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Preferences for Psoriasis Treatment: A Systematic Review of Patient Perspectives

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Abstract

A common skin condition that many people live with for a long time is psoriasis. It can cause serious physical and psychological discomfort. Fortunately, there are lots of available treatment choices. To deliver effective care, it is necessary to comprehend what patients prefer. In this study, we looked at different psoriasis treatment options and conducted a comprehensive search of electronic databases. The optimal course of treatment for psoriasis depends in large part on the patient's preferences, the location of the disease, and its severity. Effectiveness, safety, convenience, side effects, ease of use, and administration method were the primary factors to consider.

Because topical treatments and biologic therapy are targeted and thought to be effective, many patients choose them. Nevertheless, considerations such as expense, availability, and possible adverse reactions also influence the choice of treatment. The increasing trend of patients and healthcare providers working together to make decisions about treatment is crucial because it guarantees that the patient's preferences will be met, which will improve results. To maximize the chance of successful psoriasis management, the chosen treatment approach should be tailored more toward patient-centered psoriasis therapy strategies in the future, especially when considering a mix of prescriptions.

Keywords: Psoriasis; Inflammation; Therapies; Medication; Treatment options; Patient preferences

Abbreviations: IL-23: Interleukin 23; TH17: T Helper 17; TNF-α: Tumor Necrosis alpha; TYK2: Tyrosine Kinase 2; RORγt: Receptor Gamma; PASI: Psoriasis Area and Severity Index; BSA: Body Surface Area; PGA: Physician Global Assessment; DLQI: Dermatology Life Quality Index; OTC: Over the Counter; UV: Ultraviolet; PUVA: Psoralen and UV-A

Introduction

Psoriasis vulgaris is an immune-mediated disease (a disease with an unclear cause that is characterized by inflammation caused by dysfunction of the immune system) that causes inflammation in the body and over-production of skin cells. There may be visible signs of inflammation such as raised plaques (plaques may look different for different skin types) and scales on the skin [1]. Psoriasis affects from 2–3% of people worldwide [2], and more than 3% of the United States adult population [1,3]. Psoriasis is most common in those with white European ancestry, with similar numbers between men and women. Although it may manifest at any age, adults between the ages of 15 and 35 are the most frequently diagnosed [4]. Approximately 1% of children have psoriasis, with many of those cases in adolescents [5]. From the 1970s to the late 90s, diagnosed cases of psoriasis in children increased from 29.6 cases per 100,000 to 62.7 cases per 100,000 [6]. Psoriasis also tends to run in families, suggesting that it has a genetic component.

Patients with psoriasis incur annual health care costs that are significantly greater than those of the general population and may amount to $135 billion annually as of 2013 in the United States [7]. The annual healthcare costs for psoriasis can range from $8,723 for mild psoriasis to $19,832 for psoriasis patients using biologics [8], although since these numbers are from 2017, they have probably increased further. With worsening severity of psoriasis, it has been correlated to more lost productivity at work [9]. The cause of psoriasis has not been fully elucidated, although there can be environmental influences, such as stress, illness, injury, and some medications, as well as genetic factors. Several genes have been linked to psoriasis, which could lead to more targeted treatments [10,11]. Psoriasis is associated with numerous comorbidities, including uveitis, cardiovascular, arthritis, metabolic syndrome, hypertension, abnormal blood lipids, and fatty liver disease [12] and with increased risk of early mortality [13].

There are several types of psoriasis: psoriasis vulgaris (or plaque psoriasis), guttate psoriasis, pustular psoriasis, inverse psoriasis, and erythrodermic psoriasis. The most common presentation is plaque psoriasis with about 90% of the psoriasis cases [14,15]. Plaque psoriasis presents with raised scaly skin patches that most often appear symmetrically on the scalp, knees, elbows, and torso. Guttate psoriasis accounts for about 2% of psoriasis cases and occurs most often in children and adolescents after a streptococcal infection [16], although it can also occur in adults or with other triggers. It presents with teardrop-shaped spots that may be covered with scales, typically on the arms, legs, and torso.

Pustular psoriasis can be divided into generalized or localized subtypes. For some subtypes, there is debate in the literature as to whether they should be classified under psoriasis vulgaris or as a separate skin disorder. Because of the rarity of each of the subtypes of pustular psoriasis, they can be considered orphan diseases [17]. Generalized pustular psoriasis is a rare subtype of psoriasis presenting with sudden eruptions of pustules and systemic inflammation that often presents with sepsis-like symptoms [18]. Forms of localized pustular psoriasis include Palmoplantar pustular psoriasis and Acrodermatitis Continua of Hallopeau, which affects the fingertips and nails [19].

Inverse psoriasis involves plaques that form on skin folds such as the armpits and groin. Due to the moisture typically present in these areas, the plaques are not usually scaly and are often mistaken for other skin disorders such as intertrigo or skin infections [20]. Erythrodermic psoriasis is a rare but severe form of psoriasis that involves inflammatory erythema covering at least 75% of the body [21], often occurring with fever and requiring prompt medical attention. This type only accounts for about 1-2% of psoriasis cases.

Anywhere from 6%-42% of patients with psoriasis may develop psoriatic arthritis [22], which manifests as joint pain, stiffness, and swelling. While there is no cure, symptomatic treatment and the prevention of joint damage is necessary. Without treatment and prevention, psoriatic arthritis can be disabling. Over the past 100 years, the understanding of the pathogenesis of psoriasis has evolved. Studies have revealed that psoriasis is regulated by the complex interactions between extracellular cytokine pathways and intracellular signaling molecules [23]. Interleukin 23 (IL-23) stimulates survival and proliferation of T helper 17 (TH17) cells, and thus serves as a key master cytokine regulator for psoriasis [24]. Tumor necrosis alpha (TNF-α) is a major proinflammatory cytokine exerting effects on several cell types that are involved in the pathogenesis of multiple inflammatory diseases, such as rheumatoid disease, psoriatic arthritis and inflammatory bowel diseases. In the skin, TNF-α is produced by a variety of cells, such as immune cells (DCs, T cells, macrophages) and keratinocytes. The efficacy of targeting TNF-α in psoriasis is likely predominantly due to inhibition of the IL-23/17 pathway [25,26]. Multiple pathways are involved in the inflammation and overactive immune system, but the predominant pathway is considered the IL-23/TH17 mediated activation of IL-17, leading ultimately to an inflammatory cascade and keratinocyte over-proliferation [27], particularly for plaque psoriasis [28].

Therapeutics that specifically target IL-23, IL-17, and IL-17RA (interleukin 17 receptor A) are approved for clinical use and show excellent efficacy. Furthermore, inhibitors of IL-23 and IL-17 intracellular signaling, such as Tyrosine kinase 2 (TYK2) or retinoid related orphan receptor gamma (RORγt), are in clinical development. Although therapies that target the IL-23 and IL-17 pathway also improve psoriatic arthritis symptoms, their effects on long-term disease modification and psoriasis-associated comorbidities still need to be explored [29].

