 out of 10 on an arbitrary scale after application, demonstrating its short-term effectiveness. However, an issue arises after consolidating data for 7 days after cream application, with 4.22 out of 10. Though it has no significant impact on its overall success, it still shows diminished retention of its anti-itching properties compared to other commercial eczema treatments. Other studies also demonstrate this by recording hydration with a corneometer; the results showed that after 7 days, the unit of measure in arbitrary units was 208.52, compared to 14 days, when the unit of measure in arbitrary units was 158.65 (Johnson & Johnson; Johnson Consumer Inc., 2017). The greater the

unit of measure in arbitrary units, the greater the hydration. This further emphasises the long-term decline in the effectiveness of emollients. Of course, it is crucial to consider that systematic reviews confirm they reduce flares in the long term when used proactively with anti-inflammatories.

A majority of emollients are effective with minimal side effects, providing a reliable short-term solution for mild to moderate eczema. However, situations in which adverse side effects occur must also be taken into account. In a study that examined the effects of a wide range of emollients, including variations in type (cream or lotion) and ingredients (botanicals, ceramides, and other components). From this study, it was found that many patients experienced the following side effects: erythema, irritation, papule formation, and further spreading of eczema, as well as other prominent side effects also being present (Emmett et al., 2023). It has been shown that overall botanical emollients may display more side effects due to the possibilities of irritants present in the natural ingredients compared to ceramides, as allergies may also arise from the use of botanical emollients (Corazza et al., 2009), whilst ceramide-based emollients remain effective and safe (Draelos, 2008), due to the presence of ceramides in skin already.

Emollients sit in a completely different category of eczema care. Because they simply repair the physical skin barrier and do not target specific immune mechanisms, it does not make sense to test them head-to-head against systemic biologics (Araviiskaia et al., 2022). The more relevant research question is how daily, consistent moisturising can reduce the overall amount of steroid cream a patient needs over time.

Alongside emollients, topical corticosteroids remain a widely prescribed treatment worldwide. The key ways in which topical corticosteroids act are via binding to glucocorticoid receptors within the cytoplasm. This causes a conformational change in the receptor, causing the dissociation of chaperone proteins from the chaperone complex. This corticosteroid-receptor complex then travels through the nuclear pores and inside the nucleus; two of these corticosteroid receptors bind together via homodimerisation, and this dimer then binds with DNA at sites known as glucocorticoid response elements. This process triggers transactivation and, as a result, the increased transcription and translation of anti-inflammatory proteins like lipocortin (Mehta et al., 2016). As referenced previously, NF-κB, a protein complex that controls the body's inflammation. As a result, the body reduces the inflammatory response. Its fundamental chemical structure is often that of a steroid such as hydrocortisone (Fig. 2), which is $C_{21}H_{30}O_5$ (PubChem, 2020). It has a four-ring structure known as a steroid nucleus, similar to other steroids. Due to its specific chemical structure, it can bind to the glucocorticoid receptor. At high concentrations, glucocorticoid receptor dimerisation can activate transcription of anti-inflammatory genes (Barnes, 2006). However, it should be noted that low doses of corticosteroids are what cause the anti-inflammatory effect.

Additionally, other commonly used topical corticosteroids contain betamethasone valerate (Fig. 2) at different concentrations based on the severity of the eczema (Brazzini & Pimpinelli, 2002). Betamethasone valerate has displayed significant decreases in common inflammatory-causing cytokines. Being one of the more potent corticosteroids, it has been a common prescription for patients with moderate or severe eczema. Clinical studies have shown its efficacy in reducing eczema severity (Gether et al., 2025). Moreover, in another study, betamethasone valerate showed potent effects in reducing symptoms of eczema relative to other common treatments, such as 0.5% and 2.5% desoximetasone, showing how it compares well against other frequent prescriptions against eczema (Ashton et al., 1987). Its chemical structure is $C_{27}H_{37}FO_6$. It has a valerate ester, a hydroxyl group and a ketone group as well (*Betamethasone Valerate Cream USP, 0.1%*, 2010).

Evidently, Topical Corticosteroids have also shown significant success in reducing mild to moderate eczema. According to a study, transepidermal water loss was significantly lower when an irritant was applied to multiple patients than when the same irritant was applied to another patch of their skin, with a topical corticosteroid also applied. The study showed that significantly less erythema and lower values of the water loss were found, showing its potent effect on combating the inflammatory properties of eczema, as well as maintaining the water content of the skin (Ramsing & Agner, 1995). Another study also dictates its effectiveness relative to other alternatives of the treatment of eczema flare-ups, such as calcineurin inhibitors meant to suppress the inflammatory response of the immune system specifically. These studies show that the topical corticosteroids are more efficacious (Schmitt et al., 2011). Furthermore, potent corticosteroids can effectively eliminate potential bacteria, which could have helped amplify the effects of inflammation in eczema (Nilsson et al., 1992).

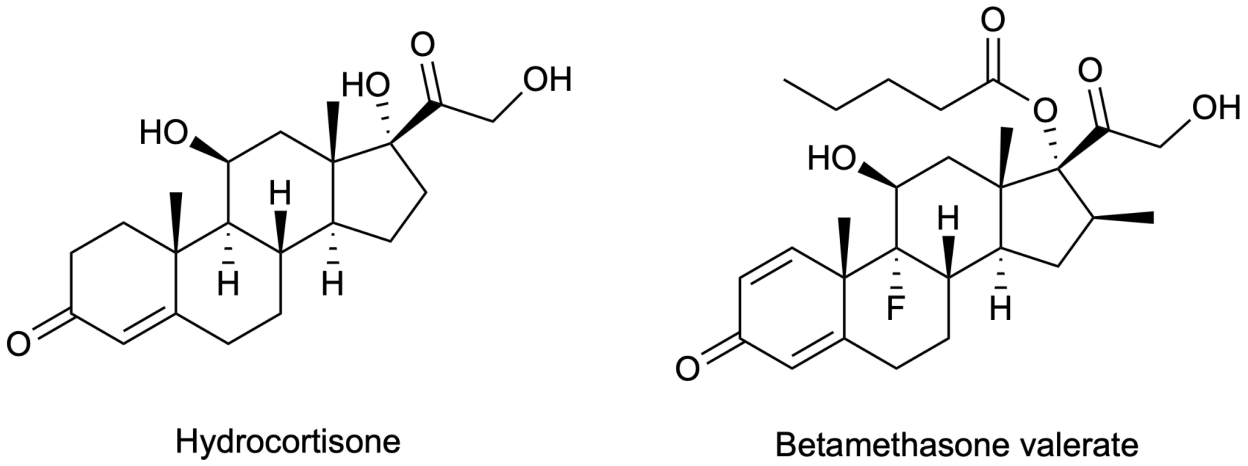


Figure 2: *Chemical structures of hydrocortisone and betamethasone valerate.*

Note. Both molecules are structurally similar and share a cyclopentanoperhydrophenanthrene steroid nucleus and multiple functional groups, including carbonyl and hydroxyl substituents.

Both hydrocortisone and betamethasone valerate have similar side effects, as they are topical corticosteroids in different forms. The most common side effects associated with the use of both medications are local side effects, such as skin atrophy, where the skin begins to thin, leading to easy bruising, and striae, which can result in stretch marks (Ference & Last, 2009). However, there are other side effects which, though rare, can occur, such as systemic side effects of Cushing's syndrome, where an increase in blood pressure and weight gain occurs or a decrease in the growth rate of children, though these systemic side effects have an amplified chance of occurring if the potency of the topical corticosteroid was too strong or there is prolonged use of the medication over a period of time (Dhar et al., 2014). Additionally, ocular symptoms may also be presented in glaucoma or cataracts (Daniel & Orchard, 2015). Despite these numerous side effects, the frequency of the occurrence is slim to none, thus being another reason why they prove to be such common prescriptions during treatment, with easily variable potencies based on the severity of the eczema.

Decades of medical use show that topical corticosteroids clear eczema lesions effectively, but doctors always have to balance this benefit against the risk of side effects. Using potent steroids over long periods can cause skin thinning, visible blood vessels, and even internal hormonal suppression (Niculet et al., 2020). Because we already know these creams work, more standard efficacy trials would add little new knowledge. Instead, upcoming research needs to focus on application schedules (Williams, 2007).. For example, studies could test proactive weekend therapy against reactive, on-demand use to determine which method keeps symptoms under control with the lowest overall amount of steroid exposure.

