



## AN OVERVIEW OF PSORIASIS: AN AUTOIMMUNE DISORDER - PREVENTION TO IT'S CLINICAL APPROACH

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### ABSTRACT

Psoriasis causes the skin to multiply tenfold faster than usual. Red, itchy, scale-covered skin plaques are some of the most common symptoms. Patients with psoriasis may develop psoriatic arthritis, a kind of arthritis. Guttate psoriasis often begins in childhood or early adulthood. Guttate psoriasis is distinguished by smooth, glossy, intense red skin regions without scales. People with psoriatic arthritis frequently develop widespread nail psoriasis. Ninety percent of persons who have it have altered nails. Psoriasis pathogenesis involves inflammation, abnormal epidermis keratinocyte multiplication, excessive proliferation, and alterations in the skin's immune system. An immune response dysfunction is what causes inflammation. Psoriasis is often passed on via families, however it can occur throughout several generations. Because the immune system is compromised in psoriasis, stimuli such as cold, dry weather, and stress exacerbate symptoms. Purplish-colored patches with grey scales on very black skin have been seen in the African American population. While there is no cure for psoriasis, therapy can considerably lessen symptoms, especially in severe situations. The physician creates a treatment plan based on the location of the rash, age, overall health, and other considerations. Retinoids and steroids are given as creams, ointments, gels, and so forth. For people with mild to severe psoriasis, there are several therapy options available. This article provides an overview of the many kinds of psoriasis, pathogenesis, diagnosis, consequences, prevention, and potential therapies.

**KEYWORDS:** Psoriasis, Immune system, Erythrodermic, Keratinocyte, Plaques.

### INTRODUCTION

Psoriasis is a persistent caused by the immune system inflammatory skin condition that affects around 2-3% of the world's population. It is distinguished by colored, scaly plaques which can form on numerous regions of the body, bringing substantial physical and psychological distress to those affected. Psoriasis etiology includes intricate interplay between genetic, immunological, and environmental variables, which result in dysregulated

immune systems and excessive keratinocyte proliferation.<sup>[1]</sup> Over time, enormous development has been made toward comprehending the underlying processes of psoriasis, resulting in the development of several therapeutic strategies.

Current psoriasis management options attempt to reduce symptoms, enhance quality of life, and limit disease progression. These techniques include topical treatments,

phototherapy, systemic medicines, and biologic drugs that target particular immune pathways.<sup>[2]</sup> Despite advances in psoriasis care, several difficulties and unmet requirements remain.<sup>[3]</sup> Some medicines have limited usage and efficacy due to adverse effects, treatment resistance, long-term safety concerns, and exorbitant prices. Furthermore, the heterogeneity in treatment response across people emphasizes the necessity for individualized and tailored methods to psoriasis care. Emerging developments and future prospects in psoriasis therapy show promise for better results.<sup>[4]</sup> These include the creation of innovative biologic medicines that target novel pathways, the investigation of combination treatments to improve efficacy while reducing adverse effects, the use of biomarkers for therapy selection and monitoring, and the progress of gene- and cell-based therapies.

## TYPES OF PSORIASIS

### 1. Guttate (gut-tate) psoriasis



If someone develops this kind of psoriasis, small pimples emerge on the skin very quickly. The pimples typically cover most of the chest, legs, and arms. Sometimes the lumps appear on the cheeks, scalp, and ears.<sup>[5]</sup> The bumps, regardless of where they develop, are often tiny and scaly, salmon-colored to pink, and transient, disappearing up in a few weeks or months without therapy.