Psoriasis Treatment Options

Overall goals of treatment for psoriasis are to reduce symptoms and improve the patient's quality of life. Potential side effects should be considered when selecting a medication, because if the patient will not use the medication as prescribed due to adverse effects, the results will not be optimal [30]. Depending on how severe the illness is, there are a variety of treatment options available, such as prescription drugs, over-the-counter remedies, and other therapies. Mild psoriasis is defined as having limited body surface area involvement and moderate to severe psoriasis typically covers at least 5% body surface area [31]. Psoriasis Area and Severity Index (PASI), Body Surface Area (BSA) are among the more common clinical tools to measure severity of psoriasis, although Physician Global Assessment (PGA) and Dermatology Life Quality Index (DLQI) can also be used [32].

When treating mild to moderate psoriasis, topical treatments are frequently the first option because they are applied directly to the skin. These consist of coal tar, retinoids, corticosteroids, calcineurin inhibitors, and vitamin D analogs. Sometimes oral medications are used, including acitretin, apremilast, methotrexate, and cyclosporine. When alternative treatments are ineffective, or psoriasis is moderate to severe, systemic medications are recommended. These include biologics, which are typically administered by injection or intravenous infusion and target immune system components.

Moisturizers, shampoos, creams, and ointments are examples of over the counter (OTC) treatments that can help lessen psoriasis-related skin irritation and inflammation. To treat psoriasis, phototherapy, also known as light therapy, entails exposing the skin to ultraviolet (UV) light while under medical supervision. Lastly, to increase efficacy and lessen side effects, combination therapy may be employed [33]. When developing a personalized treatment plan for psoriasis, it's critical for patients to collaborate closely with their physician. Since each person reacts to treatments differently, it might be required to periodically evaluate and make necessary adjustments.

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Conventional Treatments

Corticosteroids

Topical corticosteroids can be highly effective for mild localized psoriasis due to their anti-inflammatory, antiproliferative, immunosuppressive, and vasoconstrictive effects [33]. Topical corticosteroids are categorized based on vasoconstrictive activity, ranging from high (class 1) to low (classes 6 and 7) [34] (Table 1). Common side effects can include cracking skin and thinning of the epidermis. The rate of adverse events with topical corticosteroids has been found to be lower than other topical psoriasis treatments [35], although commonly reported side effects include thinning skin, spider veins, stretch marks, acne-like breakouts. Data from 2017-2021 found that super potent corticosteroids were 55% more expensive than low potency and also that changing the vehicle (e.g. ointment instead of cream) could reduce medication cost [36]. As expected, name brand medications were substantially more expensive than generic.

Table 1: Topical Corticosteroids for Psoriasis.

Class	Name	Strength	Vehicle	Price	Adverse Effects
I - Superpotent CS	Clobetasol propionate [37]	0.05%	Cream	$7.65-$16.20	Eczema, erythema, folliculitis, hypopigmentation, pruritus, skin atrophy, stinging, local irritation
		0.05%	Foam	$1.18-$8.64	
		0.05%	Gel	$2.76 - $9.26	
		0.05%	Spray	$9.45	
		0.05%	Lotion	$0.92- $10.68	
		0.05%	Ointment	$8.27 - $8.66	
		0.05%	Shampoo	$0.76-$8.95	
		0.05%	Solution	$0.29 - $4.13	
	Augmented Betamethasone dipropionate [38]	0.05%	Cream	$0.31-$5.58	Local irritation and reactions, acne, pruritus, folliculitis, rash
		0.05%	Gel	$4.10	
		0.05%	Lotion	$2.50-$3.18	
		0.05%	Ointment	$4.23-$5.55	
	Diflorasone diacetate [39]	0.05%	Cream	$13.98-$16.46	Burning, acne, allergic dermatitis, hypopigmentation, skin atrophy pruritus, irritation
			Ointment	$13.98-$18.87	
	Fluocinonide [40]	0.05%	Cream	$2.88-$3.21	HPA-axis suppression, burning, headache
			Gel	$3.97-$7.73	
			Ointment	$4.72	
			Solution	$0.80-$2.74	
	Halobetasol propionate [41]	0.05%	Cream	$2.64-$5.31	Stinging, HPA-axis suppression, burning, pruritus
			Lotion	$18.32	
			Ointment	$5.31-$7.39	

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II - High Potency	Amcinonide [42]	0.10%	Cream	$346	Burning, acne, allergic dermatitis, folliculitis, dryness, pruritus, skin atrophy, HPA-axis suppression, Cushing's syndrome
			Lotion	$68.74-$103.74	
			Ointment	$38.16	
	Betamethasone dipropionate [38]	0.05%	Cream	$2.77-$3.52	Local irritation and reactions, acne, pruritus, folliculitis, rash
			Emulsion	$11.55	
			Lotion	$0.75-$0.80	
			Ointment	$3.14-$4.10	
	Desoximetasone [43]	0.05%	Cream	$6.12-$6.80	HPA-axis suppression, skin dryness, irritation, pruritus
		0.25%	Cream	$2.67-$7.16	
		0.05%	Gel	$4.97-$6.13	
		0.25%	Spray	$1.73-$6.57	
		0.05%	Ointment	$6.12-$6.80	
		0.25%	Ointment	$1.20-$7.76	
	Diflorasone diacetate [44]	0.05%	Cream	$13.98-$25.53	Burning, acne, allergic dermatitis, folliculitis, pruritus, skin atrophy, irritation, HPA-axis suppression
			Ointment	$13.98-$18.87	
	Halcinonide [45]	0.10%	Cream	$13.29-$15.40	Intracranial hypertension (children), burning, acne, allergic dermatitis, folliculitis, pruritus, skin atrophy, HPA-axis suppression, Cushing's syndrome, growth suppression (children)
			Ointment	$15.40	
			Solution	$7.70	
III - Medium-High Potency CS	Amcinonide [42]	0.10%	Cream	$346	Burning, acne, allergic dermatitis, folliculitis, dryness, pruritus, skin atrophy, HPA-axis suppression, Cushing's syndrome
			Lotion	$68.74-$103.74	
			Ointment	$38.16	
	Betamethasone dipropionate [38]	0.05%	Cream	$2.77-$3.52	Local irritation and reactions, acne, pruritus, folliculitis, rash
			Emulsion	$11.55	
			Lotion	$0.75-$0.80	
			Ointment	$3.14-$4.10	
	Fluticasone propionate [46]	0.05%	Cream	$1.14 - $1.23	Burning, eczema, rash, irritation, stinging, HPA-axis suppression
			Lotion	$6.50	
	Triamcinolone acetonide [47]	0.50%	Cream	$0.67-$1.04	Acne, allergic dermatitis, folliculitis, dryness, skin atrophy, HPA-axis suppression, Cushing's syndrome
			Ointment	$0.67	
IV - Medium Potency CS	Betamethasone valerate [38]	0.10%	Cream	$1.49 - $1.87	Local irritation and reactions, acne, pruritus, folliculitis, rash
			Ointment	$1.36 - $1.39	
			Lotion	$1.20	
		0.12%	Foam	$6.54	
	Fluticasone propionate [46]	0.01%	Ointment	$1.14 - $2.54	Burning, eczema, rash, irritation, stinging, HPA-axis suppression
	Hydrocortisone valerate [48]	0.20%	Ointment	$4.41	Acne, burning, folliculitis, pruritus, irritation
	Mometasone furoate [49]	0.10%	Cream	$1.94	Paresthesia (children), Decreased cortisol (children), burning, pruritus
			Ointment	$1.23 - $1.73	
			Solution	$0.97 - $1.00	
	Triamcinolone acetonide [47]	0.2 mg	Spray	$3.89- $10.09	Acne, allergic dermatitis, folliculitis, dryness, skin atrophy, HPA-axis suppression, Cushing's syndrome
		0.10%	Cream	$0.24 - $0.42	
		0.05%	Ointment	$0.67 - $2.27	

