

A Review on treatment and natural sources for management of psoriasis.

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Abstract

Psoriasis is an inflammatory skin disease characterized by scaling and inflammation (pain, swelling, warmth and redness), resulting in thick, red skin covered with silvery scales. These spots may be itchy or painful. Systemic therapy, topical therapy, and light therapy are now used to treat psoriasis. These treatments have a number of negative and potentially fatal side effects. Psoriasis patients are more likely to develop other conditions such as psoriatic arthritis, anxiety and depression, cancer, metabolic syndrome, cardiovascular disease, and Crohn's disease. Most people use herbal medicine because it is readily available, affordable and effective. Many plants have promising properties, including remarkable results in the treatment of psoriasis. [1]. The aim of this study is understand the pathogenesis, different treatment and highlight natural sources, herbal preparation and related therapies that could add value to the development of better, effective and safe formulation for the treatment of psoriasis that can help new researchers and students in this field.

Keywords: psoriasis, immunological disorder, topical therapy, herbal treatment, pathogenesis.

Introduction

Psoriasis is an immunological disorder manifesting as localized or widespread erythematous scaling lesions or plaques. Psoriasis is a chronic, non-communicable, painful, disfiguring and disabling disease for which there is no cure and with great negative impact on patients' quality of life. Active pharmaceutical ingredients (drug) can diminish the lesions, but cannot cure the disease. [2] Emollients, keratolytics, antifungals afford variable symptomatic relief and used as topical therapy. Corticosteroids are primary in the treatment of psoriasis disease topically. Etiology of this chronic condition is not clear. Stress is the most common etiological factor and patients with chronic disorders like Crohn's disease are more likely to suffer from psoriasis. [3]. The normal cell growth and cell maturity observed in twenty-eight to thirty days, but the skin of affected area by psoriasis, cells are days and never fully mature. [4]

Types of psoriasis

- 1) Plaque psoriasis
- 2) Guttate psoriasis
- 3) Inverse psoriasis
- 4) Pustular psoriasis
- 5) Erythroderma psoriasis [5]

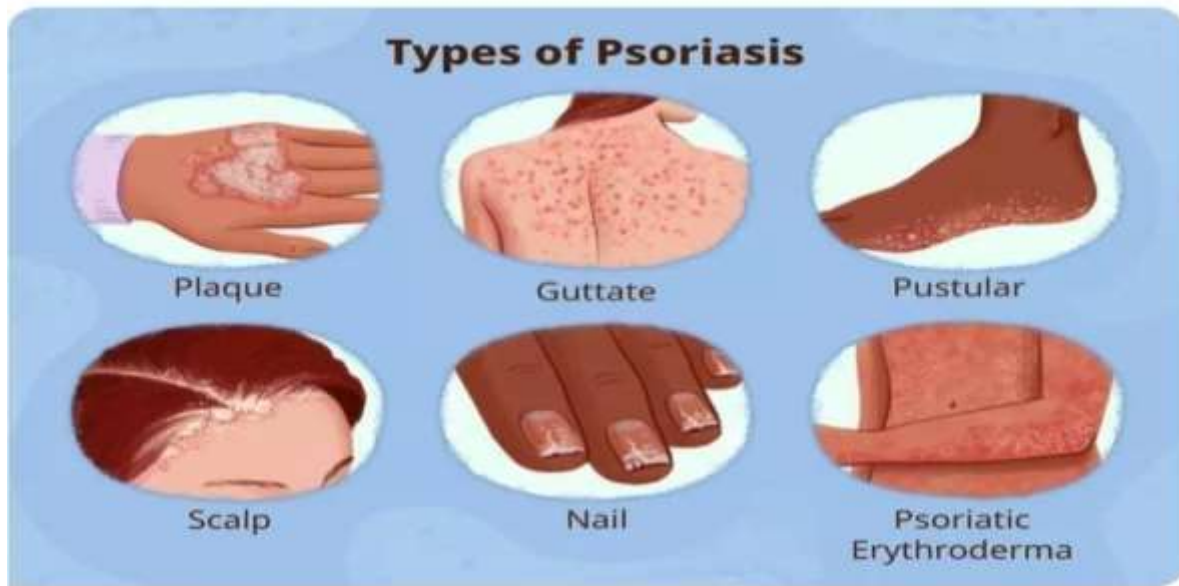


Fig: 1 Types of psoriasis [6]

Occurrence

Psoriasis affect both males and female with earlier onset, in female and those with family history. Its age of onset Shows a bimodal distribution with peaks at 30-39 years and 60-69 year men , 10 yearsearlier in women.[7]

Causes

Imbalance of bacteria is due to following reasons:

- 1) Due to use of antibiotics
- 2) Hormone imbalance
- 3) Poor eating habit
- 4) Genetics
- 5) The immune system.[5]

Symptoms

- 1) Skin abnormalities comprise a deep red along with peeling or splitting skin.
- 2) Itching
- 3) Scaly skin
- 4) Irritation and redness
- 5) Swelling
- 6) Blister [5]

Pathogenesis

Psoriasis is a hyperproliferative skin disease in which epidermal turnover is increased. The pathogenesis of psoriasis involves the interaction of cellular mechanisms and interactions between T cells, antigen-presenting cells (APC), keratinocytes, Langerhans cells, macrophages, natural killer cells, several Th1-type cytokines, and certain growth factors such as Angi-

Endothelium growth factor (VEGF), keratinocyte growth factor (KGF), etc. is said to play a key role in the Pathogenesis of psoriasis. Is an immunologically mediated disease, activation of T-lymphocytes causes inflammation of the skin. Component and second, epidermal hyperproliferation is also associated with inflammatory events. It is assumed that different mechanisms are involved in the pathogenesis of psoriasis:

- T cell function
- The role of the dendritic cell
- Hyperproliferation of keratinocyte disease
- Angiogenesis
- Cytokine mediators:
- Reduced apoptosis
- Genetic factors
- Role of oxidants and antioxidants in psoriasis

1) T cell function:

The primary function of T cells is to recognize processed peptide antigens associated with proteins encoded by MHC class II genes. Therefore, for activation, T cells require APCs to process and present peptide fragments on the cell surface of the APC. T cells secrete various lymphokines. T cells can also suppress immune responses; in this role they are called suppressor T cells. Different T cell populations express different cell membrane proteins. The majority of helper T cells are CD4-positive, while cytolytic and suppressor cells are CD8-positive. Activation of T cells requires three

steps:

- a. Bonding
- b. Antigen-specific activation (signal 1)
- c. non-antigen-specific cell-cell interaction (signal 2)

2) The role of dendritic cells.

Dendritic cells are the main class of antigen-presenting cells that are increased in psoriatic skin. Too bad Langerhans cells are a type of immature dendritic cell (IDC) found in normal epidermis and can also be found in psoriatic lesions. These IDCs are stimulated to further develop into mature DCS (mDCs).

Psoriasis lesions show a significant increase in DCs in the skin. Myeloid DCs expressing XIIIa and CD11c or CD83 and DC-LAMP proteins are positive for MDC

3) Hyperproliferation of keratinocytes

The skin provides a protective mechanism with its multi-layered structure. The epidermis. Consists of five layers: stratum Basale, spinosum, granulosum, lucidium and stratum corneum.