Guttate psoriasis may not reappear after it has cleared. It's still unclear why this happens. Guttate psoriasis typically develops in children and young people who have had an illness such as strep throat. It is conceivable that guttate psoriasis will resolve when the infection resolves.<sup>[6]</sup>

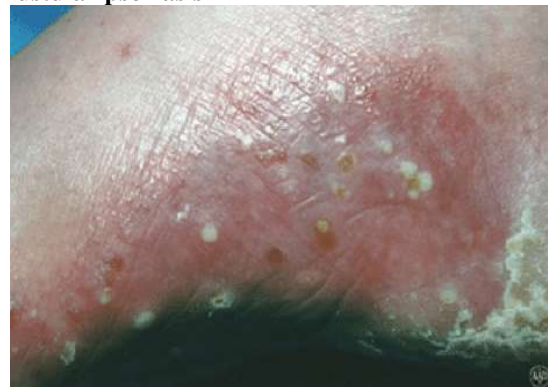
### 2. Plaque (plack) psoriasis



Approximately 80% to 90% of patients with psoriasis acquire this type. Plaque psoriasis causes a variety of symptoms, including thick, raised skin patches known as plaques, scale (a dry, thin, and white in color layer that covers certain plaques), opaques of various sizes, and smaller plaques merging together to form bigger plaques.<sup>[7]</sup>

Plaques typically occur on the scalp, knees, elbows, or lower back, although they can appear elsewhere on the skin. Plaques are prone to itching, but avoid scratching. Scratching might make the patches thicker.<sup>[8]</sup> Dermatologists advocate treating psoriasis to relieve the itching.

### 3. Pustular psoriasis



This kind of psoriasis produces pus-filled pimples that often occur on hands and feet. The pus-filled pimples may appear to be infectious, although the skin is not. The bumps are free of germs and other potential infection-causing agents. When pustular psoriasis emerges, patients may observe red, swollen skin speckled with pus-filled bumps, highly uncomfortable or painful skin, and brown spots (and sometimes scale) appearing when the pus-filled lumps dry up.<sup>[9]</sup>

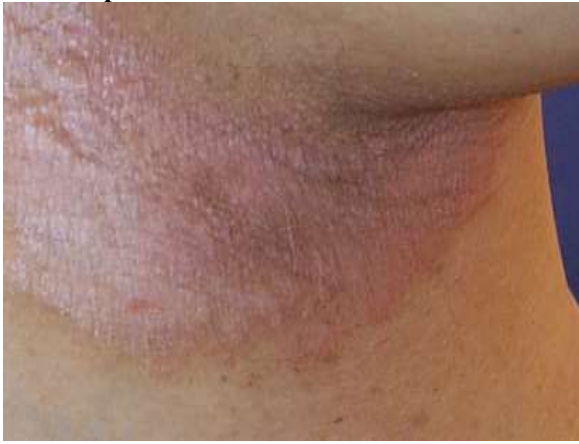
### 4. Pustular psoriasis (generalized)



This unusual form of psoriasis causes pus-filled pimples to appear on much of the skin.<sup>[10]</sup> A flare-up, also known as von Zumbusch psoriasis, produces the following events.<sup>[11]</sup>

- Skin on much of the body becomes dry, red, and painful.
- Within hours, pus-filled pimples cover the majority of the skin.
- Pus-filled pimples often rupture within a day, leaking pus over the skin.
- As the pus dries (typically within 24 to 48 hours), the skin peels, as depicted in this image.
- When dry skin peels off, it reveals a smooth, glazed surface.
- In a few days or weeks, you may notice a new crop of pus-filled lumps covering the majority of the skin, as the cycle repeats.

### 5. Inverse psoriasis



The additional names for this form of psoriasis are intertriginous psoriasis and flexural psoriasis. This kind of psoriasis occurs where skin meets skin, such as the armpits, genitals, and buttock creases. Many signs of inverse psoriasis may occur, including smooth, red areas of skin that appear raw, a lack of silvery-white layer, and uncomfortable or painful skin.<sup>[12]</sup>

### 6. Nail psoriasis



Although numerous individuals associate psoriasis with the skin, it can manifest itself elsewhere in the body.

Many patients with psoriasis see symptoms of the condition on their nails. Fingernails and toenails may alter as a result of psoriasis. Approximately 50% of persons with plaque psoriasis see psoriasis on their fingernails at some time.<sup>[13]</sup> The following symptoms may arise in this kind of psoriasis.<sup>[14]</sup>

- Tiny dents in nails.
- Buildup of skin cells beneath one or more nails, which lifts up the nail.
- White, yellow, or brown discoloration under one or more nails.
- A nail lifting up so that it's no longer attached.