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V - Medium-Low Potency CS	Betamethasone valerate [38]	0.10%	Cream	$1.49 - $1.87	Local irritation and reactions, acne, pruritus, folliculitis, rash
			Ointment	$1.36 - $1.39	
			Lotion	$1.20	
		0.12%	Foam	$6.54	
	Desonide [51]	0.05%	Cream	$5.35- $10.33	Stinging, atopic dermatitis, pruritus, irritation, rash, HPA-axis suppression (children)
			Gel	$11.34	
			Lotion	$5.02	
			Ointment	$1.55 - $5.35	
	Hydrocortisone butyrate [48]	0.10%	Cream	$4.18	Acne, burning, folliculitis, pruritus, irritation
			Lotion	$8.18 - $9.63	
			Ointment	$3.82 - $3.98	
			Solution	$3.98	
	Hydrocortisone Probutate [48]	0.10%	Cream	$17.54	
	Hydrocortisone valerate [48]	0.20%	Cream	$4.01	
	Triamcinolone acetonide [47]	0.10%	Lotion	$0.71 - $1.50	Acne, allergic dermatitis, folliculitis, dryness, skin atrophy, HPA-axis suppression, Cushing's syndrome
		0.03%	Ointment	$0.13 - $0.14	
VI - Low Potency CS	Alclometasone dipropionate [50]	0.05%	Cream	$2.17	Burning, dryness, rash, erythema, pruritus, acne, HPA-axis suppression, Cushing's syndrome, growth suppression
			Ointment	$0.66	
	Desonide [51]	0.05%	Cream	$5.35- $10.33	Stinging, atopic dermatitis, pruritus, irritation, rash, HPA-axis suppression (children)
			Gel	$11.34	
			Lotion	$5.02	
			Ointment	$1.55 - $5.35	
	Triamcinolone acetonide [47]	0.03%	Cream	$0.30	Acne, allergic dermatitis, folliculitis, dryness, skin atrophy, HPA-axis suppression, Cushing's syndrome
			Lotion	$0.63 - $1.25	
VII - Least Potent CS	Hydrocortisone acetate [48]	1%	Cream	$0.04 - $0.23	Acne, burning, folliculitis, pruritus, irritation
		2%		$58.93	
		2.50%		$0.25 - $0.42	
		1%	Lotion	$0.06	
		2%		$5.00	
		2.50%		$0.88 - $0.91	

Vitamin D analogues

The most common vitamin D analogues on the market are a synthetic vitamin D, calcipotriene, and a naturally occurring vitamin D3, calcitriol. They work by reversing some of the damage of psoriasis by binding to vitamin D receptors, thus blocking keratinocyte proliferation, enhancing differentiation, and decreasing inflammation. Vitamin D analogs are often prescribed in conjunction with topical corticosteroids, although they can be used alone. The combination therapy has been shown to be more effective than either Vitamin D analogues or topical corticosteroids alone [33,52], particularly with betamethasone [53]. In conjunction with narrow-band ultraviolet B phototherapy, both calcitriol and calcipotriene reduced redness and scales on psoriasis plaques with some side effects such as mild itching and hyperpigmentation reported [54].

Calcitriol (3 μg/g) has been reported to be more effective than calcipotriol (50 μg/g) with fewer instances of erythema, edema, and stinging/burning [55]. In rare cases, use of calcitriol can lead to hypercalcemia, although there are usually related underlying causes [56,57]. Calcitriol is indicated for the treatment of plaque psoriasis. It is available as an ointment ($7.03-$11.45) in the US and Canada [58]. Calcipotriene is available in a variety of topical formulations, as well as a combination form with betamethasone. It has been shown to be a highly effective psoriasis treatment compared to a range of other topical treatments [59]. It is indicated for the treatment of plaque psoriasis of both the body and scalp in

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those > 4 years of age. It is available as a 0.005% strength cream ($6.75 - $9.71), ointment ($6.03 - $6.88), foam ($16.95-$19.13), and solution ($5.39 - $5.66) in the US and Canada [60]. Some adverse effects reported include a burning sensation, pruritus, irritation, rash, stinging, and tingling of skin.

Retinoids

Retinoids are a group of natural or synthetic products related to Vitamin A. They are available in either topical or systemic forms. Systemic retinoids are teratogens and thus contraindicated for pregnancy or those who may become pregnant. There are reports of skeletal abnormalities with long-term use of systemic retinoids, but some studies have found a lack of supporting evidence [61]. Other common side effects of retinoids are dose-dependent and include mucocutaneous reactions like cheilitis and hair loss, hyperlipidemia, and elevated liver enzymes. One study found a higher risk of cardiovascular effects with retinoids than methotrexate [62].

Acitretin (Soriatane) is a 2nd generation systemic retinoid approved by the FDA in 1997. It is an effective treatment for generalized pustular psoriasis (0.7-1 mg/kg/day) [63] and erythrodermic psoriasis [64]. For plaque psoriasis, it is more effective when combined with phototherapy or other treatments [63]. Tazarotene is a 3rd gen prescription topical acetylenic retinoid available in 0.1% and 0.05% strengths. While an effective treatment for psoriasis alone [65], its effects are enhanced when paired with corticosteroids [66]. Due to low systemic absorption, it is not known to have significant systemic adverse effects [65], although mild skin irritation can occur [67]. Tazarotene is applied as a thin film to psoriatic lesions once daily in the evening initially as 0.05%. If tolerated, the strength can be increased to 0.1%. It is approved for the treatment of psoriasis in both adults and children. It is available as a 0.05% cream ($12.99 - $20.38), 0.1% cream ($19.19), 0.1% foam ($14.84- $16.01), a 0.05% gel ($15.80- $19.19), a 0.1% gel ($16.79- $20.38) and a 0.045% lotion ($14.27) in the US and Canada [68]. The most common adverse effects include desquamation, erythema, a burning sensation, xeroderma, skin irritation, psoriasis exacerbation, and skin pain.