3.2. Moderate-to-severe eczema

There are two key biologics currently used to treat eczema that are well known, namely Dupixent and Ebglyss. Dupixent (dupilumab) has been FDA-approved since March 2017 for the treatment of eczema. Its function is to inhibit the signalling of cytokines IL-4 and IL-13, resulting in reduced inflammation and, as a consequence, skin barrier dysfunction (Seegräber et al., 2018). Ebglyss (lebrikizumab) was FDA-approved in September 2024 for the treatment of eczema and works similarly to Dupixent by inhibiting cytokine signalling; however, it only inhibits IL13, preventing T cell Th2 signalling and consequently reducing both inflammation and eosinophilia (Khan et al., 2025). IL-13 is a cytokine which regulates allergic responses, known as interleukin-13. Lebrikizumab and dupilumab are both produced by inserting the genetic code into Chinese hamster ovary (CHO) cells to help mass-produce the antibodies; they must then be purified extensively to isolate the respective biologics in Dupixent and Ebglyss.

Dupilumab has been extensively researched, and studies have shown its efficacy in treating eczema, as in one study on the effect of dupilumab on chronic hand eczema (CHE), results showed that dupilumab was effective in treating this particular eczema. According to the hand eczema severity index, patients had a significant decrease, and the dermatology life quality index (DLQI) increased overall. It showed a high tolerance for patients and thus proved to be a very promising treatment for eczema, with high efficacy and a low rate of adverse side effects, making it relatively safe (Asamoah et al., 2025). Another study showed that 80.3% of patients in a clinical trial evaluating the effects of dupilumab on CHE achieved partial or complete resolution of their eczema, demonstrating both its potency and efficacy in treating chronic hand eczema (Riva et al., 2024). Its chemical structure is a monoclonal antibody of a subclass of immunoglobulin G4 that binds to the IL4 receptor. IL-4 is a cytokine which regulates allergic responses, also known as interleukin-4. As a result of being able to bind to the IL-4 receptor, dupilumab can inhibit signalling along both the type 1 and type 2 receptors, thus resulting in a decrease in inflammation (Knox et al., 2024).

Individual patient traits also change how someone responds to a biologic. Having a past history of eye disease or certain allergic tendencies can increase the chance of getting conjunctivitis (Gurnani & Le, 2026). At the same time, age and body weight affect how quickly a drug clears the body. An insufficient dose can easily make a drug look ineffective, when the real issue is simply underdosing. Grouping trial participants by baseline traits and physical profiles will be an important step toward personalized prescribing (Lauffenburger et al., 2022).

For lebrikizumab, there have been fewer studies due to its recent approval by the FDA for clinical trials; therefore, it has not been as thoroughly studied as Dupilumab and has only recently become well known as a biologic. Studies, however, have also demonstrated its effectiveness in treating eczema. In a study that studied the long-term effects of lebrikizumab on patients with moderate to severe eczema, the results showed that a significant majority of patients experienced a substantial improvement in skin quality, having an investigator's global assessment (IGA) of 0 or 1, and there was no requirement to

further take topical corticosteroids or other treatments to maintain these effects (Stein-Gold et al., 2026). Additionally, a significant majority of patients had a low EASI score, demonstrating lebrikizumab's potent effects on eczema. Its chemical structure is also that of an immunoglobulin G4 monoclonal antibody. It binds IL-13 with high affinity, thereby inhibiting its inflammatory effects.

Suggestions that lebrikizumab has a safer profile than dupilumab should be taken with caution. While both biologics met standard phase III licensing requirements, lebrikizumab has not been used in the real world for nearly as long (Chovatiya et al., 2025). Variations in reported side-effect rates between trials may reflect differences in study protocols as well as patient groups rather than true biological differences. Direct, active-comparator trials are the only way to resolve this.

The key potential adverse side effects that come about through the use of dupilumab for the treatment of eczema were head and neck eczema, conjunctivitis, eczema, peeling of skin and dryness in eyes, however overall dupilumab did show to have a high tolerance, as these adverse side effects only presented in less than 20% of patients, and are relatively minor and not severe or life threatening (Parmar et al., 2022). In another study, it was said that a small minority of patients had mild conjunctivitis, and a few patients had severe conjunctivitis, which may remain an issue; therefore, dupilumab must be researched slightly more to ensure the safety of patients who may decide to utilise it as a treatment for moderate to severe eczema. The key side effects of lebrikizumab are injection site reactions and conjunctivitis, and therefore it has similar side effects to dupilumab (Lin et al., 2024). However, studies show that relative to dupilumab, it seems that lebrikizumab seems to be more favourable due to its side effect profile and high tolerance. Moreover, it should be noted that dupilumab has a greater number of ocular effects (Loh et al., 2020).

Though there is a positive correlation between clinical safety and efficacy, a majority of adverse events are minor, such as injection site reactions or mild conjunctivitis, and only a small percentage of these adverse events are serious; as the minor adverse events do not infer or correlate with worse efficacy, it should be concluded that there is no direct cause-and-effect relationship between safety and efficacy in the administration of dupilumab (Beck et al., 2022). It should also be noted that due to the method of administration being through injection with a needle, there would be a high prevalence of injection site reactions expected (Usach et al., 2019). This suggests a future investigation into the direct relationship between safety and efficacy as a clinical trial to mitigate bias in future research.

Janus kinase (JAK) inhibitors reduce eczema severity by blocking intracellular signalling triggered by pro-inflammatory cytokines such as IL-4 and IL-13, thereby reducing immune-mediated inflammation.(*Basic Mechanisms of JAK Inhibition*, 2020). In a literature review, it was stated that there are currently 11 FDA-approved JAK inhibitors which can be used. However, the key JAK inhibitors which are often used in the treatment of eczema are abrocitinib, ruxolitinib and upadacitinib (Fig. 3) (Chovatiya & Paller, 2021; Shawky et al., 2022).

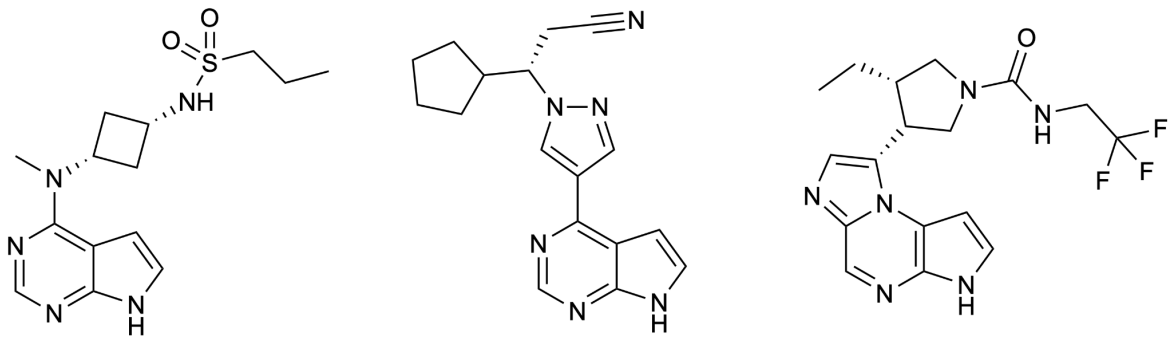


Figure 3: *Chemical structures of the most commonly used JAK inhibitors to treat eczema.*

Note. All 3 share a nitrile group that facilitates binding to the kinase, and they also have a pyrrolopyrimidine core. The nitrile group enables blocking of the JAK-STAT pathway.

Studies have shown that abrocitinib, ruxolitinib and upadacitinib are effective in the treatment of eczema. This is evident in a study on the efficacy of abrocitinib and upadacitinib. For abrocitinib, results from the trial showed a significant reduction in pruritus for many patients, and 48.3% of patients demonstrated investigator's global assessment (IGA) scores of 0 or 1. Moreover, in week 1, there were also very substantial improvements in the eczema area severity index (EASI). This shows that abrocitinib has a high efficacy and can lead to skin clearance and relief. For upadacitinib, 50% of patients demonstrated an IGA score of 0 or 1 at 16 weeks, and there was a 90% improvement in EASI score as well at 16 weeks. There was also a general improvement in eczema symptoms, indicating relatively high efficacy, comparable to that of abrocitinib (Nezamololama et al., 2020). In another study, which evaluated the effects of ruxolitinib on eczema, it was found that there was a 51.6% decrease in EASI overall after 4 weeks, and there was a large percentage of patients who were able to achieve IGA scores of 0 or 1; therefore, the results also demonstrated ruxolitinib's efficacy (Mohney et al., 2023).

