

# Skin care solutions as unique as you.

Ask how compounding can help  
your problem skin.



## Compounding Options for Patients With Eczema, Psoriasis or Dry Skin

### Formula Examples

- Cyanocobalamin 0.07% Topical Cream (PCCA XemaTop™)
- Doxepin HCl 0.5%/Naltrexone HCl 1% Topical Cream (PCCA XemaTop)
- Tacrolimus 0.1%/Ketotifen 0.05% Topical Cream (PCCA XemaTop)
- Coal Tar Topical Solution 5%/Salicylic Acid 6%/Clobetasol Propionate 0.05% Topical Cream (PCCA XemaTop)
- Zinc Pyrithione 0.2%/Clobetasol Propionate 0.05%/Cyanocobalamin 0.07% Topical Cream (PCCA XemaTop)

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# From International Seminar: Compounding Options for Patients With Rosacea

By Nat Jones, RPh, FIACP, PCCA Pharmacy Consultant

I had the opportunity to give a presentation at International Seminar last month about some formulations that may help patients suffering from rosacea. For those who were unable to attend, here is a summary of what I discussed along with some bonus formulas.

Rosacea is a chronic inflammatory skin disease that affects about 16 million people in North America.<sup>1</sup> Greater than 75% of people with rosacea feel the condition has affected their self-esteem or made them uncomfortable in public settings and avoid social activities.<sup>2</sup> Rosacea affects both sexes, but it is almost three times more common in women than men. Patients are often between the ages of 30 and 50 and are usually Caucasians.

Rosacea is characterized by facial redness, small and superficial dilated blood vessels on facial skin, papules, pustules, and swelling. It typically begins as redness on the central face across the cheeks, nose or forehead, but can also less commonly affect the neck, chest, ears and scalp.

## SUBTYPES OF ROSACEA

- **Erythematotelangiectatic rosacea:** flushing, persistent redness, possible visible blood vessels
- **Papulopustular rosacea:** persistent redness with bumps and pimples that come and go
- **Phymatous rosacea:** skin thickening, enlargement of nose from excess tissue
- **Ocular rosacea:** I did not cover this subtype in my presentation, but list it here for reference

## FORMULA EXAMPLES FOR PATIENTS WITH ROSACEA

Below are some commonly requested formulas for patients with rosacea, all of which use PCCA Clarifying™ Base. Clarifying is ideal in these situations because not only does it contain an ingredient that has been shown to reduce oil formation,<sup>3</sup> it is moisturizing, and has natural ingredients that may improve the appearance of red, blotchy skin.

- PCCA Formula #11709  
Niacinamide 4%/Metronidazole 1% Topical Cream (Clarifying)
- PCCA Formula # 12191  
Ivermectin 1%/Niacinamide 5%/Potassium Azelaoyl Diglycinate 15% Topical Cream (Clarifying)

- PCCA Formula #12292  
Metronidazole 0.75%/Ivermectin 1% Topical Cream (Clarifying)
- PCCA Formula #11991  
Ivermectin 1%/Niacinamide 4% Topical Cream (Clarifying)
- PCCA Formula #11635  
Niacinamide 5%/Biotin 0.1%/Potassium Azelaoyl Diglycinate 6% Topical Cream (Clarifying)
- PCCA Formula #11639  
Potassium Azelaoyl Diglycinate 15%/Niacinamide 5% Topical Cream (Clarifying)

For more information on compounding options for patients with rosacea, see Sara Hover's "Cash-Friendly Options for Dermatological Compounding" (PCCA Document #99184). And for some help when talking to practitioners, see this month's *Marketplace Changes & Compounding Opportunities* (PCCA Document #99301). As always, if you have compounding questions, contact the PCCA Pharmacy Consulting Department at 800.331.2498.

## REFERENCES

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*Always be sure to check the PCCA Formula Database and follow the most up-to-date version of a formula as changes are continuously made to existing formulations to provide the highest quality. The formulas and/or statements listed are provided for educational purposes only. They are compounding ideas that have commonly been requested by physicians, and have not been evaluated by the Food and Drug Administration. Formulas and/or material listed are not to be interpreted as a promise, guarantee or claim of therapeutic efficacy or safety. The information contained herein is not intended to replace or substitute for conventional medical care, or encourage its abandonment. Every patient is unique, and formulas should be adjusted to meet their individual needs.* ©



## Topical Glutathione for Skin Lightening

By Jane H. Jones, RPh, PCCA Pharmacy Consultant

In the Pharmacy Consulting Department, we receive many calls about skin-lightening compounds. Some of the ingredients we recommend are hydroquinone, kojic acid, tretinoin, azelaic acid, and arbutin to name a few. Glutathione has been mentioned by Dr. Oz and other cosmetic companies as a safer alternative for skin lightening. It has been used as a topical cream in both Japan and India for its bleaching properties for many years.

### GLUTATHIONE BENEFITS AND PROPERTIES

Glutathione is an antioxidant that:

- Strengthens the immune system
- Prevents aging
- Detoxifies the liver
- Inhibits melanin production and lightens skin tone
- Kills free radicals in our bodies
- Helps support brain health

It is considered to be the most powerful, most versatile and most important part of the body's self-generated antioxidants (endogenous).

### GLUTATHIONE AND SKIN LIGHTENING

Topical glutathione is a safe and clinically proven skin lightener. The most interesting study is the one conducted by Watanabe in October 2014. The study abstract shows the following:

**SUBJECTS AND METHODS:** 30 healthy adult women aged 30 to 50 years. The study design was a randomized, double-blind, matched-pair, placebo-controlled clinical trial. Subjects applied glutathione 2% lotion to one side of the face and a placebo lotion to the other side twice daily for 10 weeks. The subjects were objectively measured for changes in melanin index values, moisture content of the stratum corneum, smoothness, wrinkle formation and elasticity of the skin. The principal investigator and each participant also used subjective scores to investigate skin whitening, wrinkle reduction and smoothness. Analysis of variance was used to evaluate differences between groups.

**RESULTS:** The skin melanin index was significantly lower with glutathione treatment than with placebo from the early weeks after the start of the trial through the end of the study period (at 10 weeks,  $P < 0.001$ ). In addition, in the latter half of the study period glutathione treated sites had significant increases in moisture content of the stratum corneum, suppression of wrinkle formation, and improvement in skin smoothness. There were no marked adverse effects from glutathione application.

**CONCLUSION:** Topical glutathione is safe. It effectively whitens the skin and improves skin condition in healthy women.

The women in the study used a glutathione cream manufactured in Japan. They applied only 0.5 gram twice daily to clean, patted-dry skin. They were told to avoid the sun and use of any makeup during the 10 weeks of trial. The results were very positive with little adverse side effects.

### SUPPLEMENTAL GLUTATHIONE

Glutathione, as a supplement, has many therapeutic benefits. It works from inside of the body to:

- Repair and nourish the skin
- Lighten and give the skin a radiant glow
- Minimize skin pores
- Improve skin hyperpigmentation
- Boost skin clarity and smoothness
- Help prevent and slow down the aging process

### NEW PCCA FORMULAS WITH GLUTATHIONE FOR SKIN LIGHTENING:

#### PCCA Formula #11347

Glutathione 10%/Sunscreen Topical Cream (VersaBase®)

**Note:** Ascorbic acid, lipoic acid, vitamin E and sunscreens were added to make a more comprehensive skin lightening cream in VersaBase Cream.

#### PCCA Formula #11348

Glutathione 5%/Aluminum Chlorohydrate 10% Topical Lotion (VersaBase)

**Note:** It is common to have some discoloration or darkening in the underarm area. This formula was written to be used as both a deodorant and skin lightener for this area.

Please contact the PCCA Pharmacy Consulting Department with any questions regarding the use of the abovementioned formulas.

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## Hyperpigmented Skin Following a Thermal Burn Injury

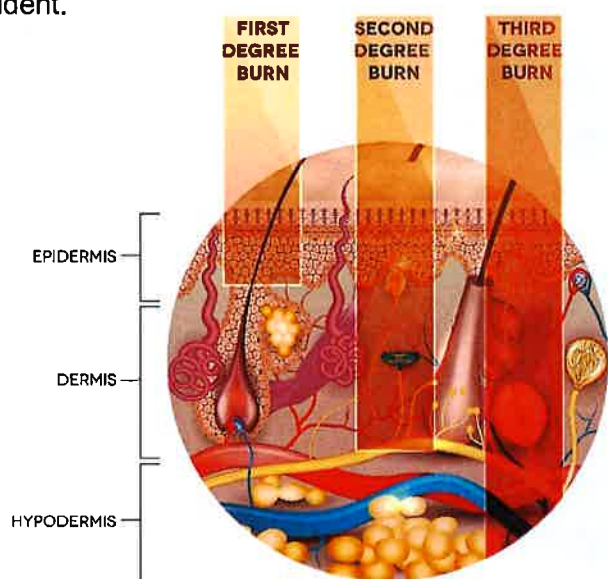
**SUMMARY:** Thermal burns, though preventable, are a common domestic incident worldwide that may result in morbidity and even death. Scarring and hyperpigmented skin, although not life-threatening, may have serious psychosocial consequences and it is therefore important to seek medical advice. This case study demonstrates the successful treatment of hyperpigmented skin with PCCA Formula 6829.

*Submitted by: Omar Eliwa, RPh, Clinical Services Manager at Hayat Pharmacy, Milwaukee, WI.*

### Introduction:

A burn is an injury to the skin or other organic tissues primarily caused by heat (thermal burns). Although preventable, burns are a global public health issue accounting for an estimated 180,000 deaths annually<sup>1</sup>. In 2016, there were 486,000 burn injuries in the USA requiring medical treatment<sup>2</sup>. The majority of the incidents occur in the home and workplace; children and women are usually burned in domestic kitchens<sup>1</sup>. Burns are classified as first-degree (superficial), second-degree (partial thickness), or third-degree (full thickness), depending on how deep and severely they penetrate the surface of the skin<sup>3</sup> (Fig. 1). Postinflammatory hyperpigmentation of the skin (melanosis) may occur following a thermal burn, mainly in darker skin types, which is commonly resolved with a combination of topical treatments<sup>4</sup>.