Calcineurin Inhibitors

While not an FDA approved treatment, topical calcineurin inhibitors such as tacrolimus and pimecrolimus are often prescribed off-label for use in thinner skin and on skin folds such as on the facial or genital areas. Topical calcineurin inhibitors work by binding to calcineurin, ultimately inhibiting T-cell activation and pro-inflammatory cytokine synthesis [33]. They have been found to be effective treatments with limited side effects [69], although they can be significantly more expensive than topical corticosteroids. Both medications carry a black box warning from the FDA for a potential link to lymphoma and skin cancer, so they should be reserved as second line agents.

Tacrolimus 1% ointment was found to be an effective treatment for psoriasis of the face or intertriginous area psoriasis [70]. It is also available as 0.1% ointment ($4.00-$11.01) and 0.03% ointment ($2.80 - $11.01) to be applied twice daily as a thin layer to the affected area. Tacrolimus 0.03% ointment is indicated in children 2-15 years old. However, it should be discontinued when psoriatic symptoms are clear. Potential adverse effects include allergic reaction, tingling, burning, pruritus, erythema, and skin infection with potential edema and hypertension in adults; however, it is generally well tolerated [71]. Pimecrolimus cream 1% ($10.15-$11.96) was found to be an effective treatment for inverse psoriasis [72]. It was generally well tolerated, but some burning, and application site reactions were reported. Pimecrolimus cream is applied twice daily to infected areas (intertriginous and facial). Pimecrolimus is not indicated for treatment of psoriasis in children younger than 2 years of age.

Other Topical Treatments

In 2022, the FDA approved two new non-steroidal biologic topicals: roflumilast cream 0.3%, a phosphodiesterase inhibitor, and tapinarof cream 1%, an aryl hydrocarbon receptor modulating agent. In October 2023, the approval of roflumilast was expanded to include children ages 6 and up. Both creams are for mild to severe plaque psoriasis, but roflumilast is also safe and effective for the face and areas where skin touches skin, such as in the knees and elbows.

Phototherapy

Phototherapy is often used in conjunction with other treatments. It works by facilitating cell turnover and desquamation. Narrowband UV-B therapy is often the preferred choice over broadband UV-B and psoralen and UV-A (PUVA) due to greater efficacy and safety, although different of types of phototherapy can be more effective on different types of psoriasis [73]. Excimer light is one type of targeted UVB phototherapy that is effective for localized psoriasis. Adding a salt bath to artificial ultraviolet B light may enhance the effects of phototherapy alone [74].

While phototherapy can be an effective treatment, it usually requires administration in a physician's office and can also have adverse effects such as blisters, photoaging, folate deficiency, and increased cancer risk [75].

Coal Tar

Coal tar suppresses inflammation and DNA synthesis resulting in decreased keratinocyte proliferation [33]. It is indicated for the treatment of skin conditions like psoriasis in adults. It is available as a cream, foam, lotion, and ointment as well as a bath and hand/foot soak. The foam is available as a 2% strength and is $0.32 per gram. The shampoo is available as 10% ($0.08 per mL), 2.5% ($0.02 per mL), 1% ($0.06 per mL), and 0.05% ($0.04-$0.05 per mL). The bath and hand/foot soaks are available at 1.5% strength

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($0.14 per mL). Coal tar products are over the counter and are widely available for patients who suffer from psoriasis [76].

Systemic Therapies

Prior to the development of biologics, the common oral systemic agents used for moderate to severe psoriasis were methotrexate, acitretin, cyclosporine, and apremilast (Table 2). These are still prescribed today, but some have contraindications, risky safety profiles, and may be less effective than biologics. However, they tend to be cheaper and more accessible than biologics because they don't have to be administered via injection. Methotrexate has been used successfully to treat psoriasis for over 50 years, but it comes with complications for hepatic, renal, and pulmonary function, is a known teratogen, can require folate supplementation, and often requires regular monitoring through lab work [77]. Acitretin is a systemic retinoid that is highly effective for pustular psoriasis and palmoplantar psoriasis, but it is teratogenic. Cyclosporine is an immunosuppressant that works well for psoriatic arthritis. There is a dose-dependent and duration risk of nephrotoxicity, so cyclosporine is best used for shorter treatment durations [78]. Apremilast is a non-biologic small molecule phosphodiesterase 4 inhibitor that does not suppress the immune system. Unlike some other oral psoriasis medications, apremilast does not require laboratory monitoring [79]. It has recently been shown to be safe and effective in children ages 6 years old and up [80].

Table 2: Systemic Agents for Psoriasis.

Drug	Class	MOA	Dose/Freq	AEs	Cost
Methotrexate	Antimetabolite	Complete inhibition of DNA synthesis in psoriatic skin [81]	Oral/IM/SubQ: 10-15 mg once weekly; adj every 4-8 wks; usual range 7.5-25 mg/wk	Dermatologic toxicity, GI toxicity, Hematologic toxicity, Hepatotoxicity, Infection, Nephrotoxicity, Neurotoxicity, Pulmonary toxicity	Tablets: 2.5 mg (per each): $3.56 - $6.24
Acitretin	Systemic Retinoid	Inhibition of proinflammatory IL-6 cytokines resulting in anti-inflammatory, antiproliferative, and keratinocyte differentiation effects. [82]	Oral: 10 to 50 mg once daily; reserve doses ≤25 mg/day for patients who do not tolerate higher doses	BBW: Pregnancy, cannot donate blood for 3 years, hepatotoxicity, Hyperesthesia, paresthesia, rigors, nail disease, pruritus, hypertriglyceridemia, increased serum glucose, decreased HDL cholesterol, hypercholesterolemia, leukocyturia, reticulocytosis, increased liver enzymes, increased CPK, rhinitis	Capsules: 10 mg (per each): $31.20 17.5 mg (per each): $38.46 25 mg (per each): $38.46
Cyclosporine	Immunosuppressant	Inhibition of production and release of interleukin II and inhibits interleukin II-induced activation of resting T-lymphocytes. [83]	Initial: 1 to 3 mg/kg/day PO in 2 divided doses; Increase by 0.5 mg/kg/day if insufficient response is seen after 4 weeks of treatment. Additional dosage increases may be made every 2 weeks if needed (maximum dose: 4 mg/kg/day).	BBW: immunosuppression, increased risk of skin malignancies (specific to psoriasis patients), hypertension, nephrotoxicity Diabetes, gingival overgrowth, thrombotic microangiopathy, hepatotoxicity, hyperkalemia, hypertension, infection, malignancy, nephrotoxicity, neurotoxicity	Capsules: 25 mg (per each): $3.85 100 mg (per each): $15.35 - $17.35
Apremilast	Phosphodiesterase (PDE) inhibitors	Inhibition of cyclic adenosine monophosphate PDE4 resulting in increased cAMP levels and IL-10 and decreased expression of nitric oxide synthase, TNA-alpha, and IL-23 [84]	Initial: 10 mg PO in the morning on day 1. Titrate upward by additional 10 mg per day on days 2 to 5 as follows: Day 2: 10 mg twice daily; Day 3: 10 mg in the morning and 20 mg in the evening; Day 4: 20 mg twice daily; Day 5: 20 mg in the morning and 30 mg in the evening. Maintenance dose: 30 mg twice daily starting on day	GI effects, neuropsychiatric effects, weight loss	Therapy pack: 10 & 20 & 30 mg (per each): $105.39 Tablets: 30 mg (per each): $96.61

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Biologics

For moderate to severe psoriasis that did not respond to conventional therapies or that involves arthritis, biologics are the next phase of treatment. As of 2023, there are 13 FDA approved biologics for psoriasis. They work by targeting specific immune-mediated pathways involved in psoriasis, and are thus categorized: TNF-alpha inhibitors, IL-17 inhibitors, IL-23 inhibitors, and TK inhibitors (Table 3).

