



# Secundum Artem

*Current & Practical Compounding  
Information for the Pharmacist.*

## COMPOUNDING FOR PATIENTS WITH PSORIASIS

### GOALS AND OBJECTIVES

**Goal:** To provide compounding pharmacists supportive information on the prevalence, diagnosis, symptoms and treatment of psoriasis.

**Objectives:** After reading and studying the article, the reader will be able to:

1. Define and discuss the different types of psoriasis.
2. Describe the different methods of treating psoriasis.
3. Discuss the active ingredients used in treating psoriasis.
4. Discuss the various formulations used in treating psoriasis.

### INTRODUCTION

Psoriasis, a chronic scaling disease of the skin, affects between 1 and 2% of the population in the United States. It involves about 7 million individuals with between 150,000 and 260,000 new cases diagnosed each year.<sup>1</sup> It primarily affects adults but does occur in all age groups; most common between the ages of 15 and 35. The economic impact of psoriasis can be significant, ranging from \$1.6 billion to \$3.2 billion spent annually on just treating psoriasis, not including the amount from the estimated 56 million hours of work lost each year.<sup>1</sup>

Psoriasis affects men and women about equally but may be slightly more prevalent in women. Patients with psoriasis may suffer discomfort (pain, itching), restricted motion in some of their joints or emotional distress. Psoriasis is generally a mild condition and there are many medications (prescription and nonprescription) that can be used to help alleviate the discomfort.

Psoriasis is actually a non-contagious, chronic skin disease presenting in many different forms and many different levels of severity. When joints are involved, it is called psoriatic arthritis and is similar to rheumatoid arthritis.

Individuals with psoriasis often experience a variety of emotions, including sadness, despair, guilt, anger and even low self-esteem. Sometimes they are embarrassed

due to the unsightly patches of the disease and sometimes are frustrated at not knowing why they developed the disease or why it cannot be cured. In fact, psoriasis can even alter the employment of affected individuals.

### DEFINITION OF PSORIASIS

Psoriasis is defined as "a common multifactorial inherited condition characterized by the eruption of circumscribed, discrete and confluent, reddish, silvery-scaled maculopapules; the lesions occur predominantly on the elbows, knees, scalp, and trunk, and microscopically show characteristic parakeratosis and elongation of rete ridges with shortening of epidermal keratinocyte transit time due to decreased cyclic guanosine monophosphate".<sup>2</sup>

### CAUSE OF PSORIASIS

The actual cause of psoriasis is unknown but may be related to disorders in the body's immune system; it is an immune-mediated disorder. Signals are generated which increase the growth rate and cycle in skin cells resulting in cells that accumulate on the surface of the body and they are not shed fast enough. Where normal skin cells mature in 28 to 30 days, a psoriatic cell may mature in



only 3-4 days and stack up on top of each other on the skin surface, forming elevated red lesions.

Psoriasis apparently has a genetic component but may also involve certain "triggers" for it to appear. These triggers may be environmental or involve emotional stress, injury to the skin, certain infections and reactions to certain drugs.

### TYPES OF PSORIASIS

Plaque psoriasis (psoriasis vulgaris) is the most common, affecting about 80% of individuals suffering from the disorder. It appears on almost any skin surface, especially the elbows, scalp, knees, trunk and nails. The lesions are described as well-defined patches of red, raised skin. The buildup on the patches, composed of dead skin cells, is called scale and appears flaky and silvery white. The scale constantly sheds as it becomes loose. The psoriatic area is usually dry and exhibits symptoms of pain, itching and cracking.

Guttate (Latin for "drop") psoriasis is indicated by the presence of small, red, individual "drops" on the skin, generally the trunk and limbs and sometimes the scalp. Guttate psoriasis lesions are generally not covered with scales and are generally not as thick as the plaque psoriasis.