The purpose of this case study is to discuss the management of hyperpigmented skin following a thermal burn injury that resulted from a domestic incident.



**Figure 1.** Schematic representation of the skin burn degrees (adapted from Tefi/Shutterstock.com).

### Case Report:

A 44-year-old black female was severely burned on the right arm while cooking a meal in the oven (Fig. 2). The patient visited the local pharmacy to seek advice on how to manage her second-degree thermal burn injury. The pharmacist recommended a topical scar product to be applied in a thin layer, twice daily. Following one month of treatment the wound was fully closed but the patient's skin was still darkened. The patient was then recommended to see a dermatologist who prescribed a compounded medication including a combination of skin lightening drugs incorporated in the proprietary base Vanishing Cream Light™, as displayed in Table 1 (PCCA Formula 6829). Hydroquinone, glycolic acid and tretinoin are dermatological drugs commonly used in hyperpigmentation conditions. Hydrocortisone, on the other hand, is a corticosteroid with multiple topical applications commonly applied from 0.1 to 2.5%<sup>5</sup>. PCCA Vanishing Cream Light™ is an elegant, medium-thickness cream that is paraben-free and petrolatum-free; it is also non-comedogenic and may be used for a variety of actives. The patient applied a thin layer of the compounded medication, at bedtime, for 4 months; a total of 60 g (30 g + 30 g) was dispensed.

Rx
Hydroquinone 8%
Glycolic Acid 8% (w/w)
Tretinoin 0.05%
Hydrocortisone 0.5%
Base, PCCA Vanishing Cream Light™

**Table 1.** PCCA Formula 6829: Hydroquinone 8%, Glycolic Acid 8% (w/w), Tretinoin 0.05% and Hydrocortisone 0.5% Topical Cream (PCCA Vanishing Cream Light™).



### Methodology:

The Treatment Satisfaction Questionnaire for Medication (TSQM) was the research instrument used to evaluate 4 domains: perceived effectiveness, side effects, convenience and global satisfaction with regards to the use of the skin lightening compounded medication over the course of treatment. The TSQM Version II comprises 11 questions which rate the patient's level of satisfaction or dissatisfaction with the medication. The effectiveness and global satisfaction domains comprise 2 questions each whereas the convenience and side effects domains comprise 3 and 4 questions, respectively. The TSQM is a generic measure, as opposed to the disease-specific questionnaires, and it is psychometric sound and valid<sup>6</sup>.

### Results and Discussion:

The patient answered all questions of the TSQM following 4 months of treatment with the compounded medication. All questions were rated with the maximum score, meaning that the patient perceived the compounded medication as 100% effective and convenient, with no side effects, and an overall global satisfaction of 100%. For instance, with regards to effectiveness, the patient was 'extremely satisfied' with the ability of the medication to treat the condition and also with the way the medication relieves symptoms. The patient reported outcomes are consistent with visual improvements observed in Figure 3, which shows a complete recovery of the hyperpigmented skin.



**Figures 2 and 3.** Digital images of the patient's thermal burn injury: before treatment (left) and 4 months post-treatment (right) with a skin lightening compounded medication (PCCA Formula 6829).

### Conclusions:

Thermal burns, though preventable, are a common domestic incident worldwide that may result in morbidity and even death. Scarring and hyperpigmented skin, although not life-threatening, may have serious psychosocial consequences and it is therefore important to seek medical advice. Compounded medications offer the possibility to combine multiple drugs in a topical base developed for specific skin conditions, such as PCCA Vanishing Cream Light™. This case study demonstrates the successful treatment of hyperpigmented skin following a thermal burn injury. The patient rated the 4 primary domains of the medication as 100%, indicating that the PCCA Formula 6829 was effective, convenient and with no side-effects.

**Copyright statement:** The TSQM and the corresponding scoring algorithm are licensed materials. Formal permission was obtained from QuintilesIMS to use these materials for the purposes of PCCA case studies. Those seeking information or permission to use the TSQM are directed to Quintiles at [www.quintilesims.com/TSQM](http://www.quintilesims.com/TSQM) or [TSQM@quintilesims.com](mailto:TSQM@quintilesims.com)

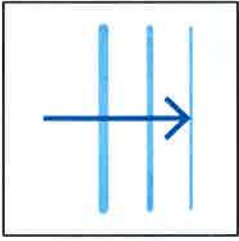
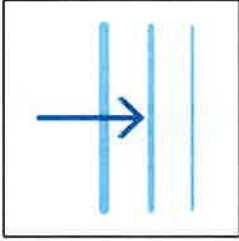
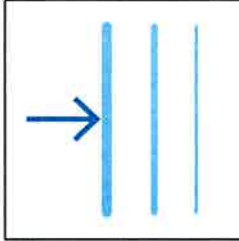
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# The Anhydrous Trio |

These PCCA bases bring longer default BUDs, for an efficient pharmacy and happy patients.

PERMEATION ENHANCEMENT	DEFAULT BUDs*	COMMON APIs	FORMULATED WITHOUT	CLINICAL STUDIES**	IDEAL FOR HRT FORMULAS	IDEAL FOR PAIN MANAGEMENT FORMULAS	IDEAL FOR DERMATOLOGY FORMULAS	IDEAL FOR VETERINARY FORMULAS
 Permeation Enhancing	180 days	<ul style="list-style-type: none"> <li>Lidocaine</li> <li>Benzocaine</li> <li>Tetracaine</li> <li>Ketoprofen</li> <li>Gabapentin</li> <li>Amitriptyline</li> <li>Ondansetron</li> </ul>	<ul style="list-style-type: none"> <li>Preservatives</li> <li>Petrolatum/mineral oil</li> <li>Soy</li> <li>Gluten</li> </ul>	Yes		✓		✓
 Topical HRT	180 days	<ul style="list-style-type: none"> <li>Estriol</li> <li>Estradiol</li> <li>Progesterone</li> <li>DHEA</li> </ul>	<ul style="list-style-type: none"> <li>Preservatives</li> <li>Petrolatum/mineral oil</li> <li>Soy</li> <li>Gluten</li> <li>Nuts</li> </ul>	Yes	✓			
 Topical	180 days	<ul style="list-style-type: none"> <li>Hydroquinone</li> <li>Ascorbic acid</li> <li>Hydrocortisone</li> <li>Tretinoin</li> <li>Clindamycin</li> </ul>	<ul style="list-style-type: none"> <li>Preservatives</li> <li>Petrolatum/mineral oil</li> <li>Soy</li> <li>Gluten</li> </ul>	Yes			✓	✓

# Commonly Requested Compounding Ideas for Dermatology Patients



## Commonly Requested Formulas for Patients with Rosacea

For more information, see PCCA Document #99301, *Rosacea Marketplace Changes & Compounding Opportunities*.

PCCA Formula # 12495	Ketotifen 0.05% Topical Cream (XemaTop™) (FormulaPlus™ • BUD Study)
PCCA Formula # 13665	Praziquantel 3%/Azelaic Acid 0.1% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13591	Metronidazole 0.75%/Ketotifen 0.05% Topical Cream (VersaBase®)
PCCA Formula # 13436	Azelaic Acid 15%/Metronidazole 1.2% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13410	Azelaic Acid 15%/Ketotifen 0.05%/Oxymetazoline HCl 1% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13128	Azelaic Acid 18%/Brimonidine Tartrate 0.4%/Niacinamide 4% Topical Cream (Clarifying™)
PCCA Formula # 13101	Azelastine HCl 0.15%/Brimonidine Tartrate 0.5% Topical Cream (Clarifying™)
PCCA Formula # 11936	Milk Thistle/Dimethyl Sulfone Compound Topical Cream (XemaTop™)
PCCA Formula # 11883	Metronidazole 1%/Niacinamide 4% Topical Cream (XemaTop™)
PCCA Formula # 11711	Oxymetazoline HCl 0.06% Topical Cream (Clarifying™)
PCCA Formula # 11710	Niacinamide 5%/Biotin 0.2%/Glycosaminoglycans/Dimethyl Sulfone Topical Cream (Clarifying™)
PCCA Formula # 10723	Brimonidine Tartrate 0.5% Topical Gel (PracaSil®-Plus/VersaBase®)

## Commonly Requested Formulas for Patients with Psoriasis/Eczema

PCCA Formula # 11788	Zinc Pyrithione 0.2%/Clobetasol Propionate 0.05%/Cyanocobalamin 0.07% Topical Cream (XemaTop™) (FormulaPlus™ • BUD Study)
PCCA Formula # 12495	Ketotifen 0.05% Topical Cream (XemaTop™) (FormulaPlus™ • BUD Study)
PCCA Formula # 13595	Ketotifen 0.05%/Naltrexone HCl 1% Topical Cream (VersaBase®)
PCCA Formula # 13567	Azelastine HCl 0.1%/Clobetasol Propionate 0.05% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13432	Betamethasone Valerate 0.008%/Mupirocin 0.15% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13568	Tacrolimus 0.1%/Naltrexone HCl 0.5% Topical Gel (WO6® Anhydrous)
PCCA Formula # 12578	Ketotifen 0.05%/Cyanocobalamin 0.07% Topical Cream (XemaTop™)
PCCA Formula # 13100	Carbamazepine 2%/Zinc Pyrithione 0.2%/Cyanocobalamin 0.07% Topical Cream (XemaTop™)
PCCA Formula # 11962	Montelukast 1%/Ketotifen 0.05% Topical Cream (XemaTop™)

For more information, see PCCA Document #99161, **Compounding and Dermatology**, and #99184, **Cash-Friendly Options for Dermatological Compounding**.