Keratinocytes are mostly formed basally and migrate further into the stratum corneum. As the cells. Move to the surface, their organelles disappear and become filled with keratin. The top layer of keratin Provides a protective property. Under normal conditions, the epidermal cell cycle is completed in about Four weeks. However, in psoriatic skin, the epidermal cell cycle accelerates. Cell division in the basal Layer occurs every 1.5 days, and keratinocytes migrate to the stratum corneum every 4 days. This causes. Hyperproliferation of keratinocytes.

4) Angiogenesis

Keratinocytes produce pro-angiogenic cytokines (VEGE, but the exact mechanism of Angiogenesis in psoriasis is still not known. In psoriasis, endothelial cells swell and become activated. These activated endothelial cells migrate, sprout and form structural support with basement membrane pericytes to form). New blood vessels. 115) This leads to an expansion of intercellular spaces. And thus, the blood vessels of the skin become larger, which facilitates the transfer of leukocytes to the skin.

5) Cytokine mediators

In psoriasis, the production of cytokines leads to hyperproliferation of the epidermis, dilation of blood vessels and inflammation of the skin. Cytokines involved in the development of psoriasis include granulocyte-macrophage colony-stimulating factor (GMCSF), epithelial growth factor (EGF), II-8,11-12, IL-1, IL-6, IFN- γ , and TNF- α . These cytokines lead to keratinocyte proliferation, neutrophil migration, enhancement of Th-type responses, angiogenesis, upregulation of adhesion molecules, and epidermal hyperplasia.

6) Decreased apoptosis

To maintain a constant thickness of the epidermis, keratinocyte proliferation is regulated by apoptotic cell death in the normal epidermis. The epidermal hyperplasia characteristic of psoriasis is thought to result from overexpression of P53, and these proliferative cells normally express Bcl-2, which protects them against apoptotic stimuli, while terminally differentiated cells lose Bcl-2 expression.

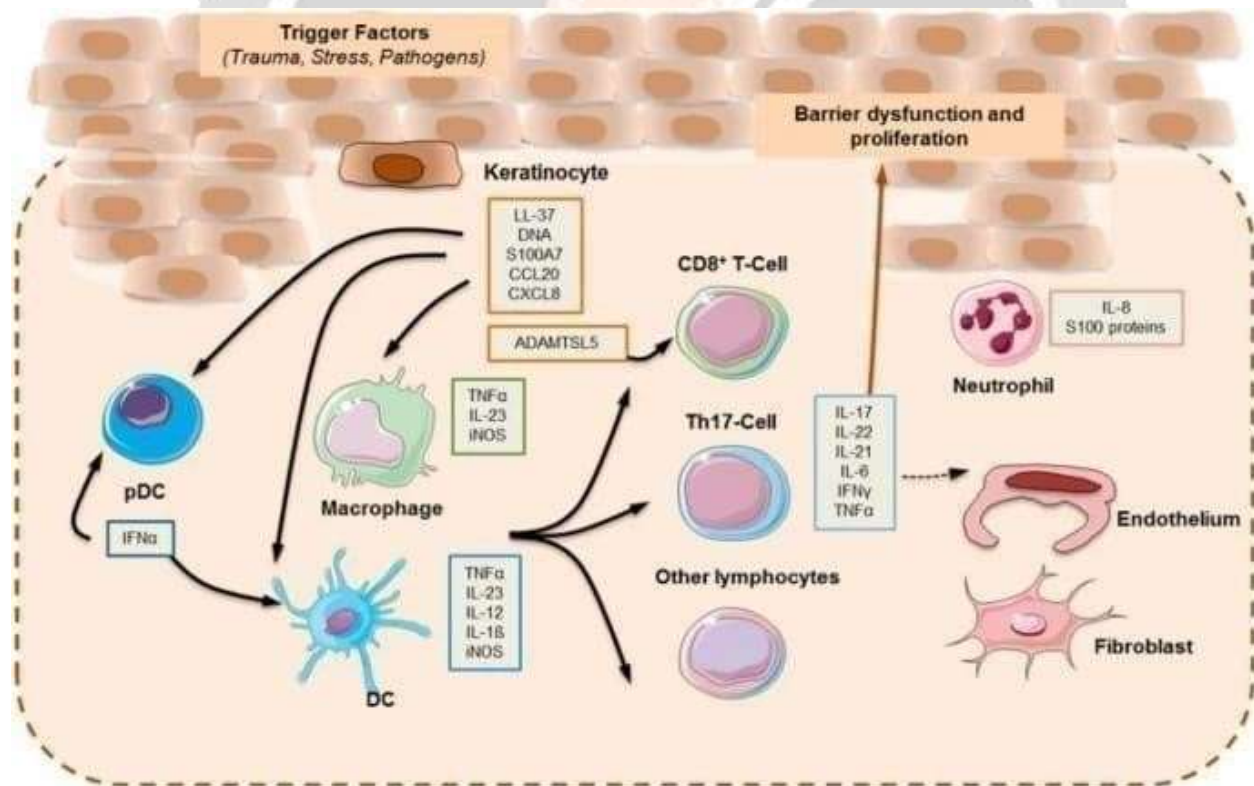


Fig: 2 Pathogenesis of psoriasis [8]

Different treatment of psoriasis

The goal of psoriasis treatment is to prevent rapid growth of skin cells and eliminate dandruff. Options include ointments and creams (topical treatment), phototherapy (light therapy), and oral or injectable medications.

The treatments used depend on how severe your psoriasis is and how it has responded to previous treatments and self-care measures. You may need to try different medications or a combination of different treatments before you find the right approach. Despite successful treatment, the disease usually returns.

- 1) Topical therapy
- 2) Light therapy
- 3) Oral or injectable medications

1) Topical therapy

a) Corticosteroids:

These medications are the most commonly prescribed medications for mild to moderate psoriasis. They are available as oils, creams, lotions, gels, foams, sprays and shampoos. A mild corticosteroid cream (hydrocortisone) is usually recommended for sensitive areas such as the face or skin folds and for generalized blemishes. Topical corticosteroids can be used once a day during a flare and on alternate days or during remission.

A healthcare provider may prescribe a stronger corticosteroid cream or ointment, such as triamcinolone (Triamex) or clobetasol (Cormax, Temovate, others), for smaller or harder-to-treat areas. Heavy prolonged use or excessive use can thin the skin. Over time, topical corticosteroids may stop working.

Drawbacks

1. Potential side effects of topical steroids include skin damage such as thinning of the skin due to changes in pigmentation, easy stretch marks, redness and dilated blood vessels.
2. Patients do not receive treatment or do not consult a doctor in time.
3. Redness
4. Itching
5. Red sores
6. Rashes
7. Psoriatic arthritis, which causes pain, stiffness and swelling in and around the joints. Where plaques have healed.
8. Temporary changes in skin color (post-inflammatory hypopigmentation or hyperpigmentation)
9. Nails that are pitted, split or chipped

b) Vitamin D analogues:

Synthetic forms of vitamin D, such as calcipotriene (Dovonex, Sorilux) and calcitriol (Vertical) – slow down the growth of skin cells. This type of medication can be used alone or in combination with

topical corticosteroids. Calcitriol causes less irritation in sensitive areas. Calcipotriene and calcitriol are generally more expensive than topical corticosteroids.

c) Retinoids:

Tazarotene (Tazorac, Avage, others) is available as a gel or ointment. Its applied once or twice a day. The most common side effects are skin irritation and increased sensitivity of light. Tazarotene is not recommended if you are pregnant, breastfeeding or planning to become pregnant.

d) Calcineurin inhibitors:

Calcineurin inhibitors, such as tacrolimus (Protopic) and pimecrolimus (Elidel) – calm the rash and reduce scaling. They can be especially useful in areas of thin skin, such as around the eyes, where steroid creams or retinoids are irritating or harmful.