Generally, many of these JAK inhibitors do have the possibility of many side effects, such as non-specific side effects, such as nausea, vomiting or diarrhoea and also a 10% possibility of headaches, dizziness or fatigue. However, there are also very slim possibilities of many various specific side effects (Fig. 4) (Rajput Khokhar et al., 2025). In a recent clinical study, patients using ruxolitinib had a 38.3% risk of adverse side effects, which is high; therefore, whilst ruxolitinib has high efficacy and is potent, it still has many side effects, but fewer systemic risks (Incyte Corporation, 2025). For upadacitinib, in a clinical trial, it was demonstrated that there was a 3.49% chance of a serious adverse event occurring, and there was a roughly 20% chance of a non-serious adverse event; however, the trial also indicated that many of the patients' eczema symptoms were substantially reduced through EASI and IGA scores (AbbVie, 2025). However, in a study with abrocitinib, there was a staggering 74% of patients who encountered treatment-emergent adverse events and 1.7% who encountered severe adverse events. Although this study demonstrated high rates of adverse events, real-world tolerability is often good, as shown in other clinical trials of JAK inhibitors. Therefore, similar to other JAK inhibitors, it has a frequency of adverse side effects (Pfizer, 2022). Though it is

important to note that oral JAKs do carry these black box warnings for serious heart events, cancer, clots and death and thus the serious risks mentioned are very consistent with these warnings for oral JAKs (Tokareva et al., 2023).

When reviewing the trial results for JAK inhibitors, ruxolitinib seems to achieve impressive skin clearance rates. However, comparing these numbers directly to oral treatments causes methodological issues. Ruxolitinib is a topical cream tested on localised eczema patches over just four weeks. In contrast, upadacitinib (50% achieving an IGA score of 0 or 1) and abrocitinib (48.3%) are daily oral tablets tested in patients with moderate-to-severe disease over twelve to sixteen weeks (Guttman-Yassky et al., 2020). The clinical trials had completely different time frames, baseline severity levels, and measuring points. Because the study setups vary so much, researchers cannot claim that one inhibitor works best without direct head-to-head trials or a network meta-analysis (Dias & Caldwell, 2019).

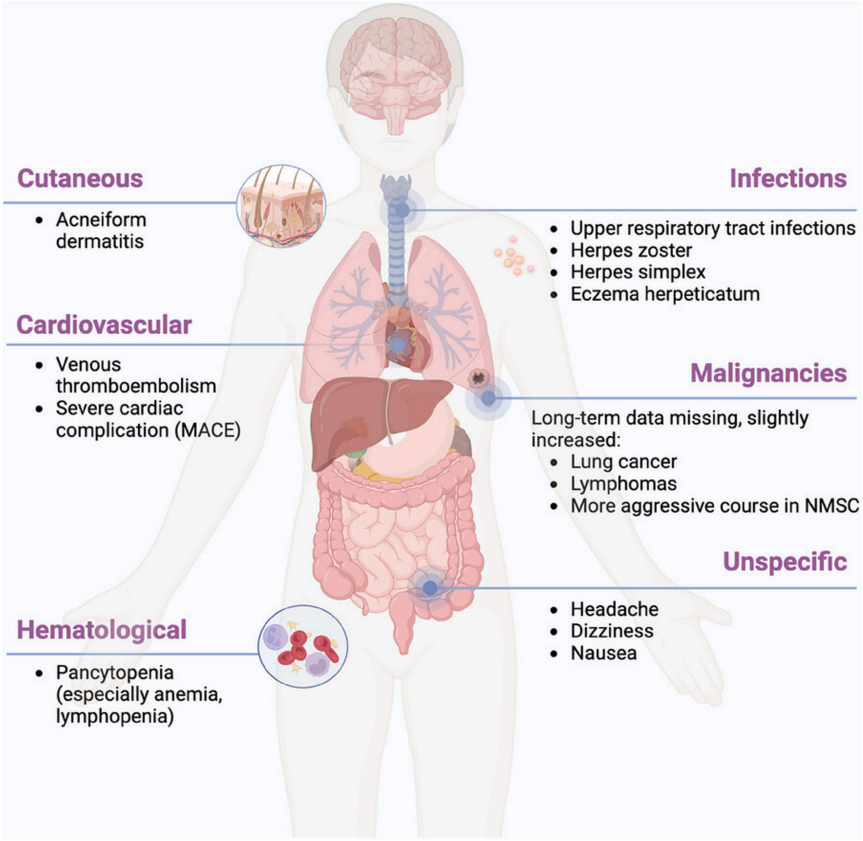


Figure 4: *Summary of potential adverse effects of JAK inhibitor therapy.*

Note. Overview of clinical complications categorised by organ system, highlighting increased risks of infection, cardiovascular events, cutaneous eruptions, and haematological abnormalities.

3.3. Alternative therapies

Manuka honey remains a highly researched topic of discussion within the medical field, with the intention to evaluate its efficacy in reducing eczema. Its key function, for which it has been said to treat eczema, is due to its anti-inflammatory and moisturising properties (Johnston et al., 2018a). It is also antibacterial, demonstrated in its effectiveness in preventing the development of the bacterium *S. aureus*, which often worsens eczema, due to further infection and flare-ups. It is anti-inflammatory, as it inhibits the signalling pathway of TLR1/2, toll-like receptors that often promote inflammation (Alangari et al., 2017). Moreover, it contains a high concentration of an anti-inflammatory chemical compound, known as methylglyoxal. Studies show that methylglyoxal inhibits the production of inflammatory cytokines; as a result, inflammation from eczema flare-ups is reduced significantly after application of this honey. This is achieved by activating NRF2, which suppresses transcription of the IκBζ gene, thereby reducing the production of inflammatory cytokines substantially (Wei et al., 2023).

It contains a myriad of chemical compounds; however, the key anti-inflammatory compounds are methyl syringate and leptosin (Fig. 5). Methyl syringate acts by inhibiting neutrophil processes (Main et al., 2024), resulting in inflammation being significantly reduced; furthermore, it inhibits the expression of the enzyme cyclooxygenase-2 (J. Park et al., 2016), helping facilitate the reduction of inflammation and pruritus. The structure of methyl syringate comprises a benzene ring, along with a methyl ester group and a hydroxyl group. The structure of leptosin consists of a core of a benzene ring, which is bonded to a furan ring alongside a ketone group, as well as a phenyl group and 2 hydroxyl groups.

There are often minimal side effects that come about through the application of Manuka honey for the treatment of eczema; however, the key issues that often arise are related to contact irritation and allergic reactions. Some patients may be more susceptible to bee or pollen allergies, leading to honey irritating their skin. Its sticky properties also make it easy for dust and debris to stick onto it, leading to the possibility of the eczema worsening. Another key issue could be the quality or grading of the honey itself, as unpurified honey may contain bacteria that can worsen eczema; therefore, medical-grade honey should be used when applying (Johnston et al., 2018b). However, other than these key potential side effects, honey, as a relatively safe chemical compound, will not often lead to other adverse side effects, resulting in its high tolerance level, mainly due to its low pH, moisturising efficacy and antibacterial properties (Mandal & Mandal, 2011).

Finally, Manuka honey cannot yet be fairly compared with licensed medical treatments. The available evidence comes mostly from small, uncontrolled observational studies that lack placebo controls (Ombasa et al., 2025). Until researchers conduct proper randomised, placebo-controlled trials, claims about how well it works compared with conventional therapies remain unproven.

Acupuncture works by stimulating the nervous system through the insertion of many tiny needles into various spots of the body. However, its key function in helping combat key symptoms of eczema is to activate the nervous system, stimulating nerves to release endorphins for pain relief, while inhibiting inflammatory cytokines (Li et al., 2021). Moreover, there are many classifications of specific areas for the needles to be inserted, for example, ST36 or PC6 (Fig. 6) (*Frontiers | Efficacy of Acupuncture on Upper Limb Dysfunction after Stroke: A Randomized Controlled Trial Protocol with Surface Electromyography Evaluation*, 2025). These are key areas of insertion on the outer side of the shin and the inner wrist, respectively. Inserting needles into ST36 activates the sympathetic nervous system and, as a result, reduces inflammation (Oh & Kim, 2022). After

inserting needles into PC6, this promotes the release of anti-inflammatory compounds and helps regulate the immune response to further reduce the severity of eczema symptoms (H.-J. Park et al., 2021).