Table 3: Biologics for Psoriasis.

Class	Drug	MOA	Dose/Freq	Adverse Events	Cost
TNF-alpha inhibitor	Etanercept	Binds TNF and blocks cell surface receptor interaction and subsequent proinflammatory cytokines [88].	50 mg SQ once weekly OR 25 mg SQ twice weekly (with or without methotrexate)	BBW: Serious infections, Malignancies Autoimmune disorders, transcription disease, dermatologic reactions, heart failure, hepatitis B reactivation, hepatotoxicity, infection, injection site reactions, tuberculosis	$1,110.27-$220.55
	Infliximab	Binds TNF and blocks cell surface receptor interaction and subsequent proinflammatory cytokines [89].	**Plaque Psoriasis:** IV 5 mg/kg at 0, 2, and 6 weeks, followed by 5 mg/kg every 8 weeks **Psoriatic Arthritis:** IV 5 mg/kg at 0, 2, and 6 weeks, followed by 5 mg/kg every 8 weeks **Pustular Psoriasis:** IV 5 mg/kg at week 0, 2, and 6, followed by 5 mg/kg every 8 weeks for up to 46 weeks	BBW: Serious infections, Malignancies Autoimmune disorders, demyelinating disease, dermatologic reactions, heart failure, hepatitis B reactivation, hepatotoxicity, infection, injection site reactions, tuberculosis	$570-7,417.30
	Adalimumab	Binds TNF and blocks cell surface receptor interaction and subsequent proinflammatory cytokines [90].	**Plaque Psoriasis:** Initial 80 mg SQ, then 40 mg every other week beginning 1 week after initial dose **Psoriatic Arthritis:** 40 mg SQ every other week	BBW: Serious infections, Malignancies Autoimmune disorders, demyelinating disease, dermatologic reactions, heart failure, hepatitis B reactivation, hepatotoxicity, infection, injection site reactions, tuberculosis	$597.00-$8,307.16
	Certolizumab pegol	Binds TNF and blocks cell surface receptor interaction and subsequent proinflammatory cytokines [91].	**Plaque Psoriasis:** 400 mg SQ every other week **Psoriatic arthritis:** Initial: 400 mg, repeat dose 2 and 4 weeks after initial dose; Maintenance: 200 mg every other week. May consider maintenance dose of 400 mg every 4 weeks.	BBW: Serious infections, Malignancies Autoimmune disorders, demyelinating disease, dermatologic reactions, heart failure, hepatitis B reactivation, hepatotoxicity, infection, injection site reactions, tuberculosis	$6,863.03
IL-17 Inhibitor	Secukinumab	Monoclonal antibody that binds to IL-17A cytokines and inhibits its binding to IL-17 receptor [92].	**Plaque psoriasis:** 300 mg SQ once weekly at weeks 0, 1, 2, 3, and 4 followed by 300 mg every 4 weeks. Some patients may only require 150 mg per dose. **Psoriatic arthritis:** With a loading dose: 6 mg/kg IV at week 0 followed by 1.75 mg/kg (do not exceed 300 mg) every 4 weeks. Without a loading dose: 1.75 mg/kg IV (do not exceed 300 mg) every 4 weeks. With a loading dose: 150 mg SQ at weeks 0, 1, 2, 3, and 4 followed by 150 mg every 4 weeks; consider an increase to 300 mg every 4 weeks in patients who continue to have active psoriatic arthritis. Without a loading dose: 150 mg SQ every 4 weeks; consider an increase to 300 mg every 4 weeks in patients who continue to have active psoriatic arthritis. Coexistent moderate to severe plaque psoriasis: 300 mg SQ once weekly at weeks 0, 1, 2, 3, and 4 followed by 300 mg	Dermatologic reactions, infection, inflammatory bowel disease, tuberculosis	IV: $507.60 SQ: $4,445.38-$8,890.75

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	Ixekizumab	Monoclonal antibody that binds to IL-17A cytokines and inhibits its binding to IL-17 receptor [93].	**Plaque psoriasis:** 160 mg SQ once, followed by 80 mg at weeks 2, 4, 6, 8, 10, and 12, and then 80 mg every 4 weeks **Psoriatic arthritis:** 160 mg SQ once, followed by 80 mg every 4 weeks; may administer alone or in combination with conventional disease-modifying antirheumatic drugs (e.g., methotrexate)	Neutropenia, antibody development, infection, injection site reaction, upper respiratory tract infection	$8,298.86
	Brodalumab	Monoclonal antibody that binds to IL-17A cytokines and inhibits its binding to IL-17 receptor [94].	210 mg SQ at weeks 0, 1, and 2, followed by 210 mg once every 2 weeks. Consider discontinuing if an adequate response is not achieved after 12 to 16 weeks	BBW: Suicidal ideation and behavior Infections (bronchitis, nasopharyngitis, pharyngitis, upper respiratory tract infection, urinary tract infection)	$2,088.01
	Bimekizumab	Monoclonal antibody that binds to IL-17A cytokines and inhibits its binding to IL-17 receptor [95].	320 mg SQ (given as two 160 mg injections) once every 4 weeks for the first 16 weeks, and then every 8 weeks thereafter.	Antibody development, infections (HSV, oral candidiasis, upper respiratory tract infection)	$8,640.00
IL-23 Inhibitors	Ustekinumab	Monoclonal antibody that binds to and inhibits proinflammatory cytokines, IL-2 and IL-23 [96].	**Plaque Psoriasis:** ≤100 kg: 45 mg SQ at 0 and 4 weeks, and then 45 mg every 12 weeks thereafter. >100 kg: 90 mg SQ at 0 and 4 weeks, and then 90 mg every 12 weeks thereafter. **Psoriatic arthritis:** 45 mg SQ at 0 and 4 weeks, and then 45 mg every 12 weeks thereafter.	Hypersensitivity reactions, infections, malignancy, noninfectious pneumonia, posterior reversible encephalopathy syndrome, tuberculosis	$16,705.72-$33,411.42
	Guselkumab	Monoclonal antibody that binds to IL-23 and reduces serum levels of IL-17A, IL-17F, and IL-22 [97].	**Plaque psoriasis:** 100 mg SQ at weeks 0, 4, and then every 8 weeks thereafter. **Psoriatic arthritis:** 100 mg SQ at weeks 0, 4, and then every 8 weeks thereafter; may administer alone or in combination with conventional disease-modifying antirheumatic drugs (e.g., methotrexate)	Infection, upper respiratory tract infection	$16,647.36
	Tildrakizumab	Monoclonal antibody that binds to p19 subunit of IL-23 resulting in inhibition of release of proinflammatory cytokines and chemokines [98].	100 mg SQ at weeks 0, 4, and then every 12 weeks thereafter.	Infection, upper respiratory tract infection	$20,684.96
	Risankizumab	Monoclonal antibody that binds to and inhibits proinflammatory cytokines, IL-2 and IL-23 [99].	**Plaque psoriasis:** 150 mg SQ at weeks 0, 4, and then every 12 weeks thereafter. **Psoriatic arthritis:** 150 mg SQ at weeks 0, 4, and then every 12 weeks thereafter; may be administered alone or in combination with non–biologic disease-modifying antirheumatic drugs.	Antibody development, infection, upper respiratory tract infection	$25,220.83
TK Inhibitor	Deucravacitinib	Inhibits tyrosine kinase 2 and prevents activation of signal transducers and cytokine pathways [100].	6 mg PO once daily.		$261.37