### 7. Erythrodermic psoriasis



This kind of psoriasis demands prompt medical attention. If somebody gets erythrodermic psoriasis, they may notice the following symptoms: scorched skin on the majority of their body, chills, fever, and a general appearance of illness, muscular weakness, a quick pulse, and intense itch.<sup>[15]</sup>

### PATHOPHYSIOLOGY

Psoriasis pathogenesis is multifaceted, with genetic, immunological, and environmental components all playing roles. It is classified as an autoimmune illness in which a person's immune system causes a persistent, excessive inflammatory reaction in the skin.<sup>[16]</sup>

There is a hereditary tendency to psoriasis. Several genes linked to the illness have been identified, including the PSORS1 gene, which is seen in a significant number of family instances of psoriasis. These genes affect immune system function and inflammation.

Inflammation in psoriasis begins with the stimulation of the immune system's cells such as T lymphocytes. T cells normally assist the body protect itself against infection and illness. However, in psoriasis, these T cells become inappropriately activated and produce inflammatory mediators that include cytokines and chemokines.<sup>[17]</sup>

TNF- $\alpha$  is the major cytokine implicated in the pathophysiology of psoriasis. This cytokine contributes

significantly to the inflammation & abnormal proliferation of cells seen in psoriasis. Furthermore, there has been an increase in the production of additional cytokines like interleukin-17 (IL-17), interleukin-23 (IL-23), and interleukin-22 (IL-22), all of which are implicated in inflammation and cell hyperproliferation.<sup>[13,18]</sup>

A discrepancy in the control of these cytokines, along with an aberrant immunological response, activates skin cells such as keratinocytes. Keratinocytes are the epidermis' primary cells that help construct the skin barrier.<sup>[19]</sup> Psoriasis is characterized by excessive keratinocyte proliferation and accumulation in the skin's outermost layer, resulting in scaly plaques. Keratinocyte hyperproliferation is mediated by the interaction of inflammatory cytokines with receptors on the cells' surfaces.

## DIAGNOSIS

### 1. Physical Examination

A doctor who specializes in dermatology examines the skin and records the position, distribution, size, shape, and appearance of lesions.<sup>[8,20]</sup> During a physical exam, the doctor may inquire about symptoms & history of illness, such as if anybody in the immediate family has been confirmed to have psoriasis.

The doctor also inquires as to when the skin lesions initially occurred, if they come and go, are itchy or uncomfortable, and whether the patient experiences joint discomfort or swelling. If the patient has previously been diagnosed and treated for psoriasis, they must inform the doctor about their treatment history so that the doctor may offer the most appropriate treatment alternatives.

Telling your doctor about any other ailments you've been diagnosed with and whether you're taking any medications might also assist with psoriasis diagnosis. HIV and AIDS can damage the immune system, increasing the risk of psoriasis.<sup>[21]</sup>

### 2. Skin Biopsy

Dermatologists can often diagnose psoriasis simply by examining the skin. A skin biopsy may be necessary to confirm the diagnosis and rule out other potential causes of symptoms, such as eczema or cutaneous lupus. A biopsy is a procedure in which a pathologist analyzes skin cells under a microscope to see if psoriasis is the source of symptoms.<sup>[16, 22]</sup> Dermatologists frequently perform a punch biopsy. The term "punch" refers to the method in which your doctor punctures the skin using a device the size and shape of a pencil and removes a tiny tissue sample. A circular incision is closed with one or two stitches.<sup>[23]</sup>

## COMPLICATIONS

Most psoriasis patients have no evident explanation for a flare-up at any one moment. However, some people's

psoriasis is more prone to flare up under specific settings. This includes the following.

### 1. Smoking

Smoking may cause psoriasis to develop in certain people and exacerbate pre-existing psoriasis. Stopping smoking can not only improve your psoriasis, but will also lower your risk of heart disease and stroke.<sup>[24]</sup>

### 2. Infections

Certain infections might induce a flare-up of psoriasis. A painful throat produced by Streptococcus bacteria can trigger a flare-up of guttate or chronic plaque psoriasis.