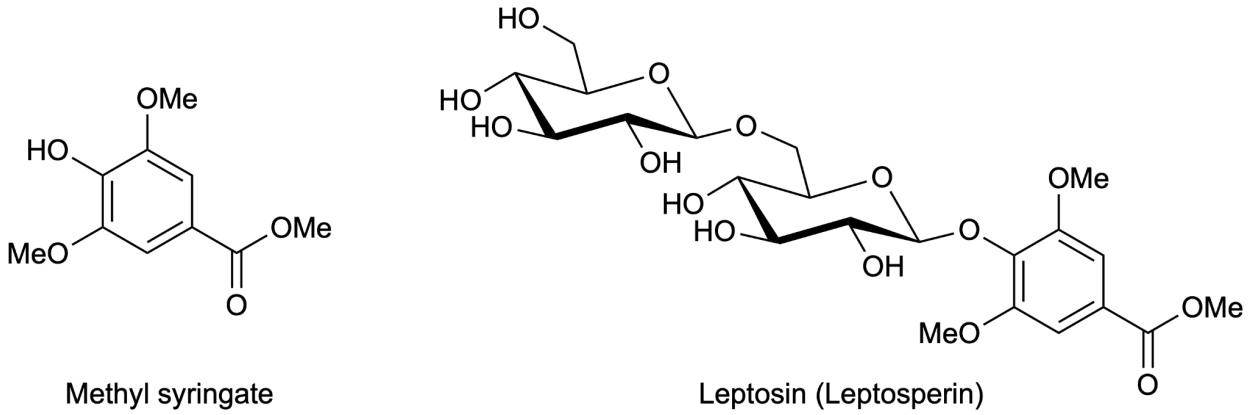


Figure 5: *Chemical structures of methyl syringate and leptosin, also known as leptosperin, along with their respective functional groups, with both similarly having a hydroxyl group and benzene ring, but methyl syringate having a methyl ester group compared to leptosin with a furan ring, ketone group and phenyl group (J. Park et al., 2016).*

There are some possible side effects which may come about through the use of acupuncture to treat eczema. This includes minor pain, bleeding and bruising at the sites of the needle insertion, dizziness, drowsiness, as well as the potential worsening of eczema, due to increasing the severity of eczema symptoms or causing a flare-up. There are also possibilities of infection and increased bleeding (Jones, 2019). The numerous severe side effects that come about through acupuncture outweigh its positive effects. Moreover, these side effects may or may not present, depending on the medical practitioner's experience and ability (Xu et al., 2013).

With acupuncture, adverse reactions usually happen because of specific existing risks, such as open skin lesions, bleeding disorders, or taking blood thinners (Strzyz & Ernst, 1997). Future research into acupuncture should concentrate on creating clear patient screening checklists and running sham-controlled trials to see whether it provides real medical value as an add-on therapy.

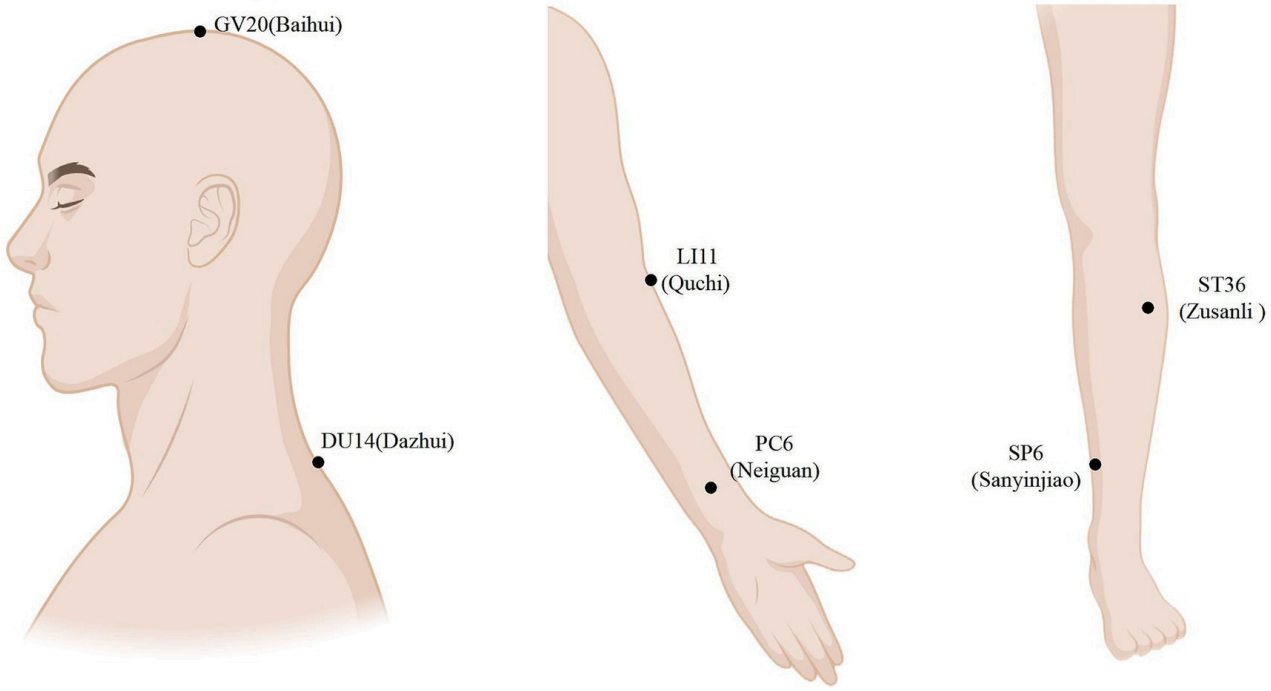


Figure 6: *Schematic representation of acupuncture points of both ST36 and PC6, in which PC6 is in the inner wrist, and ST36 is in the outer shin.*

3.4. Evaluation of each treatment

Generally, there are numerous advantages to emollients becoming a standard for general prescription. Notable advantages include the effectiveness of moisture retention, helping improve the strength of the skin barrier. Studies have shown that emollients have high efficacy in reducing the severity of flare-ups and eczema, as indicated by POEM scores, and have demonstrated considerable decreases in flare-ups and itching. However, this study also showed that adverse effects, whilst not fatal, are common as some patients did experience worsening of eczema, further itching, dryness and a burning sensation (Ridd et al., 2022). Moreover, relative to other medications, it is affordable for the average person and also easy to apply, though drawbacks also include frequency of application and potential clogging of pores, which may result in worsening of eczema (Table 1, Entry 1) (*How Parents and Children Evaluate Emollients for Childhood Eczema: A Qualitative Study | British Journal of General Practice*, 2022).

Topical corticosteroids are highly effective in quickly resolving eczema flare-ups, relatively safe, and versatile, with different potencies prescribed to patients depending on the severity of their eczema. An example of this would be hydrocortisone given to patients with very mild eczema, and betamethasone valerate at different concentrations for moderate and severe eczema. Moreover, they are often affordable, as their over-the-counter availability has driven prices down. These advantages all make it a primary treatment for eczema. However, whilst topical corticosteroids are a very effective solution to eczema, it is crucial to be aware of the potential side effects as noted previously, as though they are of very low chance, local effects

could still occur, such as striae or general irritation, with more severe side effects of Cushing's syndrome, which can come up as a side effect, though it is very unlikely to occur. It should also be noted that prices may increase significantly depending on the severity of the eczema, which should be a factor when considering other possible treatments. Therefore, overall, it is evident why topical corticosteroids are so commonly prescribed, having a very high efficacy, versatility, and being relatively affordable for the common person, whilst only having very slim chances of adverse side effects occurring (Table 1, Entry 2).

The key strengths of the use of dupilumab and lebrikizumab are that, overall, they help substantially reduce inflammation and pruritus, thus significantly improving skin health, holding this over many other traditional treatments for eczema due to being able to treat the underlying reasons for inflammation. They also reduce the number of systemic side effects because they are able to treat the underlying reasons for inflammation; moreover, they have been thoroughly researched, and as a result, there are minimal side effects, and they are relatively safe (Kumar et al., 2025). Studies mentioned previously have shown a consistent improvement in eczema symptoms, and the biologics themselves have a high efficacy and potency, being able to combat eczema symptoms effectively. However, the key weaknesses are cost and necessity for injection, as many patients will not be able to afford such a costly treatment on average, compared to the cheaper alternative of an over-the-counter (OTC) medication for eczema treatment, whereas biologics cost a lot, leading to many patients having to pay out of their pockets for it. It is also important to note that many patients appear to be very sceptical of needles, therefore being a large barrier in biologics becoming widespread and used often. Due to biologics being able to suppress the immune system, there is a greater frequency of infection among patients who use these biologics compared to topical corticosteroid creams (Ameen et al., 2021). Therefore, though biologics are an optimistic avenue of research currently, some research should be invested towards clinical trials to further evaluate their safety profile and the reduction of cost via an investigation into the possibility of the industrialisation of biologics (Table 1, Entry 3).

