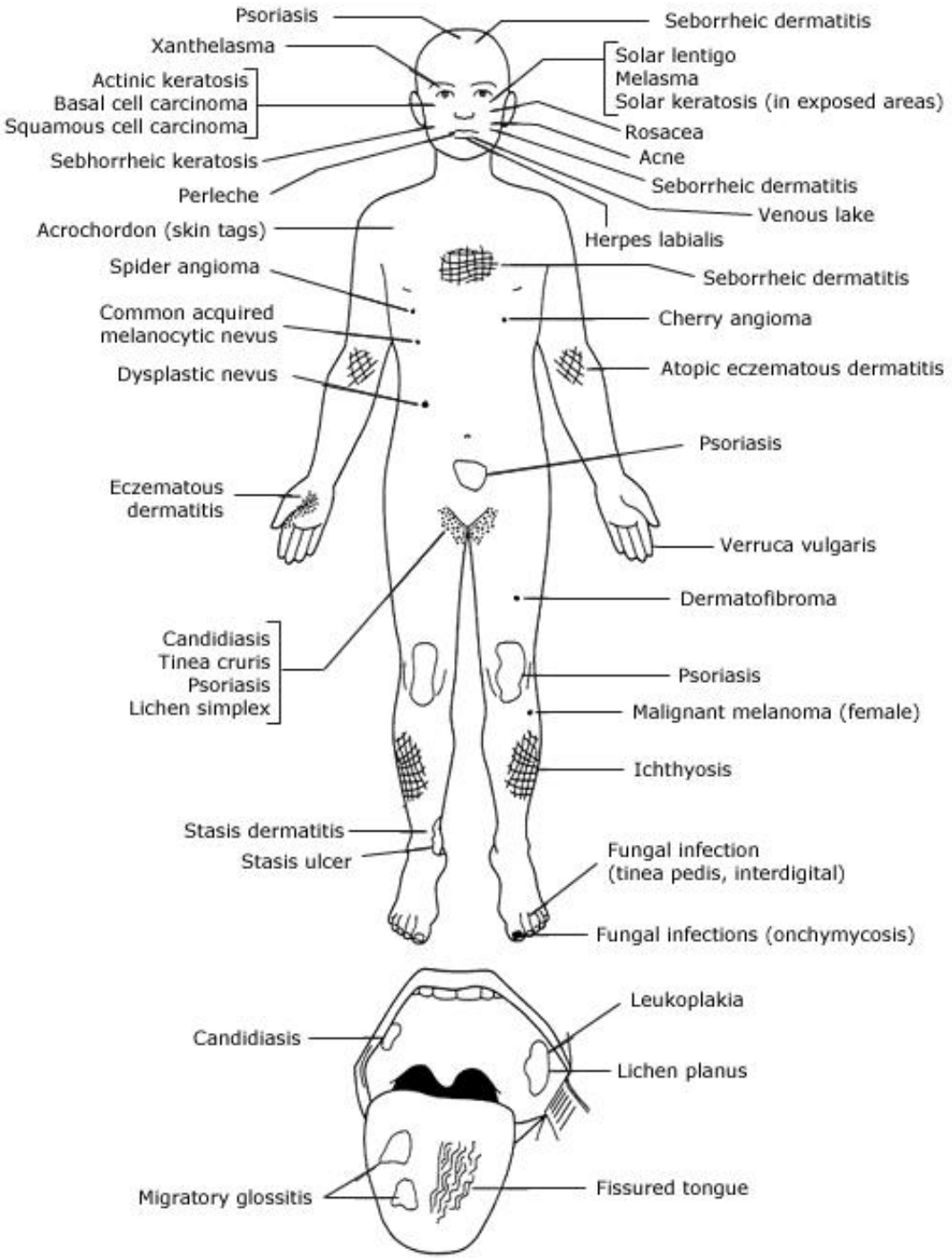


Pharmacology in Dermatology

BRYN BYERS KRAUSE,
MSN, APRN, FNP-C

10 Most Common Derm Conditions seen by Non-Dermatologists

- **Contact Dermatitis**
 - **Acne**
 - **Cellulitis**
 - **Warts**
 - **Rash**
 - **Impetigo**
 - **Cysts**
 - **Herpes Zoster**
 - **Tinea**
 - **Candida**
-