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Anti-CD6	Itolizumab (INDIA ONLY)	Monoclonal antibody that binds to CD6 and downregulates the transcription of proinflammatory cytokines which decreases the levels of IFN-gamma, IL-6, and TNF-alpha [101].	1.6 mg/kg given as an IV infusion once every 2 weeks for 12 weeks, followed by 1.6 mg/kg every 4 weeks for up to 24 weeks.	Infusion related reactions, hypersensitivity reactions, infections	22,000 Indian Rupee = 263.78 USD

Biologics are highly effective for moderate to severe psoriasis, and some of the most effective for plaque psoriasis include infliximab, bimekizumab, ixekizumab, and risankizumab [85]. Many of the biologics have unique benefits, for instance adalimumab is highly effective for psoriatic arthritis and certolizumab is safe for pregnant or nursing patients [86]. Several biologics are approved and effective for pediatrics, including adalimumab, etanercept, ustekinumab, secukinumab, and ixekizumab, although injections are challenging with pediatrics and the long-term safety is still under investigation [87]. However, biologics are expensive and not always covered by insurance. While biologics are generally well tolerated, some do come with contraindications. IL-17 inhibitors are not recommended for those with irritable bowel syndrome, because it can worsen symptoms. Also, because they are administered parenterally due to degradation by the gastrointestinal tract, patients have to receive their treatments in a clinical setting.

Natural Treatments

Natural remedies for psoriasis can be appealing to many because they are readily available, cheaper, and don't have many of the side effects that come with prescription medications. Treatment with natural products would not be intended to cure psoriasis, but to ease the symptoms and improve the patient's quality of life.

Patients looking for natural remedies for psoriasis can begin with lifestyle choices. A healthy diet and exercise regime can help alleviate symptoms, reduce stress, which many patients find leads to breakouts [102], and can be beneficial for other conditions associated with psoriasis such as arthritis, inflammatory bowel disease, and cardiovascular diseases. Nutrition and inflammatory foods have been connected to psoriasis [103].

Many natural treatments have not been studied for efficacy or have been evaluated in a very limited manner with small study populations or lacking control groups. Herbal remedies, such as Mahonia aquifolium, Indigo naturalis, and others have shown anti-inflammatory properties that could be beneficial for psoriasis [104]. While there is a growing body of evidence that some herbal remedies may improve psoriasis symptoms, more work is needed to determine ideal dosage forms. Clinical studies performed on natural products are listed in Table 4.

Aloe Vera

Aloe vera is a succulent with thick fleshy green leaves. The inner parts of the leaves contain a water-holding mucilage rich in polysaccharides and other compounds that are moisturizing and beneficial to the skin [105]. Traditionally, aloe vera has been used for a variety of skin issues such as sunburn, eczema, skin irritations, wound healing due to its anti-inflammatory and antiseptic properties. Many cultures that use aloe vera claim that it has many further therapeutic uses; however, many of these alleged properties and uses are not scientifically proven, partially due to the natural variation in plant chemical compositions due to environment and growing conditions and a lack of clinical studies [106].

In animal studies, aloe vera formulated into a hydrogel [107] or ethanolic extract [108] was effective compared to a control and comparable to conventional medications. Aloe vera cream (70% aloe mucilage) was found to be more effective than 0.1% triamcinolone acetonide cream at reducing clinical psoriasis symptoms [109]. A hydrophilic cream with 0.5% aloe vera completely relieved symptoms in 83% of patients compared to only 6% of patients using placebo [110]. Neither of these studies reported significant side effects. However, a different study found placebo to be more effective at relieving psoriasis symptoms than aloe vera gel, which caused skin dryness as a side effect [111].

Nigella Sativa

Nigella sativa (also known as Black Cumin or Black seed) has been used for traditional medicine in the Middle East and Southeast Asia. The seeds of this annual flowering plant have been used for digestive disorders, liver disease, asthma, inflammation, and skin disorders among others. One of the major constituents of Nigella sativa is thymoquinone.

Animal trials of Nigella sativa have generally found it to be effective to different degrees. When a 95% ethanolic extract of Nigella sativa was evaluated on a mouse tail model for psoriasis, it was as effective as 0.1% tazarotene compared to placebo [112]. When evaluated on guinea pigs a similar ethanolic extract was more effective than placebo but was not as effective as 0.1% topical tazarotene [113]. Nigella sativa oil application to mice was effective in alleviating imiquimod induced psoriasis-like skin lesions [114].

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Table 4: Clinical Trials Evaluating Herbal Remedies.