The key strength of JAK inhibitors is their efficacy, which is evident in numerous clinical trials mentioned previously, where, using a variety of scales, such as EASI, IGA or DLQI, there have been significant improvements in all three scales using all three common JAK inhibitors in Abrocitinib, Ruxolitinib and Upadacitinib. Moreover, relative to other common treatments, JAK inhibitors have much higher efficacy in skin clearance as well. Furthermore, compared to other treatments like biologics, where a needle is required for administration, most JAK inhibitors are orally administered, therefore being easier to administer and appealing to more patients (Harrington et al., 2020). However, though JAK inhibitors do possess high efficacy for treatment and are easy to administer, they still possess many downsides. As a result of its high efficacy, the likelihood of adverse events occurring increases. This is demonstrated by a greater frequency of serious side effects, such as cardiovascular events or blood clots. Another crucial weakness to note compared to other treatments is specificity, as JAK inhibitors affect multiple signalling pathways, which ultimately leads to many potential side effects. They are also costly compared to OTC eczema treatments, costing tens of thousands of dollars (Table 1, Entry 4).

In general, the key advantages of utilising Manuka honey as an alternative medication relative to other common eczema treatments on the market are due to its inherent anti-inflammatory properties, along with its ability to retain moisture and reduce the severity of eczema flare-ups (Patel & Cichello, 2013). Though the Manuka honey has been demonstrated to possess these important qualities in the effective treatment of eczema, it still contains many disadvantages, which would make it an unreliable choice for dermatologists to prescribe to patients with eczema. The key disadvantages involve its cost, feel, lack of research and risk factor for allergies. Regarding its cost, relative to other commercial products for treatment, the same potency of treatment is offered at a comparable efficacy, whilst being more costly compared to over-the-counter (OTC) emollients or topical corticosteroids. Due to a severe lack of research into alternative medications like Manuka honey

compared to commonly researched treatments, such as topical corticosteroids, a greater number of clinical trials must be performed in order to further determine how it compares against traditional and modern treatments. Furthermore, it has been reported to feel very sticky and greasy, which a patient may find uncomfortable in daily life, especially with the frequency of application, compared to an emollient, which may be both soothing and won't feel as greasy. Many patients with allergies to pollen or bees, as stated previously, will not be able to use this medication; therefore, its versatility is substantially hindered by this factor compared to a topical corticosteroid (Alhabsi et al., 2026). Lastly and overall, there is still only preliminary evidence for its potential antibacterial benefits and lesion improvement; therefore, no large randomised controlled trials (RCTs) confirm superiority over standards, and it is not recommended in major guidelines as a primary treatment (Table 1, Entry 5). However, it is important to note that, compared with the other treatments discussed in the traditional and modern approaches, the figures for Manuka Honey are drawn from different trials with different patient populations, disease severity, and primary endpoints. As a result, it is vital to note that the interpretations of these trials may not be as strong, due to the lack of direct head-to-head clinical data to mitigate bias accordingly.

For acupuncture overall, the drawbacks outweigh the advantages due to the multiple side effects, which may be presented if in the care of an inexperienced medical professional, who may not be effective and accurate at inserting the needles into the patient, leading to multiple side effects occurring. Though it does have a few advantages, much research has been invested in the safety and efficacy of treating eczema with acupuncture, and studies have shown that when an experienced practitioner performs the treatment, eczema symptoms can be substantially reduced, and it is relatively safe. However, again, it still comes with very adverse side effects. It also needs to be considered that it is very costly compared to many OTC medications, such as topical corticosteroids, as an experienced practitioner of acupuncture is costly, yet necessary to ensure safety. Furthermore, though as stated previously, there has been a bit of research that has been invested into acupuncture, many other commercial treatments are even more rigorously evaluated and tested in clinical trials to be safer, more potent and cheaper. Lastly, the systematic reviews of acupuncture show mixed and low-quality evidence overall, with some mild itch and symptom reduction, which unfortunately come with heavy risks such as pain and infection, and the severe lack of thorough and evaluative trials makes it unreliable compared to conventional options (Zeng et al., 2021). Therefore, though through these findings the data does show the implication that overall acupuncture may not be a preferred option of treatment, it is still important to note that these interpretations should be approached with caution, being primarily preliminary insights.

Overall, the treatments summarised in Table 1 highlight the need for a personalised approach. Healthcare providers should evaluate severity using the EASI index and weigh the risk-benefit profile of each option. Selecting the optimal strategy requires balancing clinical efficacy with patient preferences to support long-term treatment adherence.

Table 1: *Summary of primary, secondary and alternative eczema therapies: a comparison of treatment types, their delivery methods, efficacy, evidence level, main advantages and clinical limitations*

Entry	Type	Target	Delivery	Evidence	Advantages	Limitations
1	Emollients	Skin	Topical	High	OTC, cheap, hydro-retentive	Low potency, frequent application, potential pore clogging

2	Corticosteroids	Skin	Topical	High	OTC, safe, versatile potency, affordable	Potential adverse side effects, variable pricing
3	Biologics	Thigh or abdomen	Injection	Medium	High potencies and efficacy	Need for injection, costly, potential adverse side effects
4	JAK inhibitors	Skin and immune system	Oral or topical	High	High efficacy, easy to administer	Lack of specificity, high frequency of side effects, and costly
5	Alternative meds	Skin	Various	Low	Unproven	Adverse side effects, costly, unsafe, lack of thorough and evaluative trials

4. Conclusion

In conclusion, after extensive evaluation of many eczema treatments, modern and traditional approaches do remain the key treatments for both research and current usage. For traditional treatments, they remain reliable and affordable due to extensive research into the efficacy and safety of emollients and topical corticosteroids, as well as ways to reduce costs, which, as a result, leads to their prescription by more medical practitioners. For modern treatments, they remain an optimistic avenue for innovation and research, due to their potency and efficacy, though more research needs to be put towards reducing the frequency of adverse side effects, as well as making these treatments more accessible to the average person, due to the costly nature of JAK Inhibitors or Biologics, leading to substantial out-of-pocket costs for patients. Alternative medicines remain an area of scepticism, and rightly so, though research has been heavily invested in their safety and effectiveness. For the same effectiveness, both traditional and modern approaches to eczema treatment outperform alternative treatments, making them unreliable and rarely used in treatment. Therefore, overall, eczema treatments remain very promising for further research and innovation to optimize and refine both traditional and modern treatments in terms of cost, adverse side effects, and efficacy.

5. References

AbbVie. (2025). A *Phase 4 Randomized, Blinded, Treat-to-Target and Dose-Flexibility Study of Upadacitinib in Adult Subjects With Moderate to Severe Atopic Dermatitis* (Clinical Trial Registration No. NCT05507580). clinicaltrials.gov. https://clinicaltrials.gov/study/NCT05507580

Alangari, A. A., Morris, K., Lwaleed, B. A., Lau, L., Jones, K., Cooper, R., & Jenkins, R. (2017). Honey is potentially effective in the treatment of atopic dermatitis: Clinical and mechanistic studies. *Immunity, Inflammation and Disease*, 5(2), 190–199. https://doi.org/10.1002/iid3.153

Alhabsi, A. N., Al Lawati, A., Al Hashmi, L., Al-Isaii, F., Alghammari, A., Das, S., & Al Hashmi, S. (2026). Clinical and Postoperative Applications of Manuka Honey in Wound Healing: An Evidence-Based Review. *International Wound Journal*, 23, e70939. https://doi.org/10.1111/iwj.70939

Ameen, M., Meller, S., Pinter, A., Shear, N. H., & Soria, A. (2021). Perception and Experience of Biologic Therapy in Atopic Dermatitis: A Qualitative Focus Group Study of Physicians and Patients in Europe and Canada. *Dermatology and Therapy*, 11(6), 2159–2177. https://doi.org/10.1007/s13555-021-00631-8

Araviiskaia, E., Pincelli, C., Sparavigna, A., & Luger, T. (2022). The Role of a Novel Generation of Emollients, 'Emollients Plus', in Atopic Dermatitis. *Clinical, Cosmetic and Investigational Dermatology*, 15, 2705–2719. https://doi.org/10.2147/CCID.S389697

Asamoah, N., Branyiczky, M. K., Almuqrin, A., Alkhayal, F., Sakka, N., Bednar, D., & Abu-Hilal, M. (2025). Efficacy and safety of dupilumab in chronic hand eczema: A systematic review. *Archives of Dermatological Research*, 317(1), 441. https://doi.org/10.1007/s00403-025-03947-z