Calcineurin inhibitors are not recommended if you are pregnant, breastfeeding or planning to become pregnant. Also, this drug is not intended for long-term use because it increases the risk of skin cancer and lymphoma.

e) Salicylic acid:

Salicylic acid shampoos and scalp answers lessen the scaling of scalp psoriasis. They are to be had in nonprescription or prescription strengths. This sort of product can be used on my own or with different topical therapy, because it prepares the scalp to take in the medicine extra easily.

f) Coal tar:

Coal tar reduces scaling, itching and inflammation. It's to be had in nonprescription and prescription strengths. It is available in numerous forms, together with shampoo, cream and oil. This merchandise can worsen the skin. They're additionally messy, stain garb and bedding, and might have a robust odor. Coal tar remedy isn't always advocated while you are pregnant or breastfeeding.

g) Anthralin:

Anthralin is a tar cream slows pores and skin cell growth. It also can eliminate scales and make pores and skin smoother. It's now no longer supposed to be used at the face or genitals. Anthralin can worsen pores and skin, and it stains nearly whatever it touches. It's commonly carried out for a brief time after which washed off.

2) Light therapy:

Light therapy is a primary line remedy for slight to excessive psoriasis, both on my own or in mixture with medications. It includes exposing the pores and skin to managed quantities of herbal or synthetic light. Repeated remedies are necessary. Talk together along with your fitness care issuer approximately whether or not domestic phototherapy is an alternative for you.

a) Sunlight:

Brief, each day exposures to daylight (heliotherapy) would possibly enhance psoriasis. Before starting a daylight regimen, ask your fitness care company approximately the most secure manner to apply herbal mild for psoriasis treatment.

b) Goeckerman therapy:

A technique that mixes coal tar remedy with mild remedy is referred to as the Goeckerman remedy. This may be greater powerful due to the fact coal tar makes pores and skin greater attentive to ultraviolet B (UVB) mild.

c) UVB broadband:

Controlled doses of UVB broadband mild from a synthetic mild supply can deal with single psoriasis patches, huge psoriasis and psoriasis that does not enhance with topical treatments. Short-time period facet results may encompass inflamed, itchy, dry skin.

d) UVB narrowband:

UVB narrowband mild remedy is probably greater powerful than UVB broadband treatment. In many locations it has changed broadband remedy. It's commonly administered or 3 instances every week till the pores and skin improves after which much less often for renovation remedy. But narrowband UVB phototherapy might also additionally motive greater intense aspect consequences than UVB broadband.

e) Psoralen plus ultraviolet A (PUVA):

This remedy includes taking a mild-sensitizing medication (psoralen) earlier than deeper into the pores and skin than does UVB mild, and psoralen makes the pores and skin extra conscious of UVA exposure. Exposing the affected pores and skin to SUVA mild. UVA mild penetrates. This extra competitive remedy continuously improves pores and skin and is frequently used for extra-intense psoriasis. Short-time period facet outcomes would possibly encompass nausea, headache, burning and itching. Possible long-time period facet outcomes encompass dry and wrinkled pores and skin, freckles, multiplied solar sensitivity, and multiplied chance of pores and skin cancer, along with melanoma.

f) Excimer laser:

With this shape of mild remedy, a robust UVB mild most effective the affected skin. Excimer laser remedy calls for fewer periods than does conventional phototherapy due to the fact more effective UVB mild is used. Side results may consist of irritation and blistering.

3) Oral or injected medications:

If you've got mild to intense psoriasis, or if different remedies have not worked, your fitness care issuer can also additionally prescribe oral or injected (systemic) capsules. Some of those capsules are used for best quick intervals and is probably alternated with different remedies due to the fact they've capacity for intense facet consequences.

a) Steroids:

If you've got some small, chronic psoriasis patches, your fitness care issuer would possibly advocate an injection of triamcinolone proper into them.

b) Retinoids:

Acitretin and different retinoids are capsules used to lessen the manufacturing of pores and skin cells. Side consequences would possibly encompass dry pores and skin and muscle soreness. These capsules aren't advocated while you are pregnant or breastfeeding or in case you intend to come to be pregnant.

c) Biologics:

These capsules, generally administered through injection, adjust the immune device in a manner that disrupts the sickness cycle and improves signs and symptoms and symptoms and symptoms of sickness inside weeks. Several of those capsules are permitted for the remedy of mild to Intense psoriasis in folks that have not spoken back to first line therapies. Options encompass apremilast (Otezla), etanercept (Enbrel), infliximab (Remicade), adalimumab (Humira), ustekinumab (Stelara), secukinumab (Cosentyx), ixekizumab (Taltz), guselkumab (Tremfya), tildrakizumab (Illumya) and certolizumab (Cimzia). Three of them etanercept, ixekizumab and ustekinumab – are permitted for children. These kinds of capsules are pricey and might or might not be protected through medical health insurance plans.

Biologics have to be used with warning due to the fact they bring about the threat of suppressing the immune device in approaches that growth the threat of significant infections. People taking those remedies have to be screened for tuberculosis.

d) Methotrexate:

Usually administered weekly as a unmarried oral dose, methotrexate (Trexall) decreases the manufacturing of pores and skin cells and suppresses inflammation. It's much less powerful than adalimumab and infliximab. It may motive dissatisfied stomach, lack of urge for food and fatigue. People taking methotrexate long-time period want ongoing trying out to display their blood counts and liver function. People want to prevent taking methotrexate at the least 3 months earlier than trying to conceive. This drug isn't always encouraged for individuals who are breastfeeding.

e) Cyclosporine:

Taken orally for extreme psoriasis, cyclosporine (Gengraf, Neoral, Sandimmune) suppresses the immune system. It's much like methotrexate in effectiveness however can't be used constantly for greater than a year. Like immunosuppressant pills, cyclosporine will increase the danger of contamination and different fitness problems, which include cancer. People taking cyclosporine long-time period want ongoing trying out to display their blood stress and kidney function. These pills aren't encouraged whilst you're pregnant or breastfeeding or in case you intend to come to be pregnant

f) Other medicinal drugs:

Thioguanine (Tabloid) and hydroxyurea (Droxia, Hydrea) are medicinal drugs that may be used whilst you cannot take different pills. Talk together along with your fitness care company approximately feasible aspect results of those pills.[9]

Natural sources of psoriasis treatments**Sources of Omega-3**

Omega-3 helps reduce psoriasis symptoms by reducing inflammation. When they enter the blood stream, they lubricate the cells of the body. This lubrication can have a healing effect on cells that especially need it, such as brain cells and cells that make joints

This lubrication can also reduce inflammation.