Common disorders encountered during the physical examination of skin

Psoriasis

Risk factors

- Genetic predisposition – 40% of patients have a family history
- Environmental and behavioral factors may also play roles
- Elevated rates of smoking, obesity, and alcohol use

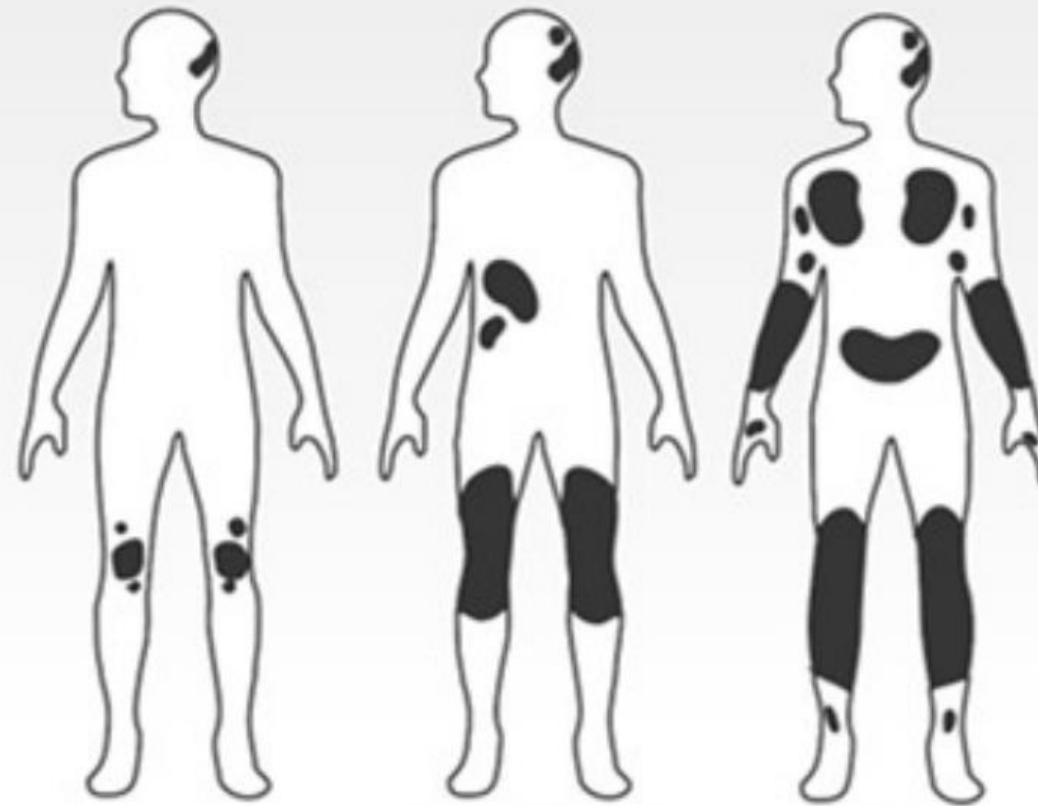
- Multiple drugs associated with worsening psoriasis or psoriasis-like drug eruptions
 - Beta blockers
 - Lithium
 - Antimalarial drugs (Chloroquine, Hydroxychloroquine)
 - NSAIDs



Psoriasis

- **First line – topical steroids, if under 10% BSA**
 - **Topical calcineurin inhibitors (Tacrolimus or Pimecrolimus)**
-

Who qualifies for systemic therapy?