Ashton, R. E., Catterall, M., Morley, N., Fairris, G., & Joseph, D. N. (1987). A Double-Blind Comparison of 0.25% and 0.05% Desoxymethasone, 0.1% Betamethasone Valerate and 1% Hydrocortisone Creams in the Treatment of Eczema. *Journal of International Medical Research*, 15(3), 160–166. https://doi.org/10.1177/030006058701500306

Barnes, P. J. (2006). How corticosteroids control inflammation: Quintiles Prize Lecture 2005. *British Journal of Pharmacology*, 148(3), 245–254. https://doi.org/10.1038/sj.bjp.0706736

Basic Mechanisms of JAK Inhibition. (2020.). Retrieved November 23, 2025, from https://cyberleninka.ru/article/n/basic-mechanisms-of-jak-inhibition/viewer

Beck, L. A., Deleuran, M., Bissonnette, R., de Bruin-Weller, M., Galus, R., Nakahara, T., Seo, S. J., Khokhar, F. A., Vakil, J., Xiao, J., Marco, A. R., Levit, N. A., O'Malley, J. T., & Shabbir, A. (2022). Dupilumab Provides Acceptable Safety and Sustained Efficacy for up to 4 Years in an Open-Label Study of Adults with Moderate-to-Severe Atopic Dermatitis. *American Journal of Clinical Dermatology*, 23(3), 393–408. https://doi.org/10.1007/s40257-022-00685-0

Betamethasone Valerate Cream USP, 0.1%. (2010). Retrieved November 16, 2025, from https://dailymed.nlm.nih.gov/dailymed/fda/fdaDrugXsl.cfm?setid=f242cdf5-6921-431f-8add-4d17887ebc93

Bhanot, A., Huntley, A., & Ridd, M. J. (2019). Adverse Events from Emollient Use in Eczema: A Restricted Review of Published Data. *Dermatology and Therapy*, 9(2), 193–208. https://doi.org/10.1007/s13555-019-0284-3

Brazzini, B., & Pimpinelli, N. (2002). New and Established Topical Corticosteroids in Dermatology. *American Journal of Clinical Dermatology*, 3(1), 47–58. https://doi.org/10.2165/00128071-200203010-00005

Change AD UK: What is Atopic Dermatitis (Atopic Eczema). Change AD. Retrieved November 9, 2025, from https://www.changead.co.uk/what-is-atopic-dermatitis

Chovatiya, R., Armstrong, A., Kircik, L., Puig, L., Kirchhof, M. G., Torres, T., Binamer, Y., Duarte, G., Akmaz, B., Dossenbach, M., Gallo, G., Yang, C., Seminario-Vidal, L., Ding, Y., & Silverberg, J. I. (2025). Short-Term Efficacy of Lebrikizumab Versus Dupilumab in Combination with Topical Corticosteroids in Adults with Moderate-to-Severe Atopic Dermatitis: Matching-Adjusted Indirect Comparison. *Dermatology and Therapy*, 16(2), 1025–1040. https://doi.org/10.1007/s13555-025-01620-x

Chovatiya, R., & Paller, A. S. (2021). JAK Inhibitors in the Treatment of Atopic Dermatitis. *The Journal of Allergy and Clinical Immunology*, 148(4), 927–940. https://doi.org/10.1016/j.jaci.2021.08.009

Corazza, M., Borghi, A., Lauriola, M., & Virgili, A. (2009). Use of topical herbal remedies and cosmetics: A questionnaire-based investigation in dermatology out-patients. *Journal of the European Academy of Dermatology and Venereology*, 23(11), 1298–1303. https://doi.org/10.1111/j.1468-3083.2009.03314.x

Daniel, B. S., & Orchard, D. (2015). Ocular side–effects of topical corticosteroids: What a dermatologist needs to know. *Australasian Journal of Dermatology*, 56(3), 164–169. https://doi.org/10.1111/ajd.12292

Dhar, S., Seth, J., & Parikh, D. (2014). Systemic Side-Effects of Topical Corticosteroids. *Indian Journal of Dermatology*, 59(5), 460. https://doi.org/10.4103/0019-5154.139874

Dias, S., & Caldwell, D. M. (2019). Network meta-analysis explained. *Archives of Disease in Childhood. Fetal and Neonatal Edition*, 104(1), F8–F12. https://doi.org/10.1136/archdischild-2018-315224

Draelos, Z. D. (2008). *The Effect of Ceramide-Containing Skin Care Products on Eczema Resolution Duration*. https://pubmed.ncbi.nlm.nih.gov/18306855/

Emmett, E. R., Allen, M., Crownshaw, S., & Ridd, M. J. (2023). How and what adverse events are reported and captured in randomized control trials of emollients in the treatment of eczema? *Clinical and Experimental Dermatology*, 48(8), 889–894. https://doi.org/10.1093/ced/llad137

Ference, J. D., & Last, A. R. (2009). Choosing Topical Corticosteroids. *American Family Physician*, 79(2), 135–140. https://www.aafp.org/pubs/afp/issues/2009/0115/p135.html

Frontiers | Efficacy of acupuncture on upper limb dysfunction after stroke: A randomized controlled trial protocol with surface electromyography evaluation. (2025`). Retrieved January 6, 2026, from https://www.frontiersin.org/journals/medicine/articles/10.3389/fmed.2025.1615762/full

Gether, L., Linares, H. P. I., Kezic, S., Jakasa, I., Forman, J., Sørensen, O. E., Storgaard, H., Skov, L., Røpke, M. A., Knop, F. K., & Thyssen, J. P. (2025). Skin and systemic inflammation in adults with atopic dermatitis before and after whole-body topical betamethasone 17-valerate 0.1% or tacrolimus 0.1% treatment: A randomized controlled study. *Journal of the European Academy of Dermatology and Venereology*, 39(2), 308–321. https://doi.org/10.1111/jdv.20258

Gurnani, B., & Le, P. H. (2026). Allergic Conjunctivitis. In *StatPearls*. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK448118/

Guttman-Yassky, E., Thaçi, D., Pangan, A. L., Hong, H. C., Papp, K. A., Reich, K., Beck, L. A., Mohamed, M.-E. F., Othman, A. A., Anderson, J. K., Gu, Y., Teixeira, H. D., & Silverberg, J. I. (2020). Upadacitinib in adults with moderate to severe atopic dermatitis: 16-week results from a randomized, placebo-controlled trial. *Journal of Allergy and Clinical Immunology*, 145(3), 877–884. https://doi.org/10.1016/j.jaci.2019.11.025

Harrington, R., Al Nokhatha, S. A., & Conway, R. (2020). JAK Inhibitors in Rheumatoid Arthritis: An Evidence-Based Review on the Emerging Clinical Data. *Journal of Inflammation Research*, 13, 519–531. https://doi.org/10.2147/JIR.S219586

How parents and children evaluate emollients for childhood eczema: A qualitative study | British Journal of General Practice. (2022). Retrieved November 10, 2025, from https://bjgp.org/content/72/719/e390

Incyte Corporation. (2025). *A Phase 2, Double-Blind, Randomized, 16-Week, Vehicle-Controlled, Efficacy and Safety Study of Ruxolitinib Cream Followed by an Open-Label Extension Period in Adults With Chronic Hand Eczema* (Clinical Trial Registration No. NCT05906628). clinicaltrials.gov. https://clinicaltrials.gov/study/NCT05906628

Johnson & Johnson Consumer Inc. (2017). *A Clinical Trial to Evaluate the Efficacy of an Investigational Nighttime Moisturizing Balm in the Management of Mild to Moderate Atopic Dermatitis in Infants and Toddlers* (Clinical Trial Registration No. NCT02404493). clinicaltrials.gov. https://clinicaltrials.gov/study/NCT02404493

Johnston, M., McBride, M., Dahiya, D., Owusu-Apenten, R., & Nigam, P. S. (2018a). Antibacterial activity of Manuka honey and its components: An overview. *AIMS Microbiology*, 4(4), 655–664. https://doi.org/10.3934/microbiol.2018.4.655

Johnston, M., McBride, M., Dahiya, D., Owusu-Apenten, R., & Nigam, P. S. (2018b). Antibacterial activity of Manuka honey and its components: An overview. *AIMS Microbiology*, 4(4), 655–664. https://doi.org/10.3934/microbiol.2018.4.655

Jones, K. (2019, June 3). Get the Facts: Acupuncture. *National Eczema Association*. https://nationaleczema.org/blog/get-the-facts-acupuncture/