Inverse (flexural) psoriasis is commonly found in the armpits, breasts and in skin folds around the genitals and buttocks. The appearance is smooth and dry but red and inflamed; it does not have the scales present. It is easily irritated from rubbing and sweating and is more common in overweight patients.

Erythrodermic psoriasis, the least common form of the disease, is particularly inflammatory and is characterized by periodic, widespread skin redness. This reddening and accompanying exfoliation, covering most of the body, is often accompanied by severe itching and pain.

Generalized pustular psoriasis (von Zumbusch Pustular Psoriasis), like its name, occurs widespread over the body but is a relatively rare form of the disease. The skin may become intensely painful and tender and pustules may appear, then dry up and reappear.

Localized pustular psoriasis is a more confined form of the disease. The pustules appear, turn brown and peel. One form is palmo-plantar pustulosis that is characterized by large pustules in fleshy areas of the hands and feet.

Psoriatic arthritis may develop in about 10 to 30% of patients with psoriasis. Symptoms can include stiffness, pain, swelling/tenderness of joints and soft tissue, reduced range of motion, morning stiffness and tiredness. Additional symptoms can include conjunctivitis and changes in the nails. Joints usually affected include the wrists, knees, ankles, lower back and neck. It affects men and women equally and generally occurs between the ages of 30 and 50.

### SEVERITY OF PSORIASIS

There are three categories of psoriasis that makes it easier to select treatment. The categories include (1) Mild Psoriasis, (2) Moderate Psoriasis and (3) Severe Psoriasis. Also, the way the psoriasis affects an individual's quality of life is considered in the classification.

Mild psoriasis is experienced by about 75-80% of the patients. It involves less than about 2% of their body and generally involves isolated patches on the knees, elbows,

scalp, hands and feet. Treatment often includes topical products, including moisturizers and OTC and Rx creams, ointments and shampoos, which are generally sufficient to control the symptoms.

Moderate psoriasis affects about 2-10% of the body's surface and involves the arms, legs, torso, scalp and other areas. Treatment includes topical medications, phototherapy and oral medications.

Severe psoriasis involves more than 10% of the body which may be covered with psoriasis plaques or pustules or widespread erythrodermic psoriasis; it can cause severe peeling of the skin. Patients with this category of psoriasis tend to develop psoriatic arthritis. Therapy includes phototherapy, oral medications or a combination.

The severity of psoriasis can be made worse by skin injury and irritation, sun exposure, stress and anxiety, some medications, infections and possibly diet.

### TREATMENT OF PSORIASIS

Psoriasis is usually a lifelong, relapsing disease in which the main treatment goal is resolution of lesions. The treatment approaches are not curative but can be very effective in controlling the disease.<sup>3</sup> The basic approaches to therapy involve a reduction in the rate of epidermal proliferation in addition to a decreased dermal inflammatory and immune response.<sup>4</sup>

An appropriate selection of therapy combined with compliance will usually result in a satisfactory outcome in a few days to a few weeks. The risk-benefit issues are very important when determining a treatment approach as is the recognition of the pathogenic factors involved. The main goal of treatment is to allow the patient to be functional in all aspects of their life and to maintain good physical and emotional health.<sup>1</sup> Patients with limited disease can usually be managed with topical therapy. The selection of the treatment method is dependent upon a number of factors, including the type of psoriasis, its severity, patient's age and medical history and its location on the body. Generally a trial and error approach is utilized as individuals respond differently to therapy.

Topical therapy can include sunlight, moisturizers, baths, salicylic acid, retinoids, anthralin, coal tar preparations, calcipotriene, tacrolimus and corticosteroids. *Sunlight* in short, regular daily doses that do not produce a sunburn will clear up psoriasis in some cases. *Moisturizers* that are thick and greasy, or emollients, aid in hydrating the skin and reducing scaling and itching. They are generally used regularly and over a long time period.

*Baths* consisting of an oil (generally dispersed with the aid of a surfactant) added to the bath water can be soothing. Generally, the body is soaked for about 15 minutes in water containing a tar preparation, oilated oatmeal or Epsom salts.