When a person has psoriasis, the immune system tells the skin cells to turn over at an abnormally fast rate. No one knows exactly why this happens. The result is redness, inflammation and patches of dry, scaly skin that can cover almost any part of the body. Taking omega-3 fatty acids can make this inflammation more manageable and less irritating.

Omega-3 fatty acids are often used in conjunction with drug therapy for a wide range of conditions, many of which are autoimmune and inflammatory, including:

1. Rheumatoid arthritis: another autoimmune disease.
2. Crohn's disease: inflammatory bowel disease.
3. Ulcerative colitis: the GIT tract inflammation.
4. Lupus: an autoimmune disease.
5. Atopic dermatitis: skin disease.[10]

Vitamin E

Most symptoms of psoriasis are related to oxidative stress caused by an excess of free radicals. As a powerful antioxidant, vitamin E fights against free radicals and reduces oxidative stress, which can reduce the severity of psoriasis symptoms. Vitamin E is an important nutrient that supports important body processes. As a powerful antioxidant, it fights free radicals that might otherwise damage healthy cells throughout the body, including skin cells. Many of the most common signs of aging are related to free radical damage, including fine lines, wrinkles, dark spots and sagging skin. By reducing the damage caused by free radicals and the inflammation commonly associated with them, vitamin E can play a role in controlling the symptoms of psoriasis. It also aids in the healing process by helping to repair the skin by supporting red blood cells that carry oxygen throughout the body. Although more research is needed, research suggests that antioxidants such as vitamin E can reduce the oxidative stress caused by psoriasis.[11]

Aloe vera



Fig: 3 Aloe vera plant

Aloe barbadensis Miller (also called Aloe Vera Linnaeus) Appears to be a succulent tropical plant in the Liliaceae family. The pulp of an aloe leaf contains 98.5% water, while the gel or glue contains 99.5% water. Carbohydrates, proteins, Mucopolysaccharides, enzymes, anthraquinones, salicylic acid, chromones, vitamins and minerals are also produced. The remaining 0.5-1%. (Aghmiuni 2017). Acemannan and aloe- Emodins are antibacterial agents that can help with psoriasis. In addition, due to keratolytic activity Salicylic acid removes psoriatic plaques. Aloe Vera gel is used to treat psoriasis by reducing redness and scaling. It is used to make topical creams and emulsions. (Choon-hakarn et al. 2010). Aloe vera also has immunomodulatory, antioxidant, anti-inflammatory, antifungal and antitumor properties. It also promotes skin moisture and wound healing by increasing collagen activity. It helps heal psoriatic skin and its negative consequences (Choonhakarn et al. 2010). A randomized trial of 80 subjects with mild to moderate psoriasis vulgaris compared aloe vera with triamcinolone acetonide (TA, 0.1%). The mean Psoriasis Area Severity Index (PASI) score decreased by 7.7 in the aloe vera group and 6.6 in the TA group after eight weeks of treatment. The average value of the Dermatology Life Quality Index (DLQI) in the TA group decreased by 5.8 points, compared to 6.1 points in the Aloe Vera group. Aloe Vera cream was found to be abundant. More efficient (Dhanabalet al. 2011). Extracted aloe vera had 81.95% anti-psoriasis activity in mouse tail models, while tazarotene had 87.94% (Divya et al. 2016). Divya et al. created a topical nanogel with aloe-emodin (an anthraquinone found in Aloe Vera) and acitretin using chitin. Their compatibility with blood has been demonstrated *in vitro*. Perry and mouse tail studies and skin safety studies have demonstrated the compound and its potential effectiveness in the treatment of psoriasis (Rajiv et al. 2019).

Angelica sinensis

Angelica sinensis (Dong Qquai, female ginseng) appears to be a biennial or perennial plant belonging to the Apiaceae family. It is also known as Dong Quy. It has long been used in Traditional Chinese Medicine (TCM). TCM claims that it stimulates and replenishes the blood by correcting deficiencies. Psoralens are used in the treatment of psoriasis because they act as photosensitizers when exposed to UV-A radiation. Patients self-administer PUVA by eating *Angelica sinensis* and then exposing themselves to natural sunlight or UV radiation. After consuming *Angelica sinensis*, UV radiation promotes DNA cross-linking in the epidermis, which slows down the rate of epidermal DNA synthesis (Richard 2020). In addition, they cause mitochondrial dysfunction, Langerhans cell toxicity, generation of reactive oxygen species, and death of keratinocytes and lymphocytes (Sivanesan et al. 2009). In a randomized, double-blind trial, the PASI score was used to evaluate the efficacy of oral psoralen and UV-A in the treatment of plaque psoriasis. After 12 weeks of treatment, two-thirds of patients improved their PASI score by at least 75%, compared to 0% in the placebo plus UV-A group (Kerkhof et al. 2006).

Arrowroot tree (*vataireopsis araroba* (*aguiar*) *Ducke*)

Dithranol (synonym: anthralin), an anthracene derivative, is an effective topical therapy for psoriasis. It was derived from chrysarobin, which is obtained from the araroba tree and bark that blooms in the Amazon rainforest. Dithranol inhibits the production of pro-inflammatory cytokines and the growth of keratinocytes. In a randomized trial of 106 patients with severe psoriatic lesions, a 15:45-minute rapid treatment with dithranol with a stepwise increase in dithranol concentration up to 5% once daily for twelve weeks was found to be significantly more effective than a standard treatment of 50 g/ml. g. calcipotriol cream twice a day. (Moy et al. 2018).

Barberry bark (*Mahonia aquifolium* (*Pursh*) *Nutt.*)

Mahonia aquifolium, sometimes called Oregon grape, is an evergreen shrub in the Berberidaceae family. It originates from the United States and is used to treat a number of inflammatory skin conditions. It has been used in TCM for a long time. The healing effect of *Mahonia aquifolium* on psoriasis is due to berberine, an alkaloid found in the plant and its extract. Berberine has been shown to exert anti-inflammatory effects through several different mechanisms, such as reduction of lipoxygenase and lipid peroxidation, reduction of T-cell infiltration in open lesions, reduction of cyclooxygenase activity leading to reduced suppression of IL-8 and prostaglandin E2. Berberine inhibits cell development by intercalating with DNA, preventing DNA replication and cell proliferation. Other alkaloids that inhibit lipoxygenase, such as oxyberberine, jatrorrhizine, corytuberine and columbamine, also contribute to the anti-inflammatory effect. (Wiesener and Lootke 1996). One study was conducted to evaluate the effectiveness of a cream containing 10% *Mahonia aquifolium* bark extract. It has been thought to be useful in the treatment of moderate psoriasis (Kost et al. 2001). *Mahonia aquifolium* crude extract inhibited the production of IL-8, which is important in the treatment of psoriasis. The main components of the crude extract were bisbenzylisoquinoline alkaloids and protoberberine. The first group inhibited the production of IL-1, T cells, TNF and TNF (Ghazisaeedi et al. 2022).

Basilica

An activated version of NF- κ B has been implicated in osteoporosis, psoriasis, septic shock, AIDS and other inflammatory diseases (Cyclin 2003). It has previously been reported that "holy basil" has chemopreventive properties. Ursolic acid, a triterpenoid produced from basil and rosemary, has been shown to limit NF- κ B activation by inhibiting IKK, which in turn inhibits cyclin D1, COX-2 and matrix metalloproteinase 9 (Woolf 2018).