PCCA's dermatology-focused bases are designed to make a difference for your patients and your practice:

### Clarifying™ Base (PCCA #30-4845)

An elegant compounding emulsion created for patients with problem skin such as acne or rosacea.

- Contains natural ingredients that may improve the appearance of red, blotchy skin
- The unique avocado extract supports healthy skin and decreases oil formation
- May reduce the chances of irritation that are often seen with acne medications

### XemaTop™ (PCCA #30-4891)

A compounding base used in formulations for patients with eczema, psoriasis and xerosis (dry skin).

- Reduces the appearance of red and irritated skin
- Replenishes the lipids within the skin
- Nourishes the skin's structural integrity
- Helps restore the skin's barrier and prevent water loss

### WO6® Anhydrous Topical Gel

(PCCA #30-5039) An elegant, stable, anhydrous topical base suitable for a broad range of dermatological or cosmetic applications.

- Anhydrous, which allows for longer default BUDs
- Smooth and creamy, offering a refined cosmetic feel without a greasy or tacky residue
- Emollient properties, moisturizing and softening the skin as it delivers APIs



Tel: 800.331.2498 | Fax: 800.874.5760 | [pccarx.com](http://pccarx.com)

Please contact PCCA's Clinical Services department with questions regarding the formulations. Page 1 of 8

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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

PCCA Formula # 12509	Tacrolimus 0.1%/Ketotifen 0.05% Topical Cream (XemaTop™)
PCCA Formula # 12711	Fluocinolone Acetonide 0.01%/Ketotifen 0.05% Topical Cream (XemaTop™)
PCCA Formula # 11781	Cyanocobalamin 1% Topical Cream (XemaTop™)
PCCA Formula # 11791	Tacrolimus 0.1%/Cyanocobalamin 0.07%/Zinc Pyrithione 0.2% Topical Cream (XemaTop™)
PCCA Formula # 11940	Naltrexone HCl 0.5%/Diphenhydramine HCl 2%/Vitamin D3 5000 IU/Gm Topical Cream (XemaTop™)
PCCA Formula # 12339	Methotrexate 1% Topical Cream (XemaTop™)
PCCA Formula # 11969	Coal Tar Topical Solution 5%/Salicylic Acid 6%/Clobetasol Propionate 0.05% Topical Cream (XemaTop™)
PCCA Formula # 11794	Anthralin 1%/Coal Tar Topical Solution 5% Topical Cream (XemaTop™)
PCCA Formula # 6952	Cyanocobalamin 0.1% Topical Foam (VersaBase®)

### Commonly Requested Formulas for Patients with Acne

PCCA Formula # 13340	Niacinamide 4%/Biotin 0.1%/Lipoic Acid 0.5% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13336	Clindamycin 1%/Niacinamide 4%/Tretinoin 0.025% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13082	Progesterone 0.25%/Spironolactone 1%/Potassium Azelaoyl Diglycinate Topical Cream (Clarifying™)
PCCA Formula # 12436	Niacinamide 5%/Tea Tree Oil 5%/Retinol Molecular/NataPres® Topical Gel (WO6® Anhydrous)
PCCA Formula # 12449	Azelaic Acid 5%/Clindamycin 2% Topical Cream (Clarifying™)
PCCA Formula # 11800	Clindamycin 1%/Benzoyl Peroxide 5%/Vitamin D3 0.5%/Superoxide Dismutase Topical Cream (Clarifying™)
PCCA Formula # 11702	Sulfacetamide Sodium 10%/Sulfur 5% Topical Cream (Clarifying™)
PCCA Formula # 12047	Clindamycin 1%/Tretinoin 0.025% Topical Cream (Clarifying™)
PCCA Formula # 11696	Azelaic Acid 15% Topical Cream (Clarifying™)
PCCA Formula # 11708	Tretinoin 0.05%/Sodium Hyaluronate Topical Cream (Clarifying™)
PCCA Formula # 11705	Tretinoin 0.05%/Erythromycin 3% Topical Cream (Clarifying™)
PCCA Formula # 11996	Clindamycin 1%/Benzoyl Peroxide 5% Topical Cream (Clarifying™)
PCCA Formula # 11701	Niacinamide 4% Topical Cream (Clarifying™)
PCCA Formula # 11760	Spironolactone 5% Topical Cream (Clarifying™)
PCCA Formula # 11634	Erythromycin 2% Topical Cream (Clarifying™)
PCCA Formula # 12467	Spironolactone 2.5%/Clindamycin 1%/Tetrahydrocurcuminoids Topical Cream (VersaBase®)
PCCA Formula # 11704	Tretinoin 0.05%/Gluconolactone/Lactic Acid Topical Cream (Clarifying™)
PCCA Formula # 11836	Clindamycin 2%/Hydroquinone 4% Topical Cream (Clarifying™)
PCCA Formula # 11590	Benzoyl Peroxide 20% Topical Cream (Clarifying™)
PCCA Formula # 11323	EGCg 200 mg/Levocarnitine 10 mg Slow Release Capsules Size #0 (LoxOral®)
PCCA Formula # 10096	Salicylic Acid 1%/Mandelic Acid/NataPres® Facial Foam Cleanser
PCCA Formula # 9018	Salicylic Acid 2%/Mandelic Acid/Niacinamide Cleansing Pads

### Commonly Requested Formulas for Patients with Acne Scars

PCCA Formula # 13096	Tretinoin 0.02%/Ascorbic Acid 2%/Palmitoyl Pentapeptide-4/Aloe Vera Topical Serum
PCCA Formula # 11058	Topiramate 2.5% Topical Gel (PracaSil®-Flus)

### Commonly Requested Formulas for Patients with Scars

For more information, see PCCA Document #98719, *Commonly Requested Compounding Ideas for Patients with Scars*.

PCCA Formula # 10419	Tretinoin 0.1% Topical Gel (PracaSil®-Plus) (FormulaPlus™ • BUD Study)
PCCA Formula # 10719	Aloe Vera 0.5% Topical Gel (PracaSil®-Plus)
PCCA Formula # 10751	Ascorbic Acid/Dimethyl Sulfone/Beta Glucan/Glucosaminoglycans Topical Gel (PracaSil®-Plus)
PCCA Formula # 10416	Urea 15%/PracaSil®-Plus Topical Gel (Spira-Wash®)
PCCA Formula # 10710	Sodium Hyaluronate/Beta Glucan/Glycosaminoglycans Topical Gel (PracaSil®-Plus)



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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

### Commonly Requested Formulas for Patients with Warts

PCCA Formula # 13335	Salicylic Acid 30%/Fluorouracil 5%/Deoxy-D-Glucose 0.2% Topical Paste (VersaBase®)
PCCA Formula # 13127	Fluorouracil 2%/Salicylic Acid 17% Flexible Collodion Topical Gel
PCCA Formula # 11073	Cimetidine 10%/Fluorouracil 5%/Deoxy-D-Glucose (2) 2%/Salicylic Acid 10%/Imiquimod 5% Topical Lipoderm®
PCCA Formula # 12016	Acyclovir 2%/Naltrexone HCl 1%/EGCg 0.2%/Salicylic Acid 3%/Cimetidine 15% Topical Anhydrous Lipoderm®
PCCA Formula # 11417	Cimetidine 10%/Fluorouracil 5%/Deoxy-D-Glucose (2) 2%/Imiquimod 5% Topical Lipoderm®
PCCA Formula # 12048	Naltrexone HCl 1%/Deoxy-D-Glucose (2) 0.2%/EGCg 0.2%/Cimetidine 15%/Salicylic Acid 15%/Vitamin A Palmitate 25,000 U/Gm/Zinc Acetate 0.5% Topical Anhydrous Lipoderm®
PCCA Formula # 11001	Imiquimod 5%/Deoxy-D-Glucose (2) 0.2% Topical Gel (PracaSil®-Plus)
PCCA Formula # 11070	Imiquimod 5%/Fluorouracil 5%/Salicylic Acid 30%/Tretinoin 0.1% Topical Gel (VersaBase®)
PCCA Formula # 9403	Fluorouracil 5%/Salicylic Acid 15%/Cimetidine 5%/Deoxy-D-Glucose (2) 0.2% Topical Lipoderm®
PCCA Formula # 5615	Cimetidine 10%/Deoxy-D-Glucose (2) 0.29%/Ibuprofen 2% Topical Lipoderm®
PCCA Formula # 10847	Cimetidine 10%/Deoxy-D-Glucose (2) 0.2%/Ibuprofen 2%/Lidocaine 5%/Salicylic Acid 15% Topical Occlusaderm®
PCCA Formula # 10359	Salicylic Acid 15%/Cimetidine 5% Topical Occlusaderm®
PCCA Formula # 0375	Squaric Acid Dibutyl Ester 0.1% Topical Solution
PCCA Formula # 9587	Diphenylcyclopropenone 0.1% Topical Solution
PCCA Formula # 9589	Diphenylcyclopropenone 2% Topical Solution
PCCA Formula # 4257	Diphenylcyclopropenone 0.01% Topical Solution
PCCA Formula # 2145	Cantharidin Topical Liquid
PCCA Formula # 2191	Cantharidin Plus Topical Liquid

### Commonly Requested Formulas for Patients with Nail Fungus

See PCCA Document #99278, *Compounding Options for Nail Fungus*, and #99251, *The Rising Costs of Nail Fungus Prescriptions*.