*Salicylic acid*, a keratolytic, aids in removing the scales. It is considered most effective when used in association with topical steroids, coal tar or anthralin. It is generally used in concentrations of 5-10% in ointment or cream vehicles. In cases of thick plaques, a stronger 20% concentration has been used.

*Retinoids* used topically, including tazarotene (Tazorac), can be effective. Tazorac is a fast-drying, clear gel that is topically applied. It has few side effects but does not act as quickly as the corticosteroids. Tazarotene, a vitamin A

derivative, is also very effective for psoriasis. It selectively binds to retinoic acid receptors which result in less local irritation and cytotoxicity than other topical retinoids.

*Anthralin* is an old remedy that is still possibly the most effective of all topical treatments. It works by reducing inflammation and keratinocyte proliferation. It is very effective in treating psoriasis but side effects such as erythema, burning and staining of the skin make it undesirable to patients. Short-contact application of newer anthralin creams can decrease these side effects. Its primary disadvantages are that it is messy and stains the clothing and skin. If it is applied to the skin for only short periods of time (eg 10 to 20 minutes) this minimizes the staining problems. It is often combined with a variety of topical drugs. Zinc oxide ointment or petrolatum can first be applied around the lesion followed by the anthralin preparation; this will minimize irritation to the normal skin surrounding the lesion. Anthralin preparations are generally applied in concentrations from 0.05% to 5% and is applied at night. Wearing plastic gloves and using old sheets and nightclothes will help to minimize its staining properties.

*Coal tar preparations* (the oldest treatment for psoriasis), described by the Greek philosopher Dioscorides nearly 2,000 years ago, are effective in treating psoriasis. Coal tar can contain up to 10,000 different chemical compounds and its precise mechanism of action is unknown. Coal tar has antiproliferative and anti-inflammatory actions and it has been demonstrated to be efficacious in the treatment of mild to moderate psoriasis. It can be used alone or in combination with other drugs and phototherapy (UVB). The use of coal tar preparations is limited by their main disadvantages; they are messy and smelly to use. Many of the newer purified tars in more elegant creams, ointments and gels are easier and more pleasant to use. Coal tar preparations seem to increase the effectiveness of UV light. They generally are applied at bedtime with sufficient time allowed for drying and then removed by showering in the morning. As an alternative, they can be applied in the morning, allowed to stay for 10-15 minutes, and then showered off.

*Calcipotriene* is a synthetic form of vitamin D<sub>3</sub> and has been available since 1993. Calcipotriene ointment (Dovonex<sup>®</sup>) can control the excessive production of skin cells when used twice daily. Its use may be based on the observation that hypocalcemia is present in many patients who develop various forms of psoriasis. It can irritate the skin and is not recommended for the face or groin area. About 60% of the patients have a good to excellent response after 4 months of treatment.

*Corticosteroids* are the choice of many physicians to begin therapy. The corticosteroid creams or ointments are easy to use and are a good choice for the scalp, face, ears and skin folds. However, these should not be used for too long a time period. The adverse effects and mechanism of actions vary greatly between the available topical agents. Chronic use of topical steroids can result in decreased effectiveness, local tissue atrophy and systemic glucocorticoid effects. Therefore, topical steroids should only be instituted as an adjunct to therapy if long-term use is required.<sup>4</sup>

*Phototherapy* involves ultraviolet light; some of the artificial sources of UVB light are similar to natural sunlight.

There are some newer phototherapy light sources available, called narrow-band UVB, that emit the part of the UV spectrum that is most beneficial for psoriasis. Generally, phototherapy is used after topical treatments, even though some physicians actually start with phototherapy. UVB light boxes can be used either at the physician's office or at home.