Capsicum annum

Cultivars derived from native American bird peppers are still found in America and #039; hot areas. Some woody species of this species used to be called *C. frutescens*; however, the features used to distinguish these types are seen in many species, such as *C. annum*, but are not consistently recognized in *C. frutescens* types. Many chemicals, including neuropeptide Y, protein gene product 9.5 (PGP-9.5), nerve growth factor (NGF), CGRP, and SP, have been implicated in psoriatic pruritus. Increased levels of NGF, PGP 9.5-reactive nerve fibers and NGF-immunoreactive keratinocytes were found in pruritus.

And is related to the intensity of itching. TrkA, a high-affinity NGF receptor, is highly expressed in epidermal and dermal nerve fibers and is correlated with itch intensity (Henrich et al. 2015).

Keratinocytes and nerve fibers of psoriatic skin have higher expression of SP and its receptor. Capsaicin has also been shown significantly reduce pruritus in psoriatic patients, indicating a possible role for this neuropeptide in the etiology of psoriatic pruritus (Znajdek-awi 1124).

Centella asiatica L.

Guto Kola, *Hydrocotyle asiatica* L or *Centella asiatica* are often used in dermatology to treat skin problems. It belongs to the family of Apiaceae. The main components of *Centella asiatica* are centeloids, because they represent pentacyclic triterpenoids, which include madecassoside, asiaticoside, madecassic acid, and asiatic acid. It also contains saponins of the oleanonic and isotan acid types, such as terminolic acid and centella saponin D. It contains saponins (1-8%) and essential oils (1%) (Sampson et al. 2001). *Centella asiatica* has long been used in Ayurvedic medicine to treat various ailments. It has been found to hold tremendous promise as a natural antioxidant and DNA damage inhibitor. [12]

Neem



Fig: 4 Neem leaves

The common name of *azadirachta indica* is neem and it is belonging to family Meliaceae. The active ingredients of *Azadirachta indica* are nimbidin, nimbolides, salanin, azadirachtin, meliasin, gedunin, nimbin, valasin, meliasin. The seed contains tigninic acid, limnoids. The seeds of *Azadirachta indica* have been used in the soap, insecticide and pharmaceutical industries. Neem has analgesic, anti- abortive, antibacterial, anti-fungal, anthelmintic, anti-inflammatory and antiviral effects. *Azadirachta indica* also has diuretic, antinematodic, antipyretic, anticonvulsant, immunomodulatory and antinematodic effects. The topical cream consists of *Azadirachta* leaf extract nanostructured lipid carriers; *Lawsonia inermis* leaf extract and *Mallotus philippensis* fruit extract with anti-psoriasis effect. *Azadirachta indica* leaf extract, *Berberis aristata* root extract, *Psoralea corylifolia* seed extract and *Hemidesmus indicus* root extract oil cream work well against psoriasis.[1].

Cloves



Cloves tree (a)



cloves flower (b)

The cloves has anti-inflammatory action. The active ingredients of cloves are eugenol and isoeugenol. Several studies have shown that these chemicals can inhibit NF- κ B activation by preventing I κ B degradation (Murakami et al. 2003). Murakami

et al. (Barrea et al. 2018). Found that bis-eugenol, but not eugenol, inhibits IB degradation and suppresses inflammatory cytokine production at both gene and protein levels.

Coffee

Coffee is considered one of the most common drinks, regardless of the location. According to the data, the most common liquids are only tea and water. In addition, coffee is a pharmacologically active liquid. These include lipids, carbohydrates, nitrogenous chemicals, vitamins, minerals, antioxidants, phenols, lactones, alkaloid compounds, diterpenes and caffeine, which makes up about 1% of the composition of coffee. This compound has that the effects of coffee depend on the dose. Moderate coffee consumption of up to three cups per day reduces psoriasis symptoms and has anti-inflammatory effects, while higher coffee consumption, especially more than four cups per day, worsens the clinical symptoms of psoriasis and is associated with pro-inflammatory chemicals. (Ammon and Wah 1990).

Curcumin



Fig: 5 Curcumin

Curcumin is actually a polyphenol made from the yellow spice turmeric, which belongs to the Zingiberaceae family, and has several properties. It contains antitumor, antioxidant, anti-inflammatory and many other biological properties and is chemically identified as [1,7-bis (4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione]. It is evident that curcumin and its widespread use in medicine is due to its various properties, which include anti-inflammatory, antioxidant, anti-proliferative, antimicrobial and carcinogenic properties (Gupta et al. 2011). Curcumin is used to treat a variety of conditions, including rheumatoid arthritis, eye problems (eg, chronic anterior uveitis and conjunctivitis), menstrual disorders, urinary tract infections, and gastrointestinal and liver problems (eg, bowel disease, abdominal pain). It has also been used as an adjuvant therapy in the treatment of skin cancer, wound healing and chicken pox (Anand et al. 2007). Dendritic cells have been associated with the early stages of psoriasis. Myeloid dendritic cells secrete IL-23 and IL-12, which stimulate IL-17-producing Th22, Th1, and T cells, resulting in the release of inflammatory cytokines such as IFN-, IL-17, IL-22, and IL-22. TNF, which initiates a cascade associated with psoriasis inflammation (Skyvalidas 2020). Curcumin has antioxidant, anti-inflammatory and immunomodulatory properties and can reduce pro-inflammatory factors, T-cell activation and proliferation by working on AP-1, NF-B and MAPK pathways. This can keep DCs immature, affecting cytokine production, stimulation of reactive T cells, and antigen presentation. Curcumin inhibits IL-17 production by CD4+ T cells (Campbell et al. 2018). Curcumin inhibits the development of differentiated HaCaT cells induced by imiquimod by attenuating proinflammatory cytokines TNF-, IL-17 and IFN- (Kang et al. 2016). IFN- and TNF- as well as IL-23, IL-22, IL-12 and IL-2 were restored to normal levels after curcumin administration in mice. This may be because curcumin reduces Kv1.3 channel current and inhibits T-cell proliferation, or because curcumin affects AP-1, NF-B, and MAPK signaling pathways in psoriatic mice (He et al. 2015). In an imiquimod-stimulated psoriatic model, curcumin nanohydrogel restored the normally distributed TJ proteins ZO1 and occludin while reducing iNOS and TNF production (Zhang et al. 2019). After topical administration to mice, curcumin reduced inflammatory

symptoms, IL-1, IL-22, IL-17F, IL-17A, and TNFmRNA levels, and CC chemokine receptor 6 (CCR6) protein expression (Kurd et al.). to 2008).

Fennel and anins:



Fig: 6 Fennel and Anins

Fennel (*Foeniculum vulgare*) and anise (*Pimpinella anisum*) were used as estrogenic substances. They are said to increase milk supply, speed up menstruation, aid in childbirth, reduce male menopausal symptoms and increase libido. Anethole, the main component of essential oils of anise and fennel, is believed to be a potent estrogenic agent, but later studies show that the actual pharmacologically active molecules are polymers of anethole, including dianethol and photoanethole (Sen et al. 1996). Anethole has been shown to prevent inflammation and carcinogenesis. It has been shown to have antioxidant properties. We have shown that anethole can limit NF- κ B activation by preventing IB degradation (Yilmaz et al. 2010).