### 3. Obesity and overweight

Obesity or overweight increases the risk and severity of psoriasis. Losing weight may help overweight persons with psoriasis.<sup>[25]</sup>

### 4. Stress

Stress appears to cause a flare-up of psoriasis in certain individuals. There is also evidence that stress management might be beneficial in some cases.<sup>[26]</sup>

### 5. Medication

Certain drugs may cause or aggravate psoriasis in some situations. Certain medications, including as beta-blockers (e.g. propranolol, atenolol), antimalarials, lithium, anti-inflammatory drugs (e.g. ibuprofen, naproxen, diclofenac), ACE inhibitors, and antibiotics, have been linked to this. In other circumstances, the psoriasis may not flare up until many weeks or months after starting the medicine.<sup>[28]</sup>

### 6. Alcohol

Consuming an excessive amount alcohol may trigger an episode in certain people.

### 7. Hormonal changes

Women's psoriasis often worsens around adolescence and menopause. Female hormone levels undergo significant alterations throughout this period. Some pregnant women with psoriasis find that their symptoms lessen during pregnancy, but they may flare up again in the months following childbirth.<sup>[29]</sup>

### 8. Trauma

Skin injury, such as excessive scratching, can cause a psoriasis patch to grow. Köbner's response refers to the formation of psoriatic plaques in areas of injured skin.<sup>[1,30]</sup>

### 9. Sunlight

Most patients with psoriasis report that sunshine helps to alleviate their symptoms. Many people find that their psoriasis is easier to manage throughout the summer. However, some patients report that intense sunlight exacerbates their psoriasis. Severe sunburn (a skin damage) can potentially cause a psoriasis flare-up.<sup>[22, 31]</sup>

## PREVENTION

### 1. Proper Diet

Although studies have shown no link between food and psoriasis, several doctors recommend that individuals with this illness eat a well-balanced diet rich in fruits and vegetables. Some people find that eliminating dairy or gluten from their diet improves their symptoms. Exercising can assist much. According to certain research, excess weight might exacerbate flares, so strive to keep a healthy weight.<sup>[32]</sup>

### 2. Taking Care of Skin and Scalp

Never pick at psoriasis patches or scales, since this may aggravate the illness. Please take careful when cutting nails. If you have psoriasis, massage topical treatments like tar shampoos into your scalp.<sup>[33]</sup> Continuous baths with soothing chemicals, such as tar solutions, may also help.

### 3. Avoid hot & frigid climates.

Psoriasis can be highly influenced by the weather. Cold, dry weather aggravates symptoms for many people. It usually improves when it's hot outside, but not always.<sup>[34]</sup>

### 4) Humidifier

It is crucial to maintain the skin hydrated at all times. When the air in your home feels dry, turn on the humidifier.

### 5. Avoid medications that cause flare-ups.

Inquire with your doctor about the pharmaceuticals you are taking, including over-the-counter medications. Determine whether they can influence psoriasis. Lithium, a medicine used to treat psychiatric illnesses, and propranolol, as well as other beta receptor blockers suggested for cardiac diseases, have a history of worsening symptoms. Quinidine is a cardiac rhythm medication.<sup>[35-39]</sup>

### 6. Apply moisturizing lotions.

Skin dryness exacerbates symptoms, therefore applying creams and lotions to keep it moist will be useful. Typically, thick, oily materials such as petroleum jelly perform well. They are more effective in trapping moisture under the skin. Apply lotion to the scales to help in their removal, then wrap the area with plastic wrap or similar water-resistant material. Leave this on for a few hours before removing.<sup>[40,41]</sup>

### 7. Prevent scrapes, cuts, bumps, and infections.

Avoid skin damage, such as bumps and wounds, as they might cause a flare up known as "Koebner's phenomenon." These can raise the risk of infection. Be especially cautious when shaving. Avoid chafing and infection, and do not get a tattoo or acupuncture.<sup>[42]</sup>

### 8. Manage stress.

Although flare-ups have not been related to stress, many individuals assume they are. So, try to avoid stimuli that

cause anxiety. Always attempt soothing approaches such as meditation or yoga.<sup>[43]</sup>

### 9. Quit Alcohol

Alcohol consumption can be extremely dangerous when combined with psoriasis therapy since it interacts with the metabolism of some medicines. Though the link between alcohol and psoriasis is unknown, it is widely accepted that drinking might exacerbate the symptoms.