Combination phototherapy can involve the use of psoralen and ultraviolet A light (PUVA). Psoralen serves to enhance the sensitivity of the body to this light and is used when more than 10% of the skin is affected or whenever a quick response is required as when the disease is interfering with an individual's occupation. PUVA treatments two or three times weekly appear to be more reliable in clearing psoriasis than UVB treatments; however, they are associated with increased short-term side effects, including nausea, headache, fatigue, burning and itching.

If topical therapies fail or the disease is severe, systemic treatment can be instituted. Some common systemic therapies include methotrexate, acitretin, cyclosporin, hydroxyurea and antibiotics.<sup>3</sup>

*Methotrexate*, which may work through immunomodulation, is effective for severe disease but is limited by its severe side effects and possible mutagenic effects. These patients must be closely monitored and methotrexate should not be used in patients with long-term liver disease or anemia.

*Acitretin*, a systemic retinoid is useful in erythrodermic, chronic, and pustular psoriasis. The main concerns with this medication are teratogenicity and hyperlipidemia. Careful patient selection and laboratory monitoring increase the safety of acitretin.

*Cyclosporin* is an immune suppressant that slows rapid cell growth. It provides rapid symptomatic relief but is effective only as long as the treatment lasts. Patients with severe psoriasis or those that are refractory to other systemic therapies are generally the best candidates for cyclosporin. Side effects such as hypertension and renal toxicity may limit its use.

*Hydroxyurea* is not as toxic as methotrexate and cyclosporine but it is also not as effective. It can be combined with PUVA or UVB. Side effects include anemia and a decrease in white blood cells and platelets.

*Antibiotics* are not routine treatment for psoriasis but can be prescribed whenever an infection triggers the outbreak of the disease.

## USEFUL FORMULATIONS FOR TREATING PSORIASIS

### Rx Psoriasis Moisturizing Ointment

Cocoa butter	50 g
White petrolatum	40 g
White wax	10 g

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Melt the white petrolatum and white wax at the lowest possible temperature and mix well.
4. Add the cocoa butter and mix while cooling.
5. Package and label.

### Rx Coal Tar 5% Ointment

Crude coal tar	5 g
Polysorbate 80	30 g
White petrolatum	65 g

1. Calculate the required quantity of each ingredient

for the amount to be prepared.

2. Accurately weigh/measure each ingredient.
3. Mix the crude coal tar with the polysorbate 80 until uniform.
4. Incorporate that mixture into the white petrolatum, geometrically, and mix until smooth and uniform.
5. Package and label.

#### **Rx Coal Tar Gel**

Coal tar solution	2 mL
Carbopol 940	500 mg
Ethanol 70%	qs 100 mL
Trolamine	qs to pH 6.5

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Disperse the Carbopol 940 in the ethanol and mix well.
4. Dropwise, add the trolamine until a pH of about 6.5 is obtained.
5. Incorporate the coal tar solution and mix well.
6. Allow to set until gelling is complete and mix until smooth, if necessary.
7. Package and label.

#### **Rx Salicylic Acid and Coal Tar Cream**

White Petrolatum	20 g
Lanolin alcohol	1.5 g
Cetearyl alcohol	10 g
Stearyl alcohol	3 g
Coal tar solution	5 g
Salicylic acid	5 g
Propylene glycol	10 mL
Methylparaben	200 mg
Propylparaben	100 mg
Purified water	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Melt the petrolatum, lanolin alcohol, cetearyl alcohol and stearyl alcohol at about 55 to 60°C.
4. Heat the purified water to about 55 to 60° C and add the methylparaben and propylparaben.
5. Add step 4 to step 3 and mix well. Cool to about 35° C.
6. Mix the coal tar solution and propylene glycol and add the salicylic acid and mix well.
7. Incorporate the mixture into the cooled cream base and mix well.
8. Package and label.

#### **Rx Coal Tar Medication Stick**

Coal Tar Solution	5 mL
Propylene glycol	13.5 g
Sodium stearate	1.5 g

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Heat the propylene glycol and sodium stearate at about 80-85° C until dissolved.
4. Allow the mixture to cool to about 60° C and add the coal tar solution with mixing.
5. Cool with intermittent stirring and pour into applicator tubes just prior to solidification.
6. Package and label.