Garlic



Fig: 7 Garlic

Garlic (*Allium sativum*) is a well-studied wonder plant that has been used for millennia to treat a variety of health problems (Pazyar and Feily 2011). Its contents include sulfur-containing molecules such as allin, enzymes such as allinase, and chemicals synthesized enzymatically from allin such as allicin. Garlic also contains other elements such as oligosaccharides, flavonoids, arginine and selenium (Allison et al. 2016).

One complex combination is aged garlic extract (AGE). Alline, cyclophilin, S-methyl-L-cysteine, S-allyl-L-cysteine, S-acetylcysteine, S-allylmercapto-L-cysteine, S-1-propionyl-L-cysteine, fructose-arginine and beta-chlorogenic are among its ingredients. L-arginine, L-methionine and L-cysteine are also present. Psoriasis has now been linked to the action of the nuclear transcription factor kappaB. Extensive research has revealed this path. Garlic (S-allyl mercaptocysteine, diallyl sulfide, ajoene) can inhibit this transcription factor (Singh and Tripathy 2014).

Gaultheria procumbens L.

Gaultheria procumbens appears to be an essential oil-producing herb in the Ericaceae family. The salicylate- and procyanidin-rich stem extract of *Gaultheria procumbens* inhibits pro-inflammatory proteins such as hyaluronidase, COX-2, and lipoxygenase. In vitro models have shown antioxidant activity. Ex vivo experiments with human neutrophils stimulated with N-formyl-L-methionyl-L-leucyl-L-phenylalanine and lipopolysaccharide reduced the production of cytokines and proteinases and reactive oxygen species (Saha et al. 2014).

Ginger

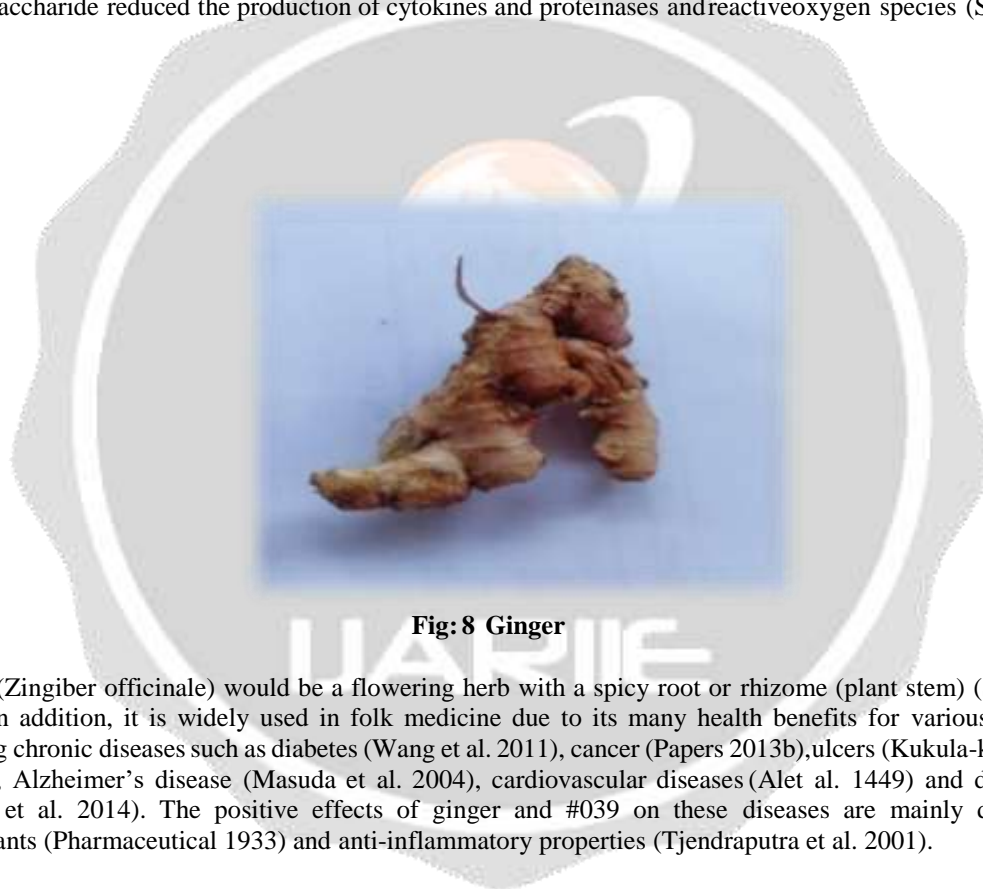


Fig: 8 Ginger

Ginger (*Zingiber officinale*) would be a flowering herb with a spicy root or rhizome (plant stem) (Salafzoon 2017). In addition, it is widely used in folk medicine due to its many health benefits for various diseases, including chronic diseases such as diabetes (Wang et al. 2011), cancer (Papers 2013b), ulcers (Kukula-koch et al. 2018), Alzheimer's disease (Masuda et al. 2004), cardiovascular diseases (Alet al. 1449) and depression (Rabelo et al. 2014). The positive effects of ginger and #039 on these diseases are mainly due to its antioxidants (Pharmaceutical 1933) and anti-inflammatory properties (Tjendraputra et al. 2001).

The pungent smell and taste of new ginger root is caused by active volatile oils (eg shogaols, gingerols and zingerone), which make up about 1-3% of its mass (Artikla 2001). Ginger also contains antioxidants such as vitamin C, vitamin E, lutein, beta-carotene, lycopene, quercetin, genistein and tannin (Wagesho and Chandravanshi 2015). In addition, ginger contains important nutrients such as manganese, selenium, copper and zinc (Wagesho and Chandravanshi 2015).

Gingerol, the active component, has already been shown to have chemopreventive properties (Tjendraputra et al. 2001). Gingerol also inhibits the enzymes nitric oxide synthase and cyclooxygenase (COX-2), both of which are regulated by NF-B (Article 2001). Since gingerol can reduce platelet

aggregation, synthesized gingerol analogs with platelet aggregation inhibitory efficacy, such as aspirin, may be useful in cardiovascular disease (Getaneh et al. 2021). Because of its anti-inflammatory properties, ginger is a potential herbal remedy for psoriasis.

Indigo (*Baphicacanthus cusia*, Brem.)

Indigo is a blue powder obtained by grinding the *Baphicacanthus cusia* plants, fermenting them, and adding lime to them. Forty-two people with chronic plaque psoriasis were given ointment containing 10% indigo once a day for 12 weeks in a randomised placebo-controlled experiment. The used indigo naturalis includes 1.4% indigo and 0.16% indirubin. The indigo therapy alleviated symptoms by 81%, whereas the placebo therapy only reduced symptoms by 26% (Lin et al. 2014). The PASI was lowered by 50% with indigo extraction (50 g/g) and 70% with indigo extract (200 g/g).

Lace flower (*Ammi visnaga* (L.) and *Ammi majus* (L.))