	Treatment	Participants	Study Design	Outcomes
Aloe vera	70% aloe vera cream vs 0.1% triamcinolone acetonide cream 2x daily for 8 weeks [109]	80	Randomized double-blind	Aloe vera was more effective
	0.5% aloe vera in hydrophilic cream vs placebo cream 3x daily for 6 weeks [110]	60	Double-blind placebo-controlled	83% aloe vera patients "cured" vs 6% of placebo
	Aloe vera gel vs placebo 2x daily for 4 weeks [111]	41	Intra-patient placebo-controlled	Placebo was more effective than aloe vera
Nigella sativa	10% (w/w) nigella sativa ointment, 500 mg capsule, or both ointment and capsule [115]	60	Randomized	Combination was most effective (85% positive response), followed by ointment (65%) and oral (50%)
Curcumin (curcuma longa)	Topical turmeric tonic applied to scalp for 9 weeks [126]	40	Randomized trial	Significant improvement of PASI scores on scalp psoriasis
	Curcuminoid C3 Complex 500 mg capsules 3x daily for 12 weeks [128]	12	Single-arm No control	2 patients had slight improvement in symptoms
	Oral bioavailable curcumin paired with topical steroids vs topical steroids alone [129]	63	Randomized	Significant improvement in PASI scores and IL-22 serum levels with combination
	Turmeric microemulgel vs gel placebo 2x daily for 9 weeks [127]	34	Randomized, prospective intra-individual, right-left comparative, placebo-controlled, double-blind clinical trial	Significant improvement in PASI scores with turmeric microemulgel
Indigo naturalis	Indigo naturalis ointment (20%) vs vehicle ointment 1x daily for 8 weeks [130]	14	Randomized placebo-controlled trial	Indigo significantly improved symptoms
	Indigo naturalis ointment vs vehicle ointment for 12 weeks [131]	42	Randomized trial	74% of patients had clearance or near clearance of plaques with I. naturalis ointment
	Refined indigo naturalis extract in oil (Lindioil) vs. olive oil 2x daily. First 12 weeks- lindioil on nails of one hand, control on other. Next 12 weeks- lindioil to both hands [133]	31	Randomized observer-blind vehicle-controlled trial	Significant reduction in Nail Psoriasis Severity Index scores for Lindioil (49.8%) vs control group (22.9%)
	Indigo naturalis ointment vs placebo ointment for 8 weeks [134]	24	Placebo-controlled	Indigo naturalis ointment improved PASI scores over placebo
	Indigo naturalis composite ointment over 8 weeks [132]	1 (pediatric)	Case study	Cleared psoriasis
	Indigo naturalis ointment (200, 100, 50, or 10 mcg/g) for 8 weeks followed by 12-week safety study [136]	100	Randomized, double-blind, parallel-group	200 mcg/g ointment had greatest improvement in PASI scores
	15% indigo naturalis nanopatches for 4 weeks [137]	3	Single-arm No control	Reduced psoriasis symptoms
	Mahonia aquafolium bark extract 10% ointment vs placebo for 4 weeks [140]	82	Intrapatient	M. aquafolium ointment worked slightly better than placebo
Mahonia aquafolium	Mahonia aquafolium 10% ointment vs. dithranol ointment 3x daily for 4 weeks [141]	80	Intrapatient	Dithranol ointment had better PASI score and biopsy results
	Mahonia aquafolium 10%ointment for 12 weeks [143]	375	Single-arm	Significant improvement in PASI scores (from 5.5 to 2.3). Physician exam stated symptoms improved or disappeared in 81.1% of patients
	M. aquafolium 10% cream with 0.1% berberine 1x daily for 12 weeks [142]	39	Open label	
	M. aquafolium 10% cream with 0.1% berberine vs. calcipotriol and fluticasone proprionate 2x daily for 6 months [142]	32	Intrapatient trial	84% patients had good response to M. aquafolium and 63% found it as good or better as conventional treatment
	M. aquifolium 10% cream with 0.1% berberine vs calcipotriol and tazarotene 1x daily for 1 month [142]	33	Observational study	M. aquafolium improved symptoms after 1 week and performed as well or better than conventional treatment
	M. aquafolium 10% homeopathic cream (Reliéva) vs placebo 2x daily for 12 weeks [144]	200	Randomized double-blind placebo-controlled	M. aquafolium cream improved PASI and Quality of Life scores
	H. perforatum extract ointment (5% w/w) vs. placebo 2x daily for 4 weeks [148]	10	intrapatient right-left comparative, vehicle controlled single-blind	H. perforatum ointment improved erythema, scaling, and skin thickness

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Hypericum perforatum	H. perforatum ointment (5% w/w) vs. placebo 2x daily for 4 weeks [149]	20	Double-blind, placebo-controlled intraindividual	H. perforatum improved PASI for erythema, scaling, skin thickness
	Hypericin and visible light exposure for 6 weeks [147]		Phase II placebo-controlled	
	Capsaicin cream vs placebo 1x daily for 6 weeks [151]	44	Double-blind placebo-controlled intrapatient	Capsaicin cream more effective than placebo
Capsaicin	Capsaicin 0.025% cream vs placebo 4x daily for 6 weeks [152]	197	Double-blind placebo-controlled	Capsaicin cream improved global psoriasis scores
	Capsaicin 0.025% cream [154]	42	Randomized, double-blind	Capsaicin cream inhibited keratinocyte proliferation
	Dermavit cream (Achillea millefolium extract, Calendula officinalis extract, Salvia officinalis essential oil) for 60 days [155]	30	Single-arm No placebo	63.3% of patients reported positive improvement in symptoms
Achillea millefolium, Calendula officinalis, Salvia officinalis	Oleogel containing 47.5% Matricaria chamomilla L. oil, 47.5% Cucurbita pepo L. seed oil, and colloidal silicon dioxide vs. placebo with 0.5% each of the M. chamomilla and C. pepo, 5% silicon dioxide, and 94% liquid paraffin for 4 weeks [157]	40	Intrapatient, double-blind block-randomized trial	Active oleogel significantly improved erythema, scaling, skin thickness and PSI scores
Matricaria chamomilla, Cucurbita pepo				

A human clinical trial evaluated a 10% (w/w) Nigella sativa ointment, 500 mg oral capsule, or both with no control group. The combination treatment demonstrated the most effective results with 85% of patients responding positively, followed by ointment (65%) and oral (50%). While the treatments were all well tolerated with no reported side effects, all groups did experience some relapse of symptoms after completion of the trial [115].

Curcumin (Curcuma Longa)

Curcumin is a polyphenolic compound found in turmeric, a spice derived from the rhizomes of Curcuma longa, which is in the ginger family. It has been shown to help reduce inflammation through blocking the production of TNF-α [116,117]. While curcumin has low oral bioavailability, many have investigated methods to increase its effect because of its potential to treat a large range of disease states [118].

To overcome the low bioavailability, a curcumin nanoemulsion loaded polymeric hydrogel was formulated and applied topically to mice. They found more rapid improvement in psoriasis symptoms with the curcumin hydrogel compared to curcumin alone or betamethasone-17-valerate gel [119]. A number of other studies have also evaluated different preparations of curcumin on animal psoriasis models [120-124]. Studies have indicated improved availability of curcumin when administered topically [125], however, few clinical trials have evaluated topical curcumin for psoriasis. One nine-week randomized trial found that a topical turmeric tonic significantly improved PASI score of patients with scalp psoriasis [126]. When turmeric was formulated in a microemulgel, it reduced PASI scores compared to placebo and improved quality of life [127].

A small trial of 12 patients all took a bioavailable formulation of oral curcumin (Curcuminoid C3 Complex 500 mg capsules) three times daily. Only 8 participants completed the trial, and of those only 2 participants had slight improvement of their psoriasis symptoms after 12 weeks. One patient experienced worsening psoriasis and ten patients reported adverse events including gastrointestinal upset and hot flashes [128]. As with many psoriasis treatments, combination therapies can be highly effective. Oral bioavailable curcumin paired with topical steroids significantly improved PASI scores and IL-22 serum levels compared to topical steroids alone in a randomized trial of 63 patients [129].

Indigo Naturalis

The flowering herb Indigo naturalis was traditionally used as a natural blue dye, but also widely used in traditional Chinese medicine. It has been investigated for potential in treating a range of diseases including ulcerative colitis, tumors, and skin diseases. Due to the properties that make indigo an excellent dye, it is challenging to formulate as a topical preparation due to skin staining.