PCCA Formula # 12663	Fluconazole 2%/Ibuprofen 2%/DMSO Nail Solution
PCCA Formula # 12661	Clotrimazole 2%/Ibuprofen 2%/DMSO Nail Solution
PCCA Formula # 12660	Itraconazole 2%/Ibuprofen 2%/DMSO Nail Solution
PCCA Formula # 12538	Ciclopirox 8%/Itraconazole 3%/Ibuprofen 2%/Fluconazole 3%/Terbinafine HCl 1%/DMSO Topical Suspension
PCCA Formula # 11990	Itraconazole 1%/Terbinafine HCl 3%/Tea Tree Oil 6.6%/Urea 10%/Biotin 0.6%/DMSO Nail Suspension
PCCA Formula # 0729	Ketoconazole 2 %/DMSO Nail Solution

### Commonly Requested Formulas for Patients Requesting Skin Bleaching/Skin Lightening

See PCCA Document #98253, *Skin Lightening Agents*, and #99257, *Topical Glutathione for Skin Lightening*.

PCCA Formula # 11851	Hydroquinone 8% Topical Cream (FormulaPlus™ • BUD Study)
PCCA Formula # 10826	Fluocinolone Acetonide 0.01%/Hydroquinone 4%/Tretinoin 0.05% Topical Gel (PracaSil®-Plus) (FormulaPlus™ • BUD Study)
PCCA Formula # 13222	Hydroquinone 6%/Hydrocortisone 0.5%/Kojic Acid 6%/Tretinoin 0.025% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13217	Fluocinolone Acetonide 0.01%/Hydroquinone 4%/Tretinoin 0.05% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13234	Hydroquinone 20% Topical Gel (WO6® Anhydrous)
PCCA Formula # 12098	Hydroquinone 8%/Tretinoin 0.1% Topical Cream (XemaTop™)
PCCA Formula # 10759	Hydroquinone 7%/Kojic Acid 0.05%/Tretinoin 0.05%/Hydrocortisone 0.05% Topical Gel (VersaBase®)



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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

PCCA Formula # 10709	Kojic Acid 6%/Hydroquinone 6%/Hydrocortisone 0.5%/Tretinoin 0.005% Topical Gel (PracaSil®-Plus)
PCCA Formula # 10603	Hydroquinone 4% Topical Gel (PracaSil®-Plus)
PCCA Formula # 8936	Tretinoin 0.025%/Hydrocortisone 1%/Hydroquinone 10% Topical Cream
PCCA Formula # 5496	Tretinoin 0.1%/Triamcinolone 0.1%/Hydroquinone 5% Topical Gel (VersaBase®)
PCCA Formula # 10284	Hydroquinone 4%/Glycolic Acid 2.5% (W/W)/Tretinoin 0.05%/Ascorbic Acid 1% Topical Lotion (VersaBase®)
PCCA Formula # 11347	Glutathione 10%/Sunscreen Topical Cream
PCCA Formula # 11348	Glutathione 5%/Aluminum Chlorohydrate 10% Topical Lotion (VersaBase®)
PCCA Formula # 13071	Niacinamide 2%/Tranexamic Acid 2% Topical Cream (VersaBase®)
PCCA Formula # 11510	Tranexamic Acid 3%/Kojic Acid 2% Topical Cream

### Commonly Requested Formulas for Patients with Vitiligo

PCCA Formula # 13154	Fluorouracil 5%/Triamcinolone Acetonide 1% Topical Cream (VersaBase®)
PCCA Formula # 13153	Fluorouracil 5%/Naltrexone HCl 0.025% Topical Cream (VersaBase®)
PCCA Formula # 5192	Pseudocatalase Topical Cream
PCCA Formula # 11076	Phenylalanine (L) 10% Topical Cream
PCCA Formula # 10804	Naltrexone HCl 0.5 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 12584	Naltrexone HCl 4.5 mg Capsules Size #3 (LoxOral®)

### Commonly Requested Formulas for Patients Requiring a Pre-Peel Preparation

*Prepares skin for the procedure.*

PCCA Formula # 7562	Mandelic Acid/Glycolic Acid/Lactic Acid/Beta Glucan/Panthenol/Sodium Pyrrolidone Carboxylate Topical Gel (VersaBase®)
PCCA Formula # 8896	Gluconolactone/Mandelic Acid/Lactic Acid/Panthenol Topical Solution
PCCA Formula # 6829	Hydroquinone 8%/Glycolic Acid 8% (W/W)/Tretinoin 0.05%/ Hydrocortisone 0.5% Topical Cream
PCCA Formula # 7932	Gluconolactone 3%/Vitamin E Acetate 1%/Chrysaderm® Night Cream
PCCA Formula # 8997	Mequinol 2%/Tretinoin 0.01% Topical Solution (Alcohol Free)

### Commonly Requested Formulas for Patients Requiring a Post-Peel Preparation

*For daily use to help renew/restore damaged skin and prevent redamage*

PCCA Formula # 9635	Sodium Bicarbonate 2% Topical Gel (VersaBase®)
PCCA Formula # 9097	Beta Glucan/Sodium Hyaluronate Topical Solution
PCCA Formula # 6840	After Peel Cream
PCCA Formula # 8894	Octinoxate 7%/Oxybenzone 5% Topical Spray

### Commonly Requested Formulas for Patients Requiring Facial Peels

**Caution:** Make sure you are familiar with the classification and depth of peel penetration for safety. Peel depth varies depending on the API, combination of APIs and application process. Peels must always be under direct medical supervision. If uncertain, please contact PCCA Clinical Services for more information.

### Commonly Requested Formulas for Patients Requiring a Superficial to Medium-Depth Peel

PCCA Formula # 9228	Salicylic Acid 30% (W/V) Topical Peel Solution
PCCA Formula # 6723	Glycolic Acid 45% (W/V)/Hydroquinone 2% Peel Solution
PCCA Formula # 10832	Lactic Acid 30% (W/V) Peel Solution
PCCA Formula # 6833	Salicylic Acid 40% Topical Peel Gel
PCCA Formula # 6830	Tretinoin 5% Topical Peel Cream



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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

PCCA Formula # 0517	Jessner's Topical Solution
PCCA Formula # 9610	Jessner's Topical Solution (Modified) - Superficial
PCCA Formula # 12397	Kojic Acid 4%/Trichloroacetic Acid 9% (W/W)/Salicylic Acid 4%/Glycolic Acid 4% (W/W)/Arbutin Facial Peel
PCCA Formula # 10756	Salicylic Acid 14%/Kojic Acid 3%/Citric Acid 5%/Trichloroacetic Acid 10%/Hydroquinone 2% Peel Solution
PCCA Formula # 10419	Tretinoin 0.1% Topical Gel (PracaSil®-Plus) (BUD Study)
PCCA Formula # 10326	Resorcinol 7%/Salicylic Acid 7%/Lactic Acid 7% (W/V)/Panthenol 2% Topical Peel
PCCA Formula # 10130	Tretinoin 5% Topical Peel (Occlusaderm®)
PCCA Formula # 10105	Glycolic Acid 20%/Trichloroacetic Acid 15%/ Kojic Acid 2% Topical Peel
PCCA Formula # 9621	Salicylic Acid 2%/Trichloroacetic Acid 7%/Mandelic Acid Topical Solution
PCCA Formula # 13602	Hydroquinone 5%/Fluticasone Propionate 0.05%/Tretinoin 0.3% Topical Gel (PermE8®/WO6® Anhydrous)

### Commonly Requested Formulas for Patients Requiring a Medium to Deep-Depth Peel

**Caution:** Must be under direct medical supervision.

PCCA Formula # 3218	Trichloroacetic Acid 35% (W/V) Topical Solution
PCCA Formula # 3466	Glycolic Acid 70% (W/V) Topical Peel Gel (Unbuffered)
PCCA Formula # 2154	Phenol Liquefied 54%/Croton Oil Topical Gel
PCCA Formula # 0349	Phenol Liquefied 54%/Croton Oil Topical Solution
PCCA Formula # 13639	Phenol 35% (W/V)/Croton Oil Topical Solution

### Commonly Requested Formulas for Patients Doing Microneedling

For more information on microneedling options, see PCCA Document #98129, *Cosmetic Compounding Ideas/Formulations Marketing Sheet*.

PCCA Formula # 13216	Benzocaine 10%/Lidocaine 5%/Tetracaine 2% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13154	Fluorouracil 5%/Triamcinolone Acetonide 1% Topical Cream (VersaBase®)
PCCA Formula # 13153	Fluorouracil 5%/Naltrexone HCl 0.025% Topical Cream (VersaBase®)
PCCA Formula # 13096	Tretinoin 0.02%/Ascorbic Acid 2%/Palmitoyl Pentapeptide-4/Aloe Vera Topical Serum
PCCA Formula # 12693	Lidocaine 10%/Tetracaine 4%/Prilocaine HCl 10%/Phenylephrine HCl 1% Topical Gel (PracaSil®-Plus/Spira-Wash®)
PCCA Formula # 12073	Benzocaine 10%/Lidocaine 5%/Tetracaine 2% Topical Cream (VersaBase®)

### Commonly Requested Formulas for Patients with Hair Loss

PCCA Formula # 13521	Minoxidil 7.5%/Naltrexone HCl 0.5% Topical Gel (Atrevis Hydrogel®)
PCCA Formula # 13088	Minoxidil 5%/Progesterone 0.25%/Cyanocobalamin 0.07%/Melatonin 0.1%/Coenzyme Q-10 0.1% Topical Solution
PCCA Formula # 11355	Minoxidil 5%/Tretinoin 0.025%/Finasteride 0.05% Topical Solution
PCCA Formula # 10360	Minoxidil 10%/Azelaic Acid 5% Topical Solution
PCCA Formula # 11353	Minoxidil 10%/Finasteride 0.1% Topical Gel (VersaBase®)
PCCA Formula # 11352	Minoxidil 10%/Finasteride 0.1% Topical Solution
PCCA Formula # 12261	Minoxidil 5%/Melatonin 0.1%/Finasteride 0.1%/Tretinoin 0.05% Scalp Solution
PCCA Formula # 12478	Minoxidil 5%/Tretinoin 0.025% Topical Gel
PCCA Formula # 11361	Finasteride 1 mg/Biotin 1.2 mg/Magnesium Glycinate Capsules Size #0 (LoxOral®)
PCCA Formula # 11358	Minoxidil 7.5%/Estradiol 0.025%/Finasteride 0.1% Topical Solution
PCCA Formula # 11356	Minoxidil 2%/Tretinoin 0.025%/Finasteride 0.05%/Progesterone 0.05% Topical Solution
PCCA Formula # 11354	Minoxidil 8.5%/Finasteride 0.1% Topical Shampoo (VersaBase®)