Khan, M. S., Siddiqui, E., Khalid, M., Bisimwa, J., & Akilimali, A. (2025). FDA approval of EBGLYSS™ (lebrikizumab-lbkz) to treat moderate-to-severe atopic dermatitis in adults and children aged 12 and older. *Annals of Medicine and Surgery*, 87(10), 6245. https://doi.org/10.1097/MS9.0000000000003736

Klein, B., Treudler, R., & Simon, J. C. (2022). JAK-inhibitors in dermatology – small molecules, big impact? Overview of the mechanism of action, previous study results and potential adverse effects. *JDDG: Journal Der Deutschen Dermatologischen Gesellschaft*, 20(1), 19–24. https://doi.org/10.1111/ddg.14668

Knox, C., Wilson, M., Klinger, C. M., Franklin, M., Oler, E., Wilson, A., Pon, A., Cox, J., Chin, N. E. L., Strawbridge, S. A., Garcia-Patino, M., Kruger, R., Sivakumaran, A., Sanford, S., Doshi, R., Khetarpal, N., Fatokun, O., Doucet, D., Zubkowski, A., Rayat, D. Y., Jackson, H., Harford, K., Anjum, A., Zakir, M., & Wang, F. (2023). DrugBank 6.0: the DrugBank Knowledgebase for 2024. Nucleic Acids Research, 52(D1), D1265–D1275. https://doi.org/10.1093/nar/gkad976

Kumar, S., Ghosh, R., Sharma, R., Komal, K., Kumar, D., & Kumar, M. (2025). Advancements in Atopic Dermatitis Management: The Role of Biologics in Overcoming Traditional Treatment Limitations. *International Journal of Medical Pharmaceutical and Health Sciences*, 2(3), 327–341. https://doi.org/10.62946/IJMPHS/2.3.327-341

Lauffenburger, J. C., Choudhry, N. K., Russo, M., Glynn, R. J., Ventz, S., & Trippa, L. (2022). Designing and conducting adaptive trials to evaluate interventions in health services and implementation research: Practical considerations. *BMJ Medicine*, 1(1). https://doi.org/10.1136/bmjmed-2022-000158

Li, N., Guo, Y., Gong, Y., Zhang, Y., Fan, W., Yao, K., Chen, Z., Dou, B., Lin, X., Chen, B., Chen, Z., Xu, Z., & Lyu, Z. (2021). The Anti-Inflammatory Actions and Mechanisms of Acupuncture from Acupoint to Target Organs via Neuro-Immune Regulation. *Journal of Inflammation Research*, 14, 7191–7224. https://doi.org/10.2147/JIR.S341581

Lin, J., Luo, M., Zhuo, Q., Chen, N., Zhang, H., & Han, Y. (2024). Efficacy and safety of lebrikizumab for the treatment of moderate-to-severe atopic dermatitis: A systematic review and meta-analysis. *Frontiers in Pharmacology*, 15. https://doi.org/10.3389/fphar.2024.1429709

Loh, T. Y., Hsiao, J. L., & Shi, V. Y. (2020). Therapeutic Potential of Lebrikizumab in the Treatment of Atopic Dermatitis. *Journal of Asthma and Allergy*, 13, 109–114. https://doi.org/10.2147/JAA.S211032

Long-term Safety and Efficacy Study of Lebrikizumab (LY3650150) in Participants With Moderate-to-Severe Atopic Dermatitis (ADjoin) (ADjoin). (2025, April 22). Eli Lilly and Company. https://clinicaltrials.gov/study/NCT04392154?cond=Eczema&term=Lebrikizumab&rank=6

Mandal, M. D., & Mandal, S. (2011). Honey: Its medicinal property and antibacterial activity. *Asian Pacific Journal of Tropical Biomedicine*, 1(2), 154–160. https://doi.org/10.1016/S2221-1691(11)60016-6

Main, E. N., Huang, J. C., & Bowlin, G. L. (2024). Methyl Syringate: A Primary Driving Factor in Manuka Honeys Ability to Ameliorate Neutrophil Intracellular ROS Activity and NETosis. *Frontiers in Bioscience (Landmark Edition)*, 29(7), 255. https://doi.org/10.31083/j.fbl2907255

Mansilla-Polo, M., & Morgado-Carrasco, D. (2024). Biologics Versus JAK Inhibitors. Part II: Risk of Infections. A Narrative Review. *Dermatology and Therapy*, 14(8), 1983–2038. https://doi.org/10.1007/s13555-024-01203-2

Mehta, A. B., Nadkarni, N. J., Patil, S. P., Godse, K. V., Gautam, M., & Agarwal, S. (2016). Topical corticosteroids in dermatology. *Indian Journal of Dermatology, Venereology and Leprology*, 82, 371. https://doi.org/10.4103/0378-6323.178903

Mohney, L. A., Singh, R., & Feldman, S. R. (2023). Review of Ruxolitinib in the Treatment of Atopic Dermatitis. *Annals of Pharmacotherapy*, 57(2), 207–216. https://doi.org/10.1177/10600280221103282

Nezamololama, N., Fieldhouse, K., Metzger, K., & Gooderham, M. (2020). Emerging systemic JAK inhibitors in the treatment of atopic dermatitis: A review of abrocitinib, baricitinib, and upadacitinib. *Drugs in Context*, 9, 2020-8-5. https://doi.org/10.7573/dic.2020-8-5

Niculet, E., Bobeica, C., & Tatu, A. L. (2020). Glucocorticoid-Induced Skin Atrophy: The Old and the New. *Clinical, Cosmetic and Investigational Dermatology*, 13, 1041–1050. https://doi.org/10.2147/CCID.S224211

Nilsson, E. J., Henning, C. G., & Magnusson, J. (1992). Topical corticosteroids and *Staphylococcus aureus* in atopic dermatitis. *Journal of the American Academy of Dermatology*, 27(1), 29–34. https://doi.org/10.1016/0190-9622(92)70151-5

Oh, J.-E., & Kim, S.-N. (2022). Anti-Inflammatory Effects of Acupuncture at ST36 Point: A Literature Review in Animal Studies. *Frontiers in Immunology*, 12, 813748. https://doi.org/10.3389/fimmu.2021.813748

Ombasa, L., Miller, J., Ware, L., Abbotts-Holmes, H., Tang, J., Gasser, O., Fraser, K., Bayer, S., Kemp, R., Costello, R., Highton, A., Evans, J., Merry, T., Schultz, M., Frampton, C., Gearry, R., McNabb, W., & Roy, N. (2025). Impact of Mānuka Honey on Symptoms and Quality of Life in Individuals With Functional Dyspepsia: Protocol for a Feasibility Randomized Controlled Trial. *JMIR Research Protocols*, 14, e66417. https://doi.org/10.2196/66417

Park, H.-J., Ahn, S., Lee, H., Hahm, D.-H., Kim, K., & Yeom, M. (2021). Acupuncture ameliorates not only atopic dermatitis-like skin inflammation but also acute and chronic serotonergic itch possibly through blockade of 5-HT2 and 5-HT7 receptors in mice. *Brain, Behavior, and Immunity*, 93, 399–408. https://doi.org/10.1016/j.bbi.2021.01.027

Park, J., Shim, M. K., Jin, M., Rhyu, M.-R., & Lee, Y. (2016). Methyl syringate, a TRPA1 agonist represses hypoxia-induced cyclooxygenase-2 in lung cancer cells. *Phytomedicine: International Journal of Phytotherapy and Phytopharmacology*, 23(3), 324–329. https://doi.org/10.1016/j.phymed.2016.01.009

Parmar, N. V., Abdula, M. A., Al Falasi, A., & Krishna, C. V. (2022). Long-term real-world experience of the side effects of dupilumab in 128 patients with atopic dermatitis and related conditions aged 6 years and above: Retrospective chart analysis from a single tertiary care center. *Dermatologic Therapy*, 35(5), e15415. https://doi.org/10.1111/dth.15415

Patel, S., & Cichello, S. (2013). Manuka honey: An emerging natural food with medicinal use. *Natural Products and Bioprospecting*, 3(4), 121–128. https://doi.org/10.1007/s13659-013-0018-7

Pfizer. (2022). a phase 3b randomized, double-blind, double-dummy, active controlled multi-center study assessing the efficacy and safety of abrocitinib compared with dupilumab in adult participants on background topical therapy with moderate to severe atopic dermatitis (Clinical Trial Registration No. NCT04345367). clinicaltrials.gov. https://clinicaltrials.gov/study/NCT04345367