Indigo naturalis ointment has been shown to improve psoriasis symptoms [130,131] with one case study in an 8-year-old boy reporting complete remission of psoriasis for two years [132]. An Indigo naturalis extract (Lindioil) was also highly effective at improving nail psoriasis [133]. Further, the application of Indigo naturalis ointment down-regulated the IL-17 pathway, which is a major pathway in the over-proliferation of skin cells in psoriasis [134], although certain genetic markers may influence the efficacy of treatment [135].

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A patented non-staining formulation of Indigo naturalis found significant improvement in PASI scores with 200 mcg/g strength and no severe treatment related adverse effects [136]. Another attempt to overcome staining issues formulated nanopatches with 15% Indigo naturalis. After initial in vitro and mice studies, the patches were evaluated for 4 weeks on 3 patients with mild psoriasis and found that it reduced psoriatic symptoms with no adverse effects [137].

Mahonia Aquafolium

Mahonia aquafolium, also known as Oregon grape, is a flowering evergreen shrub native to the western United States. In traditional Chinese medicine, plants of the Mahonia family have been used for eczema, wound healing, and various other diseases [138]. The anti-inflammatory properties of the active constituents (e.g. berberine) in the bark can inhibit keratinocyte proliferation [139].

Compared to placebo, Mahonia aquafolium bark extract 10% ointment was slightly more effective when M. aquifolium ointment was applied to one side of the body and placebo to the other [140]. However, in a similar study with M. aquafolium ointment 10% on one side of the body and dithranol ointment on the other, the dithranol outperformed Mahonia on PASI scores and skin biopsies for cellular immune activity and keratinocyte proliferation [141]. Some minor side effects such as burning and itching were reported with M. aquafolium ointment. Mahonia aquafolium 10% cream with 0.1% berberine was found to be equally effective as two different combination treatments (calcipotriol and fluticasone proprionate; calcipotriol and tazarotene) [142].

Mahonia aquifolium 10% ointment led to significantly improved PASI scores from 5.5 to 2.3 [143] and from 5.6 to 1.4 [142] in two different single-arm studies after 12 weeks. A proprietary Mahonia aquafolium 10% homeopathic cream, Relieva, significantly improved PASI scores and Quality of Life scores in 200 patients, although a small number of patients (<1%) reported side effects including rash, burning, and clothing staining [144].

Hypericum Perforatum (St Johns Wort)

Hypericum perforatum, commonly known as St Johns wort, is a perennial flowering plant. It has been used in traditional medicine of numerous cultures for centuries to treat ailments like kidney and lung disease, depression, and treating wounds. In recent years, it has been studied for potential medicinal uses for psychiatric, endocrine, and skin disorders [145]. A primary active component of Hypericum perforatum is hypericin, which has been shown modulate the immune system, partially through inhibiting tumor necrosis factor alpha (TNF-α) induced apoptosis [146]. Hypericin was also found to be an effective twice weekly treatment paired with visible light exposure [147].

A Hypericum perforatum extract ointment (5% w/w) also containing 84% Vaseline, 10% propylene glycol, and 1% avicel led to improvement in erythema, scaling, and skin thickness compared to placebo with no reported reactions [148]. A different study also using a similar Hypericum perforatum ointment (5% w/w) produced improved PASI scores for erythema, scaling, and skin thickness compared to placebo [149]. Further, this study found reductions in TNF-α, which is often found in high levels on psoriasis lesions and plasma of patients with psoriasis.

Capsaicin

Capsaicin is a chemical component of hot peppers known to cause burning of skin and mucous membranes. This effect can lead to an analgesic effect with decreased sensitivity of the skin to painful stimuli. Capsaicin has been formulated into many different topical preparations for neuralgic pain relief and skin disorders because of the analgesic effect and its effective transdermal absorption [150].

Capsaicin cream has been found to be significantly more effective than placebo in improving psoriasis symptoms [151]. Capsaicin 0.025% cream was also effective for pruritic psoriasis, significantly improving global psoriasis scores and pruritis relief, although some patients did report a burning sensation side effect [152]. Capsaicin has been demonstrated to increase perfusion and histamine release in both psoriatic lesions and normal skin [153]. In a small trial (n=42) on psoriatic skin, 0.025% capsaicin cream was demonstrated to downregulate HIF-1α (hypoxia-inducible factor-1α) gene translation, thus inhibiting keratinocyte proliferation [154].

Other Herbal Treatments

A cosmetic cream containing Achillea millefolium extract, Calendula officinalis extract, and Salvia officinalis essential oil (Dermavit cream) was applied to 30 patients for 60 days. While there was no placebo group in this study, 63.3% of patients reported satisfactory improvement in psoriasis symptoms and only one patient reported no change [155]. Calendula officinalis has been demonstrated to have anti-inflammatory properties by inhibiting nitric oxide production in mouse cells [156].

A topical oleogel containing 47.5% Matricaria chamomilla L. oil, 47.5% Cucurbita pepo L. seed oil, and colloidal silicon dioxide was prepared along with a placebo containing 0.5% each of the M. chamomilla and C. pepo, 5% silicon dioxide, and 94% liquid paraffin to resemble the active gel in texture, color, and smell. The active oleogel resulted in significant improvement in erythema, scaling, thickness, and PSI scores compared to placebo and it was well tolerated with no serious adverse events. Three patients dropped out due to bilateral irritation possibly due to allergic reaction [157].

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Conclusion

Selecting the best course of action for psoriasis treatment requires considering several variables including the intensity and type of psoriasis symptoms; it's critical to customize the course of treatment for the individual psoriasis type. Treatment choices may be influenced by the patient's medical history, including any prior psoriasis treatments. The severity of the psoriasis must be carefully weighed against the treatment's possible side effects and long-term safety. Convenience, cost, and usability are a few examples of significant factors that may affect treatment compliance and overall efficacy.

Prescription drugs are typically recommended for moderate to severe cases of psoriasis, while over-the-counter options might be enough for milder cases. Prescription drugs are specially designed to target the symptoms of psoriasis and often provide faster and more noticeable relief compared to over-the-counter medicines. This is especially true for people with severe psoriasis. Both prescription and over-the-counter medications can have side effects and risks. Prescription drugs may have more serious side effects and need to be closely monitored by a healthcare provider. On the other hand, over-the-counter options are generally considered safe when used as directed, but it's still important to be aware of potential negative effects. Prescription drugs for psoriasis can be expensive, especially with no insurance coverage. Over-the-counter medications are usually cheaper and easier to obtain without a prescription, which makes them a popular choice for those seeking affordable solutions.

Some people prefer the convenience and independence of over-the-counter medications, including herbal treatments, especially if they have mild symptoms or prefer self-care methods. Others may prefer the guidance and expertise of a healthcare provider when taking prescription medications, especially if they have other health conditions or need regular monitoring. To sum it up, it's important to remember that what works for one person may not work for another when it comes to treating psoriasis. It might take some trial and error to find the most effective combination of treatments for the symptoms.

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