### 10. Sun in the limit

UV spectrum light inhibits skin cell multiplication, therefore sitting in the sun for a short period of time to receive just enough doses is good. A maximum of 20 minutes is sufficient. The use of sunscreen is critical for the skin. Sunburn triggers psoriasis and increases the risk of cancer. Some medicines increase the skin's sensitivity to UV radiation. It is suggested that you use medications that have been validated by your doctor.<sup>[44]</sup>

## TREATMENT

Psoriasis therapies try to prevent skin cells from developing too fast and to eliminate scales. Topical lotions and ointments, light treatment (phototherapy), and oral or injectable drugs are all options. The therapies you utilize are determined by the severity of the psoriasis and the response to previous therapy and self-care practices.

### 1. Topical therapy

- **Corticosteroids.** These medicines are the most commonly recommended for treatment of mild to moderate psoriasis. They are available in various forms, including oils, ointments, creams, lotions, gels, foams, sprays, and shampoo. Mild corticosteroid ointments (hydrocortisone) are often indicated for delicate regions such as the face or skin folds, as well as for treating large patches. Topical corticosteroids may be used once per day during flares and on alternate days or weekends during remission.<sup>[20, 45]</sup>
- **Retinoids.** Tazarotene (Tazorac, Avage, others) is available as a gel or cream. It's applied once or twice daily. The most common side effects are skin irritation and increased sensitivity to light.<sup>[46, 47]</sup>
- **Calcineurin inhibitors.** Calcineurin inhibitors, such as tacrolimus (Protopic) and pimecrolimus (Elidel), alleviate the rash and minimize scaly accumulation. They are especially useful in places with thin skin, such as around the eyes, where steroid creams or retinoids are unpleasant or dangerous.<sup>[17]</sup>
- **Coal tar.** Coal tar alleviates scaling, irritation, and inflammation. It is available in both nonprescription and prescription strengths. It comes in numerous forms, including shampoo, cream, and oil. These products may irritate the skin. They are also untidy, causing stains on clothing and bedding and emitting a strong stink.<sup>[48]</sup>
- **Salicylic acid.** Shampoos and scalp treatments containing salicylic acid minimize scalp psoriasis

scaling.<sup>[49]</sup> They are available in both nonprescription and prescription levels. This sort of treatment can be used alone or in conjunction with other topical therapies since it prepares the scalp to absorb drugs more effectively.

- **Vitamin D analogs.** Synthetic versions of vitamin D, such as calcipotriene (Dovonex, Sorilux) and calcitriol (Vectical), inhibit skin cell proliferation. This medicine can be used alone or in combination with topical corticosteroids. Calcitriol may reduce irritation in sensitive regions. Calcipotriene and calcitriol are often more costly than topical corticosteroids.<sup>[50]</sup>

## 2. Light therapy

The use of light is the initial therapy for moderate to severe psoriasis, either alone or in conjunction with medicines. It entails exposing the skin to regulated levels of natural or artificial light. Repeated treatments are required. Consult your healthcare physician to see how much home phototherapy is a possibility for you.<sup>[6]</sup>