PubChem. (2020). *Hydrocortisone*. Retrieved November 15, 2025, from https://pubchem.ncbi.nlm.nih.gov/substance/46505089

Rajput Khokhar, A., Ghoreschi, K., & Huynh, J. (2025). Adverse effects of Janus kinase inhibitors with relevance for daily practice in dermatology. *JDDG: Journal Der Deutschen Dermatologischen Gesellschaft*, 23(9), 1127–1140. https://doi.org/10.1111/ddg.15796

Ramsing, D. W., & Agner, T. (1995). Efficacy of topical corticosteroids on irritant skin reactions. *Contact Dermatitis*, 32(5), 293–297. https://doi.org/10.1111/j.1600-0536.1995.tb00784.x

https://via.ritzau.dk/pressemeddelelse/14054976/new-data-show-almiralls-ebglyssr-lebrikizumab-provided-sustained-disease-control-for-up-to-three-years-in-more-than-80percent-of-adults-and-adolescents-with-moderate-to-severe-atopic-dermatitis?publisherId=90456&lang=en

Ridd, M. J., Santer, M., MacNeill, S. J., Sanderson, E., Wells, S., Webb, D., Banks, J., Sutton, E., Roberts, A., Liddiard, L., Wilkins, Z., Clayton, J., Garfield, K., Barrett, T. J., Lane, J. A., Baxter, H., Howells, L., Taylor, J., Hay, A. D., … Thomas, K. S. (2022). Effectiveness and safety of lotion, cream, gel, and ointment emollients for childhood eczema: A pragmatic, randomised, phase 4, superiority trial. *The Lancet Child & Adolescent Health*, 6(8), 522–532. https://doi.org/10.1016/S2352-4642(22)00146-8

Riva, H. R., Yoon, T., Hendricks, A. J., Malick, H., Chisholm, C. D., Housewright, C. D., Singh, V., & Guevara, A. (2024). Dupilumab for Chronic Hand Eczema: A Systematic Review and Meta-Analysis. *Dermatitis®*. https://doi.org/10.1089/derm.2024.0186

Rogers, D. W., & Skanupong, S. (1974). *Heats of hydrogenation of sixteen terminal monoolefins. The alternating effect*. 78, 2569–2572. https://pubs.acs.org/jpchax/article-abstract/78/25/2569/1033586/Heats-of-hydrogenation-of-sixteen-terminal?redirectedFrom=fulltext

Santer, M., Ridd, M. J., Harvey, J., Lax, S., Muller, I., Roberts, A., & Thomas, K. S. (2024). Atopic eczema in primary care: Evidence update and implications for practice. *British Journal of General Practice*, 74(738), 40–42. https://doi.org/10.3399/bjgp24X736101

Schmitt, J., von Kobyletzki, L., Svensson, Å., & Apfelbacher, C. (2011). Efficacy and tolerability of proactive treatment with topical corticosteroids and calcineurin inhibitors for atopic eczema: Systematic review and meta-analysis of randomized controlled trials. *British Journal of Dermatology*, 164(2), 415–428. https://doi.org/10.1111/j.1365-2133.2010.10030.x

Seegräber, M., Srour, J., Walter, A., Knop, M., & Wollenberg, A. (2018). Dupilumab for treatment of atopic dermatitis. *Expert Review of Clinical Pharmacology*, 11(5), 467–474. https://doi.org/10.1080/17512433.2018.1449642

Shawky, A. M., Almalki, F. A., Abdalla, A. N., Abdelazeem, A. H., & Gouda, A. M. (2022). A Comprehensive Overview of Globally Approved JAK Inhibitors. *Pharmaceutics*, 14(5), 1001. https://doi.org/10.3390/pharmaceutics14051001

Stein-Gold, L., DeBruin-Weller, M., Thaci, D., Kircik, L., Yang, C., Rueda, M. J., Gallo, G., & Paller, A. (2026). Lebrikizumab ADvocate1 and 2 Monotherapy and ADjoin (Long-Term) Trials: Use of Topicals Therapies. *Dermatology and Therapy*, 16(6), 2757–2772. https://doi.org/10.1007/s13555-026-01771-5

Study Results | NCT02691507 | Trial to Determine the Therapeutic Benefit of an OTC Cream on Dry, Itchy Skin of Adults and Children With Eczema | ClinicalTrials.gov. (2017). Retrieved November 9, 2025, from https://clinicaltrials.gov/study/NCT02691507?term=eczema%20atopic%20dermatitis%20of%20oatmeal&rank=1&tab=results

Strzyz, H., & Ernst, G. (1997). [Adverse reactions to acupuncture]. *Schmerz*, 11(1), 13–19. https://doi.org/10.1007/s004829700012

Sur, R., Nigam, A., Grote, D., Liebel, F., & Southall, M. D. (2008). Avenanthramides, polyphenols from oats, exhibit anti-inflammatory and anti-itch activity. *Archives of Dermatological Research*, 300(10), 569–574. https://doi.org/10.1007/s00403-008-0858-x

Tokareva, K., Reid, P., Yang, V., Liew, D., Peterson, A. C., Baraff, A., Giles, J., & Singh, N. (2023). JAK inhibitors and black box warnings: What is the future for JAK inhibitors? *Expert Review of Clinical Immunology*, 19(11), 1385–1397. https://doi.org/10.1080/1744666X.2023.2249237

Usach, I., Martinez, R., Festini, T., & Peris, J.-E. (2019). Subcutaneous Injection of Drugs: Literature Review of Factors Influencing Pain Sensation at the Injection Site. *Advances in Therapy*, 36(11), 2986–2996. https://doi.org/10.1007/s12325-019-01101-6

Waked, I. S., & Ibrahim, Z. M. (2020). Beneficial Effects of Paraffin Bath Therapy as Additional Treatment of Chronic Hand Eczema: A Randomized, Single-Blind, Active-Controlled, Parallel-Group Study. *The Journal of Alternative and Complementary Medicine*, 26(12), 1144–1150. https://doi.org/10.1089/acm.2020.0356

Wei, S.-L., Yang, Y., Si, W.-Y., Zhou, Y., Li, T., Du, T., Zhang, P., Li, X.-L., Duan, R.-N., Duan, R.-S., & Yang, C.-L. (2023). Methylglyoxal suppresses microglia inflammatory response through NRF2-IκBζ pathway. *Redox Biology*, 65, 102843. https://doi.org/10.1016/j.redox.2023.102843

Williams, H. C. (2007). Established corticosteroid creams should be applied only once daily in patients with atopic eczema. *BMJ : British Medical Journal*, 334(7606), 1272. https://doi.org/10.1136/bmj.39195.636319.80

Xu, S., Wang, L., Cooper, E., Zhang, M., Manheimer, E., Berman, B., Shen, X., & Lao, L. (2013). Adverse Events of Acupuncture: A Systematic Review of Case Reports. *Evidence-Based Complementary and Alternative Medicine : eCAM*, 2013, 581203. https://doi.org/10.1155/2013/581203

Yang, J., Ou, B., Wise, M. L., & Chu, Y. (2014). *In vitro* total antioxidant capacity and anti-inflammatory activity of three common oat-derived avenanthramides. *Food Chemistry*, 160, 338–345. https://doi.org/10.1016/j.foodchem.2014.03.059

Zeng, Z., Li, M., Zeng, Y., Zhang, J., Zhao, Y., Lin, Y., Qiu, R., Zhang, D.-S., & Shang, H.-C. (2021). Potential Acupoint Prescriptions and Outcome Reporting for Acupuncture in Atopic Eczema: A Scoping Review. *Evidence-Based Complementary and Alternative Medicine*, 2021(1), 9994824. https://doi.org/10.1155/2021/9994824

Data & Code Availability Statement

No new raw data or software code were generated or analysed during this study. All data evaluated in this review were obtained from previously published literature and publicly available clinical trial registries at ClinicalTrials.gov. All primary sources and trial identifiers (NCT numbers) are cited within the article.

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Nathan Shiu is a 16-year-old student studying in the United Kingdom who attends Dulwich College. He has a strong interest in Medicine and Biochemistry due to a profound interest in the importance of healthcare in the wider community. His current academic efforts lie in understanding the efficacies of lab-made painkillers and how they compare against over-the-counter painkillers. Outside of academic research, Nathan is the President of the Junior Doctors' Society, a founder of an Impact 500 project aiming to raise awareness and funds for the charity Doctors in Distress and a writer in the Pursuit of Knowledge article in their school.

Mentor Contribution Statement

Mentor, Dr Daria Sokolova, has helped in advisory and supporting roles throughout the process of this literature review.