5-Methoxypsoralen (5-MOP) and furanocoumarins 8-methoxypsoralen (8-MOP) is secluded for therapeutic application from *Ammi visnaga* (L.) Lam. And *Ammi majus* (L.) Psoralens are phototoxic chemicals that are photoactivated via ultraviolet A (UVA) light and can induce extremely phototoxic skin responses.

They limit keratinocyte growth and exhibit immunosuppressive effects in the healing environment of PUVA treatment (psoralen and UVA), which is utilized to treat strong inflammatory skin disorders such as psoriasis. Several clinical investigations have demonstrated the effectiveness of systemic PUVA (Vongthongsri et al. 2006), bath PUVA (Amornpinyokeit and Asawanonda 2006), and cream PUVA (0.1% 8-MO) (Bensouilah and Bensouilah 2003) in psoriasis.

***Matricaria recutita* L.**

Matricaria recutita belonging to asteraceae family. Chamazulene seems to be the primary phytochemical accountable for antipsoriatic action. LTB₄ production then increases, resulting in psoriatic plaque. The flavonoids and apigenin the flower contains quercetin (Bonesi et al. 2018). Quercetin is an anti-inflammatory, anti-tumor, antiviral, and antibacterial flavonol. It inhibits both IFN-induced STAT-1 stimulation and NF- κ B activation. It reduces the generation of histamine and IgE. It inhibits NF- κ B activation and decreases TNF-induced luciferase reporter gene transactivation (Jamalian et al. 2012). It also lowers TNF-, suppresses COX-2, IL-6, and IL-8 expression, and inhibits TNF-induced luciferase reporter gene transactivation (Jamalian et al. 2012).

Melaleuca alternifolia

Terpinen-4-ol has been shown to reduce the production of TNF, IL-1, IL-8 and PGE₂. It can also affect vasodilation and plasma extravasation (Koh et al. 2002). In a study of 27 patients evaluating the effect of tea tree oil on histamine-induced crying or agitation, mean cry volume was significantly reduced after 10 minutes of treatment (Khalil et al. 2004). Human and rodent investigations had similar findings. Freshly extracted oil is a mild to the moderate sensitizer, while oxidation elevates the oil's allergenic action. The oil contains sensitizers such as α -terpinene, ascaridole, β -phellandrene, γ -phellandrene, limonene, and trihydroxy menthane.

Nigella sativa

Nigella sativa is a popular therapeutic plant that has a long religious and cultural background in Unani, Ayurvedic, Arabic, and Chinese medicine. Many bioactive natural agents, including alpha-hederin, alkaloids, thymoquinone, and saponins, are found in *N. sativa* and contribute to its wide spectrum of effects as a bronchodilator, diuretic, antidiabetic, analgesic, antihypertensive, antibacterial, antineoplastic, and anti-inflammatory agent, making it a promising therapeutic for dermatological diseases. Thymoquinone (TQ) is the major bioactive ingredient, accounting for 30-40% of Essential oils (Arjumand et al. 2019). TQ's high antioxidant and anti-inflammatory properties have led to much research into its wide range of health benefits. Treatment with *N. sativa* has been shown to significantly reduce inflammation through TQ-mediated secretion of proinflammatory cytokines and eosinophils (Arjumand et al. 2019). TQ intraperitoneal administration prior to airway challenge showed a significant reduction in eosinophilia in the lung, serum IgG and IgE levels, and IL-13, IL-4, and IL-5 proinflammatory Th2 cytokines. *N. sativa* functions as an antioxidant by enhancing free radical defence by inhibiting elastase, lipid peroxidation, and myeloperoxidase (Sethi et al. 2008). Despite suppressing transcription factors such as NF- κ B and STAT3 and anti-apoptotic BCL2, *N. sativa* increases cell death by up-regulating pro-apoptotic caspases 8, 9 and 3 and B-cell lymphoma 2 X protein (BAX) (Forouzanfar et al. 2016). Due to its antibacterial, anticancer, anti-inflammatory and other properties, as well as its ability to improve hypopigmentation through increased melanin distribution. *Sativa* is widely available.

Olibanum (Boswellia serrata, Triana and Planch.)

Frankincense is the other name of olibanum. Several previous studies reported that 200 patients with mild to moderate psoriasis were given an olibanum ointment containing 5% 3-O-Acetyl-11-keto-boswellic acid three times per day for twelve weeks. Contact dermatitis occurred in 13 individuals (6.5%) (Balamurugan et al. 2022).

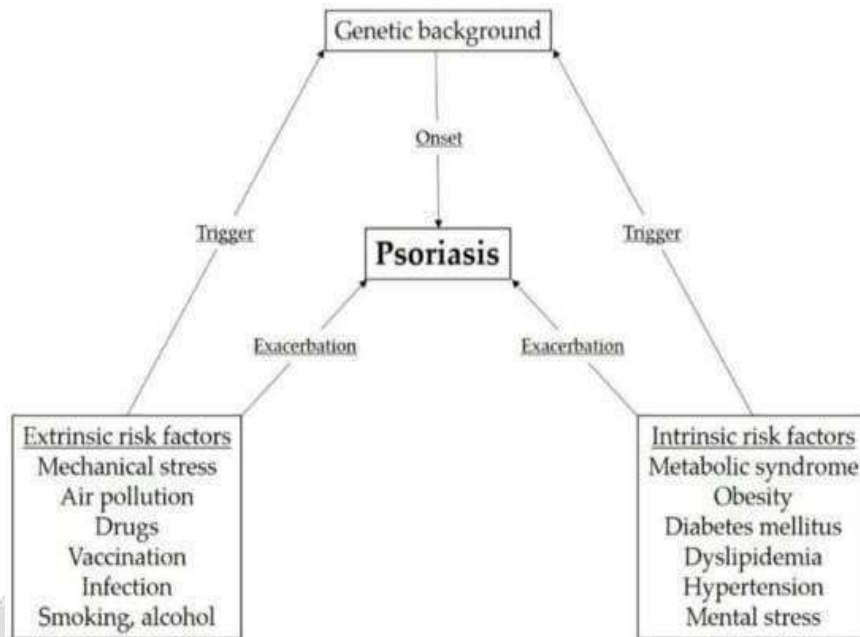
Pomegranates

Fig: 9 Pomegranate

The dried seeds of the pomegranate or *Punica granatum* are a popular culinary spice. Flavonoids from pomegranate extract have been shown to reduce low-density lipoprotein oxidation and cardiovascular disease in atherosclerotic humans and mice (Aviram and Dornfeld 2001). Pomegranate juice can inhibit serum angiotensin-converting enzyme activity and lower systolic blood pressure (Schubert et al. 2002).

According to a new study (Asogwa and Okoye 2019), pomegranate can reduce NF- κ B activation in vascular endothelium in a unique way. [12]

Risk factors for the development of psoriasis [13]



Challenges of individual treatment and evaluation of treatment success

Psoriasis in “difficult-to-treat” areas—localized psoriasis in specific areas—is difficult to treat and often results in significant physical disability and discomfort. “Difficult to treat” areas are used to describe psoriasis of the scalp, palms and soles, and nails, which are often associated with severe emotional and functional impact. Some authors also include facial psoriasis and inverse psoriasis in this classification.

The biggest challenge after determining the severity of the disease is to choose the optimal treatment adapted to the needs of the patient, especially in cases with multiple foci and difficult-to-treat areas.