- **Goeckerman Therapy.** The Goeckerman therapy combines coal tar treatment with light therapy. This can be more effective since coal tar increases skin sensitivity to ultraviolet B (UVB) radiation.<sup>[51]</sup>
- **Sunlight.** Heliotherapy, or brief daily exposure to sunshine, may help with psoriasis. Before starting a sunshine program, consult your doctor about the healthiest approach to utilize natural light for psoriasis therapy.
- **Psoralen plus ultraviolet A (PUVA).** To cure, use psoralen, a light-sensitizing drug, before exposing the afflicted skin to UVA rays. Psoralen enhances the skin's response to UVA radiation, which penetrates deeper than UVB light.
- **UVB broadband.** Controlled dosages of UVB radiation from an artificial light source can cure psoriasis spots, extensive psoriasis, and psoriasis that does not respond to topical therapy. Short-term side effects may include inflamed, itchy, or dry skin.<sup>[52]</sup>
- **UVB narrow band.** UVB narrowband light therapy may be more successful than UVB broadband treatment. In many cases, it has supplanted broadband treatment. It is often given twice or three times each week until the skin recovers, then less frequently for maintenance therapy. However, narrowband UVB phototherapy may result in more severe adverse effects than UVB broadband.<sup>[52]</sup>

## 3. Oral or injected medications

- **Retinoids.** Retinoids, such as acitretin, are tablets that inhibit skin cell formation. Side effects may include dry skin and muscular discomfort. These medicines are not suggested if you are pregnant, nursing, or plan to become pregnant.
- **Methotrexate.** Methotrexate (Trexall), which is usually given once a week as an oral dosage, reduces skin cell formation and inhibits inflammation. It is less effective than both adalimumab and infliximab.

It may induce upset stomach, lack of appetite, and weariness. People who take methotrexate on a long-term basis require continuous tests to evaluate their blood count and liver function.<sup>[53,27]</sup>

- **Biologics.** These medications, often taken via injection, break the disease cycle and alleviate symptoms within weeks. Several of these medications are licensed for the treatment of moderate to severe psoriasis in persons who have not responded to first-line treatments. Premilast (Otezla), etanercept (Enbrel), infliximab (Remicade), adalimumab (Humira), ustekinumab (Stelara), secukinumab (Cosentyx), ixekizumab (Taltz), guselkumab (Tremfya), tildrakizumab (Ilumya), and certolizumab (Cimzia) are all options. Three of them—etanercept, ixekizumab, and ustekinumab—are licensed for children. These medications are costly and may or may not be covered by health insurance policies.<sup>[54]</sup>
- **Cyclosporine.** Cyclosporine, when taken orally to treat severe psoriasis, inhibits the immune system. It works similarly to methotrexate but cannot be administered for longer than a year. Cyclosporine, like other immunosuppressant medicines, raises the risk of infection and other health issues, including cancer. People who use cyclosporine on a long-term basis must have regular blood pressure and renal function tests.
- **Steroids.** If you have a few tiny, persistent psoriasis spots, your doctor may recommend an injection of triamcinolone directly into them.<sup>[39]</sup>
- **Other Medicines.** When other treatments are not tolerated, thioguanine and hydroxyurea might be utilized. Talk to your doctor about the potential negative effects of these medications.<sup>[55]</sup>

## CONCLUSION

To summarize, psoriasis is a complicated skin illness that has serious physical and emotional consequences for those who suffer from it. Although we have made progress in understanding the underlying processes and developing therapeutic alternatives, there are still hurdles in reaching optimal results. New biologic medicines targeting particular pathways, including IL-23 inhibitors like mirikizumab and ROR $\gamma$ t inhibitors, show promise for treating psoriasis. These agents have the potential for improved effectiveness and disease control. Topical therapy advancements, notably with microneedles & nanoparticle-based carriers, show promise for enhancing medication delivery and treatment efficacy for psoriasis. These novel techniques may result in more focused and efficient medicines, with fewer side effects and better patient adherence. The discovery and validation of biomarkers utilizing multi-omics technology are critical steps toward customized treatment strategies. Biomarkers can assist predict therapy response, monitor disease activity, and guide therapeutic decisions, resulting in more personalized and successful treatment regimens. Collaboration among researchers, doctors, and industry stakeholders is crucial for translating promising

findings into clinical application. Furthermore, tackling the difficulties of medication resistance, side effects, and high expenses is critical in enhancing psoriasis care. We are able to make considerable progress in psoriasis control by embracing innovative techniques, encouraging cooperation, and personalizing therapies to individual requirements. Ultimately, this will lead to improved results and a higher quality of life for people suffering from this persistent skin disorder.

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