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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

PCCA Formula # 11196	Minoxidil 5%/Azelaic Acid 1.5%/Tretinoin 0.025%/Progesterone 0.25%/Finasteride 0.1% Topical Foam (VersaBase®)
PCCA Formula # 11104	Minoxidil 5%/Azelaic Acid 5% Topical Foam (VersaBase®)
PCCA Formula # 11061	Minoxidil 10%/Zinc Pyrithione 1% Topical Suspension
PCCA Formula # 10935	Minoxidil 10%/Finasteride 0.1%/Tretinoin 0.025%/Fluocinolone Acetonide 0.025% Topical Solution
PCCA Formula # 10645	Minoxidil 10% Topical Shampoo (VersaBase®)
PCCA Formula # 10173	Minoxidil 15% Topical Solution

### Commonly Requested Formulas for Patients Needing an Anesthetic

See PCCA Document #98634, *Compounding Topical Anesthetics*, and PCCA Document #98628, *Toxicities of Topical Anesthetics*.

PCCA Formula # 9872	Benzocaine 20%/Lidocaine 6%/Tetracaine 4%/DMSO 10% Topical Lipoderm® (FormulaPlus™ • BUD Study)
PCCA Formula # 9445	Benzocaine 20%/Lidocaine 6%/Tetracaine 4% Topical Lipoderm® (FormulaPlus™ • BUD Study)
PCCA Formula # 13603	Benzocaine 10%/Lidocaine 5%/Tetracaine 2% Topical Gel (PermeE8®/WO6® Anhydrous)
PCCA Formula # 10117	Benzocaine 20%/Lidocaine 6%/Tetracaine 4% Topical Ointment (Plasticized™)
PCCA Formula # 11652	Benzocaine 20%/Lidocaine 10%/Tetracaine 4% Topical Cream (VersaBase®)
PCCA Formula # 12073	Benzocaine 10%/Lidocaine 5%/Tetracaine 2% Topical Cream (VersaBase®)
PCCA Formula # 5733	Lidocaine 6%/Tetracaine 6%/Benzocaine 4% Topical Gel
PCCA Formula # 8596	Lidocaine 23%/Tetracaine 7% Topical Ointment (Plasticized™)

### Commonly Requested Formulas for Patients with Shingles

PCCA Formula # 13209	Acyclovir 2%/Gabapentin 10%/Ketoprofen 5%/Amitriptyline HCl 2%/Tetracaine 1% Topical Gel (PermeE8® Anhydrous)
PCCA Formula # 13211	Acyclovir 5%/Amitriptyline HCl 2%/Ketoprofen 5%/Bupivacaine HCl 1%/Gabapentin 6% Topical Gel (PermeE8® Anhydrous)
PCCA Formula # 11398	Acyclovir 5%/Amitriptyline HCl 2%/Ketoprofen 5%/Bupivacaine HCl 1%/Gabapentin 6% Topical Gel (PracaSil®-Plus)
PCCA Formula # 9989	Deoxy-D-Glucose (2) 2%/Gabapentin 10%/Ketoprofen 5%/Amitriptyline HCl 2%/Tetracaine HCl 1% Topical Lipoderm®
PCCA Formula # 11964	Arginine HCl 1%/Aloe Vera 0.2%/Misoprostol 0.0024%/Naltrexone HCl 1%/Phenytoin 2% Topical Gel (Spira-Wash®)
PCCA Formula # 9988	Deoxy-D-Glucose (2) 0.2%/Gabapentin 5%/Ketoprofen 5%/Amitriptyline HCl 2%/Tetracaine HCl 1% Topical Lipoderm®
PCCA Formula # 11989	Acyclovir 5%/Lidocaine 2%/Hydrocortisone 2.5% Topical Cream (VersaBase®)
PCCA Formula # 11986	Acyclovir 5%/Lidocaine 2% Topical Cream (VersaBase®)

### Commonly Requested Formulas for Patients with Wounds

See PCCA Document #97853, *Commonly Requested Compounding Ideas for Patients with Wounds*.

PCCA Formula # 13289	Misoprostol 0.0024%/Metronidazole 2%/Lidocaine HCl 2% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13288	Misoprostol 0.0024%/Naltrexone HCl 1%/Phenytoin 2%/Arginine HCl 1%/Aloe Vera Topical Gel (WO6® Anhydrous)
PCCA Formula # 13287	Phenytoin 5%/Misoprostol 0.0024%/Nifedipine 2% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13286	Misoprostol 0.0024%/Naltrexone HCl 1%/Arginine HCl 1%/Aloe Vera Topical Gel (WO6® Anhydrous)
PCCA Formula # 13285	Ketoprofen 2%/Lidocaine 2%/Misoprostol 0.0024%/Phenytoin 2%/Urea 10%/Aloe Vera Topical Gel (WO6® Anhydrous)
PCCA Formula # 10298	Misoprostol 0.0024%/Metronidazole 2%/Lidocaine HCl 2% Topical Gel (Spira-Wash®)



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# Compounding for Winter Conditions

By Ranel Larsen, RPh, PCCA Pharmacy Consultant

It's that time of year again. With the holiday hustle and bustle upon us, here are a few suggestions to keep you and your patients healthy so that everyone can make the most of this wonderful time of the year.

## DRY SKIN

A big complaint of the winter months is dry skin, or xerosis. Temperature and humidity are some of the factors that can influence the water content of the skin. Without adequate hydration, the skin can dry out and crack. This can cause itching, inflammation, scaling and rough texture, and can lead to infection.<sup>1</sup> It is common to experience dryness in the winter months when we all spend more time indoors in low-humidity environments.

One of the most effective ways to treat dry skin is to increase the moisture content. This can be accomplished by using PracaSil™-Plus (PCCA #30-4655), which contains silicones and pracaxi oil, which is rich in fatty acids and lipids. An excellent active to incorporate is urea (PCCA #30-1269), which can be used to increase the water-holding capacity of the skin. It promotes hydration by increasing stratum corneum water uptake and enhances the water-binding capacity. It also has a mild keratolytic action, removing excess keratin in dry skin conditions.<sup>2</sup> **PCCA Formula #10417** uses 20% urea in PracaSil-Plus as a topical gel.

Another option is compounding a lotion bar. You can use many different molds for this, but the ideal device is a deodorant-type applicator (PCCA #35-3363 or #35-1687), which allows for mess-free application.

**PCCA Formula #10925** is our basic lotion bar formula, containing 33% coconut oil. Coconut oil has emollient properties and significantly improves the hydration of skin.<sup>3</sup> This oil also contains 62% medium-chain fatty acids, which in addition to its antioxidant properties are believed to be responsible for its anti-inflammatory activity.<sup>4</sup>

XemaTop™ (PCCA #30-4891) is one of our new bases that was specifically designed for the topical delivery of APIs in formulations used by patients with dry skin conditions. It replenishes the lipids within the skin and helps restore the skin's barrier, reducing irritation and preventing water loss.

## ANTI-VIRAL

Being out in the crowds, whether for shopping or traveling, can expose you and your patients to lots of germs. Our "Fly-Safe" formula is used in the winter months before entering crowded areas. A small amount is placed in the nostrils right before a flight, entering a shopping mall, or any other area where contracting germs is a concern. There are several versions of the "Fly-Safe" formula on the Members-Only Website.

- **PCCA Formula #13683** Chlorpheniramine Maleate 0.1%/Deoxy-D-Glucose (2) 0.2%/EGCg 1%/Ascorbic Acid 2%/Vitamin D3/Shea Butter Topical Balm
- **PCCA Formula #13682** Ketotifen 0.05%/Deoxy-D-Glucose (2) 0.2%/EGCg 1%/Shea Butter Topical Balm
- **PCCA Formula #13681** Azelastine HCl 0.1%/Deoxy-D-Glucose (2) 0.2%/EGCg 1%/Ascorbic Acid 2%/Vitamin D3/Shea Butter Topical Balm
- **PCCA Formula #13680** Ketotifen 0.05%/Deoxy-D-Glucose (2) 0.2%/EGCg 1%/Ascorbic Acid 2%/Vitamin D3/Shea Butter Topical Balm
- **PCCA Formula #13679** Deoxy-D-Glucose (2) 0.2%/EGCg 1%/Ascorbic Acid 2%/Vitamin D3/Shea Butter Topical Balm
- **PCCA Formula #13678** Deoxy-D-Glucose (2) 0.2%/EGCg 1%/Shea Butter Topical Balm

Ketotifen and azelastine HCl are relatively selective histamine H1 antagonists/mast-cell stabilizers, and they inhibit the release of histamine and other mediators from cells involved in the allergic response.

DDG acts as an anti-viral. Its structure is similar to mannose and competes with mannose in protein glycosylation, which ultimately results in inhibition of protein synthesis.<sup>8</sup>

EGCg, an active polyphenol in green tea, has been shown to have antiviral, antibacterial and antifungal effects.<sup>9</sup>

*Continued on next page*



COMPOUNDING FOR WINTER CONDITIONS *(Continued)*

An alternative to compounding the “Fly-Safe” formula with EGCg is our Wellness Works Green Tea-70 (WW #10320). This is an excellent option to have on your shelf for those wanting to strengthen their immune systems. It contains a high concentration of EGCg with 350 mg per capsule. The suggested directions are to take one capsule once or twice daily.