Recent advances in systemic therapies may offer greater benefit to patients who have difficulty with local approaches. Rare controlled studies have reported the efficacy and safety of systemic (conventional or biological) therapy in difficult-to-treat areas of psoriasis. In general, the available evidence comes from sub-analyses of studies involving patients with psoriasis and/or PsA, which also evaluated the effects of nails, scalp, palms or soles.

Another reason for worse clinical outcomes may be patient-related. Traditional systemic treatment methods require different concentrations for local therapeutic response, toxicity is a major problem. In addition, choosing the appropriate treatment is problematic because there are not enough clinical trials in such settings. Only patients with a BSA of at least 10% can participate in clinical trials with newer targeted biological agents, and therefore there is insufficient evidence of the effectiveness of new therapies in patients with a lower BSA or difficult-to-treat areas. This approach affects access to new treatments for patients with reduced disease severity in some public health systems, and other payers refuse to reimburse those with less than 10% BSA.[14]

Herbal marketed products which are used in psoriasis

Sr.No	Marketed products Name	Uses	Manufactured by
1.	Purim tablets	Skin infection	Himalaya Ayurveda
2.	RAR Anti-psoriasis (Capsule)	Used as Anti-psoriatic agent	RAR wellness
3.	AZ-TIKTAN (Capsule)	Used as chronic skin problems	Ayurveda yogashram Remedies pvt.Ltd
4.	Imupsora (Tablet)	Used as Anti-psoriatic agent	Charak
5.	Psoraksha oil	Rejuvenating, Hydrates, Repair	Ayushvedham
6	Loerds L 154 (drop) (Homeopathic medicine)	Skin disease, red , itchy, scaly patches	Lord's cares better
7.	Psorease (Oil)	Effectively used for scalp psoriasis.	Dr. Stanleys
8.	Psoria oil	It is indicated for psoriasis. Itis also useful for dandruff, scaling, and fungal skin infections.	Nagarjuna
9.	Psoraban oil	Psoriasis ,eczema , chronic disease	Dr.Ambalkars Ayurvedic Researchcentre pvt. Ltd
10.	Soribadyasavam	Skin disorder & urinary disease	Venkateswara Ayurveda NilayamLtd
11.	Dr.JRK Psorolin-B- ointment	Redness, itching & provide inter moisturization	Siddha medicines
12.	Dr.Parth pavanmani (Ayurvedi cmalham)	For Eczema Treatment, Psoriasis Treatment, Anti-acne &Pimples.	Dr.parth pavanmani

13.	Sehund Tailum (massage oil)	Psoriasis eczema all kinds of skin disease	Axiom Ayurveda
14.	Charmoogari (Ointment)	Skin problems,like allergies irritation, scabies & other problems	Baidyanath
15.	Psornil (Capsule)	Useful in psoriasis itching	Herbal & pure
16.	Psoroscan (Tablet)	Useful in psoriasis & Autoimmune disorders	Chirayu
17.	Zoryve (cream)	For topical use only	Arcutis
18.	Psorafit (Capsule)	Psoriasis & other skin issues	Ayurveda & Redefined
19.	Psoroclear(Tablet)	Scalp psoriasis ichthyosis, itching, Redness	Barphani
20.	Psoraflex capsule	Itching, Redness	Zoic pharmaceuticals
21.	Nisore (oil)	Psoriasis eczema	VOPEC PHARMACEUTIC ALSPVT . LTD.
22.	Psoraflex capsules	Treat for psoriasis	Zoic pharmaceuticals
23.	Psoriasis healer kit (Tablet)	Ayurvedic medicines for psoriasis healer kit	Zoic
24.	Sarasvab lotion	Soothes itching skin	TRIO
25.	Tregulate	Sooth itching Redness & scaling skin ailment	Zealous
26.	Wrightia oil	Treat psoriasis	Vedas cure

27.	Epi – Guard(Oil)	Helpful in allergic dermatitis	SN Herbals
28.	Psoramin ointment	Eczema & psoriasis relief	Nisarg pharma
29.	T-sora capsule	Psoriasis, Eczema, Erythema, Fungal and bacterial infections, Scaling and secondary infections, All other stubborn skin diseases	Trio health care Pvt.Ltd
30.	Talekt tablet	It is a detoxifier that eliminates impurities from the skin's surface and an anti-inflammatory, which is useful in combating various dermatological disorders.	Himalaya Ayurveda

List of some recent drugs available in market [1]

Drugs	Mechanism of actions	Marketed preparation
Methotrexate	Inhibition DNA production by blocking thymidine and purine synthesis	Methocip Tablet (Cipla), Methorex Tablet(Zydus), Folictrax Tablet (IpcaLab)
Cyclosporine	T cell-inhibit	Imusporin Capsule (Cipla), Cyclophil ME 25 Tablet (Biocon), Psorid Capsule (Biocon)
Acitretin (Retinoids)	Transcriptional process by acting throughout nuclear receptors and normalizes keratinocyte proliferation and separation	Treat Capsule (KaizenPharma.), Acipsor Capsules (Kivi Labs), Acetroin (Nidus Pharma)
Apremilast	Inhibition the hydrolyzation of the second messenger cAMP.	Aprezo tablet (Glenmark Pharma. Ltd.), Apxenta tablet (Ajanta Pharma.), Apraize (Ipca Lab.)
Etanercept	Dimeric human fusion protein mimicking TNF- α R	Intacept 25 solution for Injection (Intas Pharma.), Etacept 25 mg Injection (Cipla), Enbrel 25 mg Injection (Pfizer).
Infliximab	Chimeric IgG1x monoclonal antibody that binds to soluble and transmembrane forms of TNF- α	Infimab Injection (SunPharma.), Remicade Injection(Janssen Pharma.)
Adalimumab	Human monoclonal antibody against TNF- α	Plamumab Injection (Cipla), Adalirel 40 mg Injection (RelianceLife Sci), Adalimac 40 mg injection (Macleods Pharma)

Tofacitinib	Janus kinase (JAK)inhibitor	Jaknat Tablet (Natco Pharma) , Tofe Tablet (AlkemLab.), Tfct-Nib Tablet (IpcaLab.)
Halobetasol	Blocks chemical messenger responsible for inflammation	Hobs 0.05% cream (Aamorb Pharma.), Haloderm Ointment (Micro Labs), Haloderm Lotion (Micro Labs)

Conclusion:

Psoriasis is the multifactorial immune-mediated hyperproliferative inflammatory condition of hyper proliferation. There appears to be a genetic predisposition to the disease, which is then triggered by one or more of several factors that are often difficult to identify. There are several different clinical variants. Psoriasis treatment is either local or systemic. Topical treatments have widely varying effects, partly because of treatment-related problems, but also because individuals seem to respond to topical treatments individually. For those who do not respond to local treatment in primary care, referral to specialist care is likely to be the next option. Systemic treatments are generally more effective, but older treatments have significant side effects that can limit their usefulness.[15]. Hence the required things are increasing effectiveness and efficiency of topical therapy also focus on herbal treatment. Healthcare professionals working with patients with psoriasis need to be aware of its potentially huge impact on mental health and quality of life. This information is useful for students and researchers.

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