#### **Rx Coal Tar and Salicylic Acid in Almond Oil Lotion**

Salicylic acid	2 g
Coal Tar Solution	3 mL
Ethoxy diglycol	8 mL
Almond oil	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Wet the salicylic acid with the ethoxydiglycol.
4. Incorporate the coal tar solution and mix well.
5. Add sufficient almond oil slowly with mixing to volume and mix well.
6. Package and label.

#### **Rx Coal Tar 5% and Salicylic Acid 10% Oil Suspension**

Coal tar topical solution	5 mL
Salicylic acid	10 g
Span 80	5 mL
Mineral oil, heavy	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Commminute the salicylic acid to a fine powder.
4. Add the coal tar solution and Span 80 and mix well.
5. Incorporate sufficient heavy mineral oil to volume and mix well.
6. Package and label.

#### **Rx Coal Tar and Hydrocortisone Lotion**

Coal tar solution	3 mL
Hydrocortisone	500 mg
Cetyl alcohol	2 g
Lanolin, Anhydrous	1 g
Mineral oil, Light	12 mL
Polysorbate 80	3 g
Propylene glycol	10 mL
Purified water	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Mix the coal tar solution and hydrocortisone.
4. Add the propylene glycol and mix well.
5. Melt the cetyl alcohol, lanolin and mineral oil together.
6. Add the polysorbate 80 to the melted mixture.
7. Warm 150 mL of water to 60° C and add to the melted oil phase.
8. Add the coal tar:hydrocortisone mixture and mix well.
9. Cool and stir until congealed.
10. Package and label.

#### **Rx Coal Tar Bath Solution**

Coal tar solution	7 g
Polysorbate 80	35 mL
Span 80	15 mL
Lavender oil	qs
Mineral oil, light	qs 100mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Mix the coal tar solution, polysorbate 80, span 80 and lavender oil.
4. Add sufficient mineral oil to volume and mix well.
5. Package and label. Shake well before using.



**Rx Coal Tar, Benzocaine and Salicylic Acid Lotion**

Coal tar solution	48.5 mL
Salicylic acid	1 g
Benzocaine	2 g
Ethanol 95%	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Dissolve the salicylic acid in 10 mL of ethanol.
4. Dissolve the benzocaine in 25 mL of ethanol.
5. Combine the two solutions and add the coal tar solution.
6. Add sufficient ethanol to volume and mix well.
7. Package and label.

**Rx Anthralin 1% Ointment**

Anthralin	1 g
Castor oil	10 mL
White petrolatum	qs 100 g

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Levigate the anthralin with the castor oil until a smooth mixture is obtained.
4. Geometrically, incorporate the white petrolatum and mix until smooth and uniform.
5. Package and label.

**Rx Anthralin 0.1% and Salicylic Acid 0.5% Cream**

Anthralin	100 mg
Salicylic acid	500 mg
Glycerin	qs
Dermabase™	qs 100 g

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Mix the anthralin and salicylic acid and ensure the particle size is small and uniform.
4. Incorporate a small quantity of glycerin to form a smooth paste.
5. Geometrically, incorporate the Dermabase™ and mix well.
6. Package and label.

**Rx Anthralin 0.2% and Salicylic Acid 2% Scalp Lotion**

Anthralin	200 mg
Salicylic acid	2 g
Peanut oil	50 mL
Coal tar solution	50 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Dissolve the anthralin and the salicylic acid in the coal tar solution.
4. Incorporate the peanut oil and mix well.
5. Package and label. Label: Shake Well Before Using.

**Rx Methoxsalen 0.3% Topical Solution**

Methoxsalen	300 mg
Propylene glycol	45 mL
Ethanol 95%	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Dissolve the methoxsalen in the propylene glycol.
4. Add sufficient ethanol 95% to volume and mix well.
5. Package and label.