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Have any questions? Contact the PCCA Clinical Services team at [800.331.2498](tel:800.331.2498).



# An Innovative Treatment for Hirsutism: Topical Metformin

By Sara Hover, RPh, FAARM, PCCA Clinical Compounding Pharmacist

The term "hirsutism" is of Latin origin, meaning excessive growth of stiff hair, or simply hairiness. The common clinical use of the term refers to women with excess growth of stiff, pigmented hair (known as "terminal hair") in a male pattern. Specific sites for excess hair are lips, chin, and chest.

In approximately 90% of hirsute females, the condition either is caused by an underlying polycystic ovarian syndrome (PCOS) or is idiopathic (of unknown cause).<sup>1</sup>

Regardless of the source, patients are looking for a cost-effective treatment for unwanted hair, and even when the commercial product is available, the cost is too prohibitive for many patients. Certainly we should look at balancing the hormones or metabolic disorders, but many times a quick solution is needed. Pharmacists and prescribers thinking outside the box and looking at literature through a different lens can create a new and innovative product to solve patients' problems.

One option may be topical metformin. It is well known that metformin reduces circulating androgens, which can decrease the occurrence of excess hair in women. Combining this with new research demonstrating a local effect when applied topically for hyperpigmentation, it's not too far of a stretch to hypothesize that applying metformin topically may inhibit and reduce terminal hair growth.<sup>2</sup>

Similar thinking is used for some commercial products. A review of eflornithine (Vaniqa®) and the studies that were used in the approval process reveals that the studies were done with both oral and topical eflornithine, but that the mechanism of action (MOA) in topical application is unknown. That is, even though the topical MOA for eflornithine is unknown, it is approved for topical use.<sup>3</sup>

## METFORMIN

Metformin is indicated as an off-label treatment for PCOS because it reduces circulating insulin, which decreases the concentration of free levels of androgens. A few studies have examined the influence of metformin on hirsutism as the primary end point. Kelly and Gordon — in a 14-month, randomized, double-blind, placebo-controlled crossover trial — demonstrated a modest reduction in hirsutism at the end of treatment.<sup>4</sup> Also, a six-

month, randomized, controlled trial of 70 patients with PCOS who received metformin along with intense pulse light (IPL) for hair removal, when compared to IPL alone, demonstrated the superiority of the regimen employing metformin in combination with IPL.<sup>5</sup>

Other evidence comes from dermatological research. Dermatologists have looked at metformin in a number of cutaneous disorders, such as hormonal acne, hidradenitis suppurativa and acanthosis nigricans. Very recently, systemic usage of metformin for psoriasis and cutaneous malignancies has shown promising results. Interestingly, though, topical metformin has also been used in hyperpigmentation disorders. One of the proposed mechanisms for reducing pigmentation involves inhibiting the activity of protein kinase C beta (PKC-β). Another study demonstrated that inhibition of PKC-β activity not only blocked tanning, but reduced basal pigmentation in the epidermis and hair.<sup>6</sup>

Finally, there is promising evidence when looking again at metformin and insulin. Studies of the local effect of metformin on the growth rate of hair at the follicular level have yet to be investigated. However, studies have shown that hair follicles that are exposed to excessive levels of insulin exhibit a higher growth rate. Conversely, hair follicles maintained in the absence of insulin or at typical levels prematurely entered a catagen-like state. The catagen phase is a transitional phase in which the hair follicle shrinks and is cut off from its blood supply. The hair does not grow during this phase, and melanin production stops.<sup>7</sup>

## ADJUNCT TREATMENT OPTIONS

This new research and new perspective on topical metformin may be helpful to compounders and patients in combination with some of the more well-known options. Here are some of the common options for these patients.

*Continued on next page*

## AN INNOVATIVE TREATMENT FOR HIRSUTISM: TOPICAL METFORMIN (Continued)

## Progesterone

Progesterone is considered an anti-androgen due to the fact that it competes with androgens for the androgen receptor. Some have suggested that it has an effect on 5-alpha reductase (5- $\alpha$ R) — an enzyme whose main function is converting testosterone to dihydrotestosterone (DHT), a highly active form of testosterone — but the literature does not support this concept. However, if progesterone occupies the androgen receptor, then testosterone or DHT are unable to bind and have an effect.<sup>8</sup>

## Azelaic Acid

A prominent theory is that the azelaic acid is responsible for the decreased DHT production, and in fact, it has been shown to inhibit the activity of 5- $\alpha$ R. By suppressing this cycle, hair growth will slow or even stop.<sup>9</sup>

## Spironolactone

Spironolactone is an androgen blocker and competes with DHT for binding to the androgen receptor. Studies have also shown spironolactone to have an inhibitory effect on 5-AR. Typically spironolactone is used orally, but it is also used topically to illicit a local effect while minimizing systemic side effects. The downside with a topical preparation is the odor, which is unpleasant and may require the addition of a fragrance.<sup>10</sup>

## EXAMPLE FORMULAS

Based on a review of the literature,<sup>11</sup> I would recommend application twice daily for formulas such as these:

- PCCA Formula #12900  
Metformin HCl 5%/Progesterone 1%/Azelaic Acid 1%/  
Spironolactone 5% Topical Cream (Clarifying™)
- PCCA Formula #12899  
Metformin HCl 5%/Progesterone 1%/Azelaic Acid 1% Topical  
Cream (VersaBase®)

If you have questions about compounding for hirsutism, please contact the PCCA Pharmacy Consulting Department (PCD) at 800.331.2498.

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Always make sure you have checked the PCCA Formula Database and are following the most up-to-date version of a formula, as changes are continuously made to existing formulations to provide the highest quality. The formulas and/or statements listed are provided for educational purposes only. They are compounding ideas that have commonly been requested by physicians, and have not been evaluated by the Food and Drug Administration. Formulas and/or materials listed are not to be interpreted as a promise, guarantee or claim of therapeutic efficacy or safety. The information contained herein is not intended to replace or substitute for conventional medical care, or encourage its abandonment. Every patient is unique, and formulas should be adjusted to meet their individual needs. ©





# Microneedling: What You Can Offer

By Ranel A. Larsen, PharmD, RPh, PCCA Pharmacy Consultant

Microneedling, also called collagen induction therapy (CIT), is a procedure that has been around for a while, but we in the PCCA Pharmacy Consulting Department have received a lot of questions about it in the last six months. Not only is it a great procedure with limited down time, but compounding holds a lot of potential for affordably making a difference in the outcomes and recovery times of the patients.

## WHAT IS IT?

Microneedling is a treatment for a number of dermatological conditions, such as wrinkles, acne scars, stretch marks and large pore size as well as skin rejuvenation. It involves very fine needles being rolled over the skin to create "micro-injuries." These micro-injuries stimulate the healing process and the production of collagen and elastin. Due to the channels created from the needles, it is also used to augment drug delivery through the skin. There are many different instruments used, but the general design involves a drum-shaped device with rows of needles. The result is smoother, firmer and younger-looking skin. It is typically suggested that the patient receive a series of treatments usually at one-month intervals for a total of four to six treatments.

## HOW IS IT PERFORMED?

Microneedling is typically performed in a dermatologist's or aesthetician's office, although there are at-home devices available. The use of a topical numbing cream will allow the patient to be more comfortable with this procedure. There are multiple ways the numbing cream can be applied. The numbing compound can be applied 30-60 minutes before the procedure starts or after a light "rolling" with the microneedling device. The advantage of applying the cream after a light rolling is that the medication can be delivered through the holes and will have a faster onset for the patient.

In addition, serums and creams containing different APIs such as hyaluronic acid, ascorbic acid, beta-glucan and niacinamide may be used to enhance the treatment and healing process. Because this procedure keeps the epidermis intact, the recovery process is very quick, and within a few hours, the small holes are closing up and the healing process has started. The side effects are very minimal and typically are limited to mild redness, irritation and inflammation, which dissipate over 24 hours.

## WHAT CAN A COMPOUNDER OFFER?

### Topical Numbing Creams

- PCCA Formulas #11652  
Benzocaine 20%/Lidocaine 10%/Tetracaine 4% Topical Cream (VersaBase®)
- PCCA Formula #12073  
Benzocaine 10%/Lidocaine 5%/Tetracaine 2% Topical Cream (VersaBase)

VersaBase is noncomedogenic and is formulated to be nonirritating, making it a great choice for this cosmetic procedure. An alternative would be to use PCCA Formula #9246 (Benzocaine 20%/Lidocaine 6%/Tetracaine 4% Topical Anhydrous Lipoderm®).

### Topicals for Use During and Post-Procedure

Hyaluronic acid is the mainstay for use with microneedling. However, many physicians combine the hyaluronic acid with other APIs, such as ascorbic acid. In addition, a topical cream or serum is applied immediately after treatment to increase absorption of the APIs through the epidermis and to decrease redness and inflammation that can occur post-procedure. After the initial application, it is used daily to continue to provide therapeutic benefit.

### Possible APIs could include:

- Hyaluronic Acid (Sodium Hyaluronate (Cosmetic Grade), (PCCA #30-3856)) – decreases redness, increases moisture, "plumps" the skin
- Ascorbic Acid USP Fine Powder (PCCA #30-1483) – anti-inflammatory, antioxidant, decreases hyperpigmentation when used during procedure
- Niacinamide USP (PCCA #30-1689) – anti-wrinkle, anti-inflammatory, increases moisture
- Beta Glucan (1,3) NQ (PCCA #30-2949) – anti-inflammatory, increases moisture, aids in healing

## MICRONEEDLING: WHAT A COMPOUNDER CAN OFFER (Continued)



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PracaSil™-Plus (PCCA #30-4655) or Biopeptide Biocosmetic™ base (PCCA #30-3377) are both excellent options to use as bases for these formulas. PracaSil-Plus has a proprietary blend of ingredients including silicones and pracaxi oil, which provide long-lasting moisturization, promote healing and reduce water loss. Biopeptide Biocosmetic base contains palmitoyl tripeptide-3 and palmitoyl pentapeptide-3, making it an ideal base in formulations for patients who wish to diminish wrinkles.

Here are some other affordable PCCA Formulas with potential for use with microneedling:

- PCCA Formula #8692  
Sodium Hyaluronate 1% Topical Gel
- PCCA Formula #8693  
Sodium Hyaluronate 2% Topical Gel
- PCCA Formula #11841  
Niacinamide 5%/Ascorbic Acid 2.5% Topical Serum
- PCCA Formula #12070  
Sodium Hyaluronate 0.75%/Ascorbic Acid 5% Topical Serum
- PCCA Formula #12071  
Sodium Hyaluronate 0.75%/Ascorbic Acid 10% Topical Serum
- PCCA Formula #12072  
Hyaluronic Acid 0.5%/Ascorbic Acid 5%/Beta Glucan 0.5%  
Topical Biopeptide Cream

**Please note:** Formulas that are cosmetic may be offered as retail products. For proper labeling of cosmetics, see the FDA Cosmetic Labeling Guide.\* An example with PracaSil-Plus is the "PracaSil-Plus Marketing & Repackaging/Labeling Guidelines" (PCCA Document #98678).

\* Access the FDA Cosmetic Labeling Guide at:

<http://www.fda.gov/downloads> or <http://www.fda.gov/Cosmetics>

# Commonly Requested Compounding Ideas for Low-Dose Naltrexone



## Capsules

See PCCA's Formula Database for more strengths and capsule size options.

PCCA Formula # 13483	Naltrexone HCl 4.5 mg Capsules Size #3
PCCA Formula # 12584	Naltrexone HCl 4.5 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 10803	Naltrexone HCl 4 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 9518	Naltrexone HCl 4 mg Capsules Size #3
PCCA Formula # 13580	Naltrexone HCl 3 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 12586	Naltrexone HCl 1.5 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 10804	Naltrexone HCl 0.5 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 7536	Naltrexone HCl 0.5 mg Capsules Size #3
PCCA Formula # 13579	Naltrexone HCl 0.25 mg Capsules Size #3 (LoxOral®)
PCCA Formula # 13581	Naltrexone HCl 1 mcg Capsules Size #3 (LoxOral®)
PCCA Formula # 11967	Naltrexone HCl 3 mg Capsules Size #0
PCCA Formula # 13099	Naltrexone HCl 3 mg/Melatonin 3 mg Capsules Size #1
PCCA Formula # 13388	Naltrexone HCl 1.5 mg/Dalfampridine (4-Aminopyridine) 5 mg Capsules Size #1

## Oral Liquid

PCCA Formula # 13403	Naltrexone HCl 0.5 mg/mL to 5 mg/mL Oral Suspension (SuspendIt®) (FormulaPlus™ • BUD Bracketed Study)
PCCA Formula # 13318	Naltrexone HCl 0.5%/Lidocaine HCl 2% Oral Rinse (MucoLox™)
PCCA Formula # 7875	Naltrexone Hydrochloride 10 mg/mL Oral Solution
PCCA Formula # 12505	Naltrexone HCl 1 mg/mL Oil Oral Suspension

## Rapid Dissolve Tablet (RDT)

PCCA Formula # 12741	Naltrexone HCl 0.5 mg Rapid Dissolve Tablet (RDT-Plus™)
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## Troche

PCCA Formula # 13574	Naltrexone HCl 5 mg Troche (NataTroche®)
PCCA Formula # 13144	Naltrexone HCl 15 mg Troche (NataTroche®)

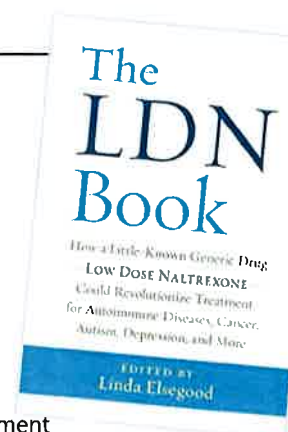
## Topical

### Commonly Requested Formulas for Patients with Psoriasis, Eczema, Atopic Dermatitis, Pruritus and Other Inflammatory Skin Conditions

PCCA Formula # 11934	Naltrexone HCl 1% Topical Cream (XemaTop™) (FormulaPlus™ • BUD Study)
PCCA Formula # 13568	Tacrolimus 0.1%/Naltrexone HCl 0.5% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13344	Naltrexone HCl 0.5%/Azelastrine HCl 0.1% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13239	Naltrexone HCl 0.5%/Diphenhydramine HCl 2%/Vitamin D3 5000 IU/Gm Topical Gel (WO6® Anhydrous)
PCCA Formula # 13228	Naltrexone HCl 1% Topical Gel (WO6® Anhydrous)
PCCA Formula # 13595	Ketotifen 0.05%/Naltrexone HCl 1% Topical Cream (VersaBase®)
PCCA Formula # 13337	Nifedipine 0.2%/Lidocaine 2%/Naltrexone HCl 0.5% Topical Cream (VersaBase®)
PCCA Formula # 13334	Naltrexone HCl 0.5%/Pramoxine HCl 1% Topical Lotion (VersaBase®)
PCCA Formula # 13153	Fluorouracil 5%/Naltrexone HCl 0.025% Topical Cream (VersaBase®)
PCCA Formula # 12946	Azelastine HCl 0.175%/Ketotifen 0.05%/Naltrexone HCl 0.5% Topical Cream (VersaBase®)
PCCA Formula # 12714	Fluticasone Propionate 0.05%/Naltrexone HCl 1% Topical Lotion (VersaBase®)

## Educational Resources

- PCCA Document #99100 – PCCA Play Overview: Low-Dose Naltrexone
- PCCA Document #99139 – The Possibilities of Naltrexone by Sebastian Denison
- The LDN Book (Amazon)



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Please contact PCCA's Clinical Services department with questions regarding the formulations. Page 1 of 3



## Commonly Requested Compounding Ideas for Low-Dose Naltrexone (cont'd)

PCCA Formula # 12546	Ketotifen 0.05%/Naltrexone HCl 1% Topical Gel (PracaSil®-Plus)
PCCA Formula # 12295	Clindamycin 1%/Lidocaine 1%/Clobetasol Propionate 0.05%/Naltrexone HCl 1% Topical Gel (PracaSil®-Plus)
PCCA Formula # 12705	Naltrexone HCl 0.5%/Diphenhydramine HCl 1% Topical Cream (XemaTop™)
PCCA Formula # 12507	Doxepin HCl 0.5%/Naltrexone HCl 1% Topical Cream (XemaTop™)
PCCA Formula # 11940	Naltrexone HCl 0.5%/Diphenhydramine HCl 2%/Vitamin D3 5000 IU/Gm Topical Cream (XemaTop™)

### Commonly Requested Formula for Patients with Alopecia

PCCA Formula # 13521	Minoxidil 7.5%/Naltrexone HCl 0.5% Topical Gel (Atrevis Hydrogel®)
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### Commonly Requested Formulas for Patients with Scars

PCCA Formula # 13063	Azelastine HCl 0.1%/Naltrexone HCl 0.5% Topical Gel (PracaSil®-Plus)
PCCA Formula # 12683	Naltrexone HCl 1%/Aloe Vera 0.2%/Beta Glucan Topical Gel (PracaSil®-Plus)
PCCA Formula # 11966	Naltrexone HCl 1%/Pramoxine HCl 1% Topical Gel (PracaSil®-Plus)

### Commonly Requested Formulas for Patients with Wounds or Burns

PCCA Formula # 13288	Misoprostol 0.0024%/Naltrexone HCl 1%/Phenytoin 2%/Arginine HCl 1%/Aloe Vera Topical Gel (WO6® Anhydrous)
PCCA Formula # 13286	Misoprostol 0.0024%/Naltrexone HCl 1%/Arginine HCl 1%/Aloe Vera Topical Gel (WO6® Anhydrous)
PCCA Formula # 12895	Naltrexone HCl 1%/Phenytoin 2%/Lidocaine 2%/Aloe Vera 0.2%/Beta Glucan Topical Gel (Spira-Wash®/PracaSil®-Plus)
PCCA Formula # 12673	Naltrexone HCl 0.5%/Zinc Acetate 15%/Allantoin 2%/Aloe Vera 0.2% Topical Gel (PracaSil®-Plus/XemaTop™)
PCCA Formula # 12296	Naltrexone HCl 0.5%/Arginine HCl 1%/Phenytoin 2%/Timolol 0.5% Topical Gel (PracaSil®-Plus)
PCCA Formula # 12237	Naltrexone HCl 0.5%/Palmitoyl Pentapeptide/Sodium Hyaluronate Topical Gel (Spira-Wash®/PracaSil®-Plus)
PCCA Formula # 12781	Naltrexone HCl 0.5%/Aloe Vera 0.2% Topical Gel (Spira-Wash®)
PCCA Formula # 11971	Phenytoin 5%/Naltrexone HCl 1% Topical Gel (Spira-Wash®)
PCCA Formula # 11964	Arginine HCl 1%/Aloe Vera 0.2%/Misoprostol 0.0024%/Naltrexone HCl 1%/Phenytoin 2% Topical Gel (Spira-Wash®)
PCCA Formula # 12566	Naltrexone HCl 1%/Beta Glucan/Hyaluronic Acid Topical Cream (XemaTop™)
PCCA Formula # 13104	Arginine HCl 1%/Melatonin 1%/Phenytoin 2%/Naltrexone HCl 1%/Aloe Vera/Poloxamer Topical Gel
PCCA Formula # 12458	Phenytoin 5%/Pentoxifylline 5%/Naltrexone HCl 1%/Arginine 1%/Misoprostol 0.0024%/Aloe Vera 0.2% Polyox Bandage
PCCA Formula # 12074	Naltrexone HCl 0.5%/Beta Glucan Topical Spray (MucoLox™)
PCCA Formula # 11975	Aloe Vera 0.2%/Arginine HCl 1%/Misoprostol 0.0024%/Naltrexone HCl 1% Topical Gel (MucoLox™)