**Rx Tacrolimus 0.03% or 0.1% Ointment**

Tacrolimus	30 mg 100 mg
Aquabase™	qs 100 g 100 g

1. Accurately weigh/measure each of the ingredients. Capsules can be used as the source of the Tacrolimus.
2. Empty the capsules and pulverize the powder.
3. Using either propylene glycol or ethoxy diglycol, make a smooth paste.
4. Incorporate the hydrophilic petrolatum geometrically to volume and mix well.
5. Package and label.

**Rx Zinc Pyrithione and Clobetasol Shampoo**

Zinc pyrithione	200 mg
Clobetasol 17 dipropionate	50 mg
Menthol	250 mg
Ethanol 95%	2 mL
Shampoo vehicle	qs 100 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Dissolve the menthol in the ethanol.
4. Add the zinc pyrithione and clobetasol 17 dipropionate and mix well.
5. Incorporate sufficient shampoo vehicle to volume and mix well.
6. Package and label.

**Rx Zinc Pyrithione 0.2% and Clobetasol 0.05% Lotion**

Zinc pyrithione	200 mg
Clobetasol propionate	50 mg
Isopropyl alcohol 91%	20 mL
Isopropyl myristate	80 mL

1. Calculate the required quantity of each ingredient for the amount to be prepared.
2. Accurately weigh/measure each ingredient.
3. Obtain the zinc pyrithione by drying until a solid is obtained.
4. Mix the zinc pyrithione and clobetasol propionate and comminute to a fine particle size.
5. Mix the isopropyl alcohol and isopropyl myristate together to form the vehicle.
6. Add a few drops of the vehicle mixture and make a smooth paste.
7. Add the remainder of the vehicle and mix well.
8. Package and label.

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4. Goroll, ed. Primary Care Medicine. 4th ed. Lippincott, Williams, and Wilkins, 2000:1033-36.

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Please circle the most appropriate answer for each of the following questions. There is only ONE correct answer per question.

1. Psoriasis is:  
I. contagious      II. chronic      III. hereditary  
A. I only  
B. III only  
C. I and II only  
D. II and III only  
E. I, II and III
2. Psoriasis is characterized by rapidly growing skin cells that build up on the skin's surface.  
A. true  
B. false
3. The most common type of psoriasis is:  
A. erythrodermic  
B. guttate  
C. inverse  
D. localized pustular  
E. plaque
4. What percent of patients may develop arthritis associated with psoriasis?  
A. <5  
B. 5-10  
C. 10-30  
D. 30-50  
E. >50
5. What severity level of psoriasis is experienced by most patients?  
A. mild  
B. moderate  
C. severe
6. Typical anthralin and coal tar solutions must be left on the skin for at least 12 hours per day to be effective.  
A. true  
B. false
7. The oldest, but still useful, topical preparations contain:  
I. anthralin      II. coal tar      III. calcipotriene  
A. I only  
B. III only  
C. I and II only  
D. II and III only  
E. I, II and III
8. Long-term use of corticosteroids may lead to decreased effectiveness.  
A. true  
B. false
9. Generally, treatment will follow what pattern?  
A. phototherapy then oral then topical  
B. oral then phototherapy then topical  
C. topical then oral then phototherapy  
D. oral then topical then phototherapy  
E. topical then phototherapy then oral
10. Which of the following are somewhat related to vitamins?  
I. tazarotene      II. calcipotriene      III. hydroxyurea  
A. I only  
B. III only  
C. I and II only  
D. II and III only  
E. I, II and III
11. My practice setting is:  
A. community-based      C. hospital-based  
B. managed care-based      D. consultant and other
12. The quality of the information presented in this article was:  
A. excellent      B. good      C. fair      D. poor
13. The test questions correspond well with the information presented.  
A. yes      B. no
14. Approximately how long did it take you to read the Secundum Artem article AND respond to the test questions? \_\_\_\_\_

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