### Permeation Enhancing

#### Commonly Requested Formulas for Patients with Pain or Neuropathy

PCCA Formula # 13404	Naltrexone HCl 1%/Magnesium Chloride Hexahydrate 10% Topical Gel (PermE8® Anhydrous)
PCCA Formula # 13396	Naltrexone HCl 1%/AzelaStine HCl 0.15% Topical Gel (PermE8® Anhydrous)
PCCA Formula # 13332	Naltrexone HCl 1%/Gabapentin 6% Topical Gel (PermE8® Anhydrous)
PCCA Formula # 12499	Naltrexone HCl 3%/Magnesium Chloride Hexahydrate 20% Topical Lipoderm®
PCCA Formula # 12254	Naltrexone HCl 1% Topical Lipoderm®
PCCA Formula # 11968	Naltrexone HCl 1%/Magnesium Chloride 10%/Cetyl Myristoleate 2% Topical Lipoderm ActiveMax®
PCCA Formula # 12571	Naltrexone HCl 1% Topical Anhydrous Licoderm®



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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

PCCA Formula # 10296	Misoprostol 0.0024%/Phenytoin 5%/Gentamicin 0.2% Topical Gel (Spira-Wash®)
PCCA Formula # 11953	Misoprostol 0.0024%/Phenytoin 2%/Beta Glucan Topical Gel (MucoLox™)
PCCA Formula # 11975	Aloe Vera 0.2%/Arginine HCl 1%/Misoprostol 0.0024%/Naltrexone HCl 1% Topical Gel (MucoLox™)
PCCA Formula # 12074	Naltrexone HCl 0.5%/Beta Glucan Topical Spray (MucoLox™)
PCCA Formula # 11973	Doxycycline 20 mg/Phenytoin 20 mg/Misoprostol 0.024 mg/Lidocaine HCl 10 mg Wound Care Capsules Size #1 (XyliFos™/LoxaSpense®)
PCCA Formula # 12206	Mupirocin 2% Topical Cream (VersaBase®)
PCCA Formula # 10942	Metronidazole 4%/Hydrocortisone 1%/Zinc Sulfate 2%/Silver Sulfadiazine 1% Topical Gel (Spira-Wash®)
PCCA Formula # 10292	Levofloxacin 2%/Mupirocin 4%/Itraconazole 1% Topical Gel (Spira-Wash®)
PCCA Formula # 10295	Misoprostol 0.0024%/Ciprofloxacin HCl 2% Topical Gel (Spira-Wash®)
PCCA Formula # 10536	Tobramycin 5%/Mupirocin 5%/Itraconazole 2% Topical Gel (Spira-Wash®)
PCCA Formula # 10290	Vancomycin 5%/Mupirocin 5% Topical Gel (Spira-Wash®)
PCCA Formula # 10299	Gentamicin 1 mg/Gm/Clindamycin 1 mg/Gm/Polymyxin B 2,000 U/Gm Topical Gel (Spira-Wash®)
PCCA Formula # 9358	Vancomycin 2.5% Topical Spray
PCCA Formula # 4429	Phenytoin 2%/Misoprostol 0.0024%/Lidocaine 2%/Bupivacaine HCl 0.2%/Diphenhydramine HCl 1%/Aloe Vera 0.2% Polyox Bandage

### Commonly Requested Formulas for Patients with Radiation Burns

PCCA Formula # 12673	Naltrexone HCl 0.5%/Zinc Acetate 15%/Aloe Vera 0.2% Topical Gel (PracaSil®-Plus/XemaTop™)
PCCA Formula # 11397	Ketoprofen 2%/Lidocaine 2%/Misoprostol 0.0024%/Phenytoin 2%/Urea 10%/Aloe Vera/Sodium Hyaluronate Topical Gel (PracaSil®-Plus)
PCCA Formula # 11396	Ketoprofen 2%/Lidocaine 2%/Misoprostol 0.0024%/Phenytoin 2%/Aloe Vera 0.2% Topical Gel (PracaSil®-Plus)
PCCA Formula # 10944	Allantoin/Vitamin D3/Aloe Vera Topical Gel (Spira-Wash®)
PCCA Formula # 11041	Misoprostol 0.0024%/Lidocaine HCl 2% Topical Lotion (VersaBase®)
PCCA Formula # 11889	Melatonin 2.5%/Beta Glucan Topical Cream (XemaTop™)

### Commonly Requested Formulas for Patients with Actinic Keratosis

See PCCA Document #98856, *Multi-Therapy Use of Topical Imiquimod & Formulas.*

PCCA Formula # 12707	Fluorouracil 0.5%/Salicylic Acid 10% Topical Solution
PCCA Formula # 12715	Fluorouracil 0.5%/Salicylic Acid 10% Topical Cream (VersaBase®)
PCCA Formula # 13450	Fluorouracil 0.5%/Diclofenac Sodium 3%/Niacinamide 1% Topical Gel (WO6® Anhydrous)
PCCA Formula # 11069	Imiquimod 5%/Diclofenac Sodium 1% Topical Lipoderm®
PCCA Formula # 11068	Imiquimod 5%/Diclofenac Sodium 3% Topical Cream (VersaBase®)
PCCA Formula # 10839	Diclofenac Sodium 3%/Sodium Hyaluronate Topical Gel

### Commonly Requested Formulas for Patients with Keratosis Pilaris

PCCA Formula # 13083	Salicylic Acid 5%/Urea 20%/Ammonium Lactate 2% Topical Cream (VersaBase®)
PCCA Formula # 12043	Lactic Acid/Salicylic Acid/Plukenetia Volubilis Topical Cream (XemaTop™)
PCCA Formula # 10251	Gluconolactone 5%/Vitamin E Acetate 2% Compound Topical Cream

### Commonly Requested Formulas for Patients with Dry, Cracking Skin

PCCA Formula # 13097	Natural Moisturizing Factor (NMF) Cosmetic Topical Cream (XemaTop™)
PCCA Formula # 10414	Urea 10%/Sodium Hyaluronate/PracaSil®-Plus Topical Gel (Spira-Wash®)



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## Commonly Requested Compounding Ideas for Dermatology Patients (cont'd)

PCCA Formula # 10416	Urea 15%/PracaSil®-Plus Topical Gel (Spira-Wash®)
PCCA Formula # 10417	Urea 20% Topical Gel (PracaSil®-Plus)

### Commonly Requested Formulas for Patients with Lamellar Ichthyosis

PCCA Formula # 12338	Acetylcysteine 10%/Urea 10%/Rosemary Oil Topical Cream (XemaTop™)
PCCA Formula # 11080	Acetylcysteine 10%/Urea 10%/Rosemary Oil Topical Gel (PracaSil®-Plus)

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# Low-dose Naltrexone Therapy for Psoriasis



**Leonard B. Weinstock, MD**  
**Jill Cottel, MD**  
**Lindsey Aldridge, RN**  
**Alexander Egeberg, MD, PhD**

*The authors' affiliations are: Leonard B. Weinstock, Associate Professor of Clinical Medicine, President, Specialists in Gastroenterology, Washington University School of Medicine, St. Louis, Missouri; Jill Cottel, Specialists in Gastroenterology; Lindsey Aldridge, Specialists in Gastroenterology; Alexander Egeberg, Department of Dermatology and Allergy, Herlev and Gentofte Hospital, University of Copenhagen, Denmark.*

## Abstract

Safe, inexpensive, and convenient psoriasis therapy is desirable. Two recent case reports suggested that low-dose naltrexone is effective. Cases from our practice are presented in order to further the evidence of efficacy and safety of low-dose naltrexone in the treatment of psoriasis. Patients included 13 females, 2 males; mean age 57 years; mean psoriasis duration 16 years. Of the patients, 8 had psoriatic arthritis. In the past, 5 had completely failed and 10 had partially responded to  $\geq 1$  topical therapies. Patients used a self-assessed Likert scale on the effect of low-dose naltrexone on their psoriasis: 1 - worse; 2 - unchanged; 3 - slightly improved; 4 - somewhat improved; 5 - marked improvement. The response to 4.5 mg of oral naltrexone was as follows: 8/15 marked improvement; 2/15 somewhat improved; and 5/15 unchanged. Three adverse events included insomnia, diarrhea, and self-limited headache. Marked improvement was seen by 53% of the 15 patients. Low-dose naltrexone regulates lymphocyte responses, reduces cytokine production, and likely reduces mast cell activity. Low-dose naltrexone is safe, inexpensive, and appears to be effective in this open-label study.

**FIGURE 1.**

**ELBOW BEFORE LOW-DOSE NALTREXONE TREATMENT.**



**FIGURE 2.**

**ELBOW 2 MONTHS AFTER ORAL 4.5-MG NALTREXONE DAILY.**



cells, and modulate immune responses.<sup>17</sup> Up-regulation of met-enkephalin and opioid receptors can be induced by a rebound effect by short-acting LDN.<sup>17</sup> Higher levels of endogenous opioids and receptors regulate lymphocyte responses, reduce cytokine production, and likely reduce mast cell activity.<sup>17-19</sup> These mechanisms of action of LDN help explain why this therapy could improve psoriasis.

Although further studies with double-blind design are warranted, in the authors' experiences, LDN is an inexpensive, safe medication that has appeared to provide effective therapy for psoriasis.

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Address correspondence to Leonard B. Weinstock, MD, 11525 Olde Cabin Rd, St. Louis, Missouri, 63141. E-mail: lw@gidocor.net

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