MILD
<3% BSA

MODERATE
3% to 10% BSA

SEVERE
>10% BSA

Prevalence:

67%

25%

8%

Managing Psoriasis with Oral Medications

• Classic oral systemics

- *Methotrexate*
- *Acitretin*
- *Cyclosporine*

PDE inhibitors

- *Apremilast (Otezla)*

TYK2 inhibitors

- *Deucravacitinib (SOTYKTU)*



Methotrexate

- Pros: Good for patients who:
 - Have minimal comorbidities
 - Need combination treatment
 - Cost consideration

Cons:

- Requires counseling on dosing frequency

Side effects

- GI upset
- Fatigue
- Headache

Requires lab monitoring : Hematologic and liver tests (causes elevated LFTs)

- Dosing: 7.5 mg to 25 mg once weekly
 - Recommend concomitant folic acid supplementation to decrease risk of side effects
-

Acitretin

- Mean BSA improvement is ~40%
- Low dose is well tolerated
- Pros: Good for patients who:
 - have a contraindication for immunosuppression (history of recent cancer)

Cons:

- Requires counseling on dosing frequency, side effects
 - Requires lab monitoring
 - hyperlipidemia
 - Not safe in childbearing women
-

Apremilast (Otezla)

- Approved for adult/pediatric psoriasis & adult psoriatic arthritis
- Side effects:
 - Nausea, diarrhea, weight loss
 - Mood changes

Pros: easy for patients to start, no required lab monitoring

"Only oral therapy that patients can start today without delay"

Cons: limited efficacy in some patients, long-term GI SE





Janus kinase (JAK) inhibitors:

Protein tyrosine kinases (TYKs) that bind to transmembrane Type 1/Type 2 cytokine receptors & mediate cellular responses to numerous cytokines and growth factors

These mediators are important in immune defense and in immune-mediated disease

In the dermatology world used with:

Systemic lupus erythematosus

Atopic dermatitis

Psoriasis

Alopecia areata

Vitiligo

Prior to Starting - JAK Inhibitors Labs/Monitoring

Initial Labs before Drug Administration

1. CBC

- Neutrophils - **<1000 cells/mm³**
- Lymphocytes - **<500 cells/mm³**
- Hemoglobin - **<8 g/dL**

2. CMP

- Liver Enzymes - **Elevated ALT or AST and suspected drug-induced liver injury**

3. Lipid Panel - Evaluate at approximately 12 weeks. If hyperlipidemia is observed, manage patients according to hyperlipidemia clinical guidelines

- Note: Only required at 12 weeks, but can get at initial visit to establish baseline

4. (TB) QuantiFERON Gold vs PPD

5. Hepatitis Panel

Deucravacitinib (SOTYKTU)

- Oral JAK
- Side effects:
 - Nasopharyngitis, headache, URI
 - No significant changes in total cholesterol, LFTs
 - Increased risk of herpes zoster
- NO black box warning - clinical trials showed a lower risk of severe side effects compared to other JAK inhibitors
- Once daily dosing 6 mg
- Highly effective against scalp psoriasis



Baricitinib (Olumiant)

- **JAK inhibitor**
 - **Oral form**
 - **Indicated for alopecia areata**
 - 2 mg once daily; if response is inadequate may increase to 4 mg once daily.
-



Zoryve (Roflumilast)

- PD4 inhibitor, cream/foam
- Very little systemic effect
- Vehicle is the secret sauce – no alcohol or propylene glycol in it
- Excellent tolerability
- Indicated for seb derm (scalp), psoriasis and atopic derm
- New – great, patients love it

Figure 6. Improvement in Patient With Psoriasis Treated With Roflumilast Foam 0.3%



S-IGA and SI-NRS are global assessments.

Atopic Dermatitis (Eczema)



Topical Steroids



- The effects of topical steroid on various cells in the skin are:
- Anti-inflammatory
- Immunosuppressive
- Anti-proliferative
- Vasoconstrictive

Topical Steroid Potency Chart

Class 1: Super potent (Clobetasol propionate)

Class 2: Potent (Mometasone furoate)

Class 3: Upper mid strength (Fluticasone propionate)

Class 4: Mid Strength (Triamcinolone acetonide)

Class 5: Lower Mid Strength (Desonide)

Class 6: Mild (Alclometasone dipropionate)

Class 7: Least potent (hydrocortisone)

To prevent steroid atrophy

"A thin layer BID M-F, weekends off, repeat as needed for flares"

or

"A thin layer BID x 2 weeks then stop"





Eucrisa (Crisaborole)

- Drug class: PDE-4 Inhibitor
 - Non-Steroid topical approved for eczema
 - FDA approval: mild-moderate atopic dermatitis in 3 months old and up
 - Side effects: application site pain, burning, stinging
-

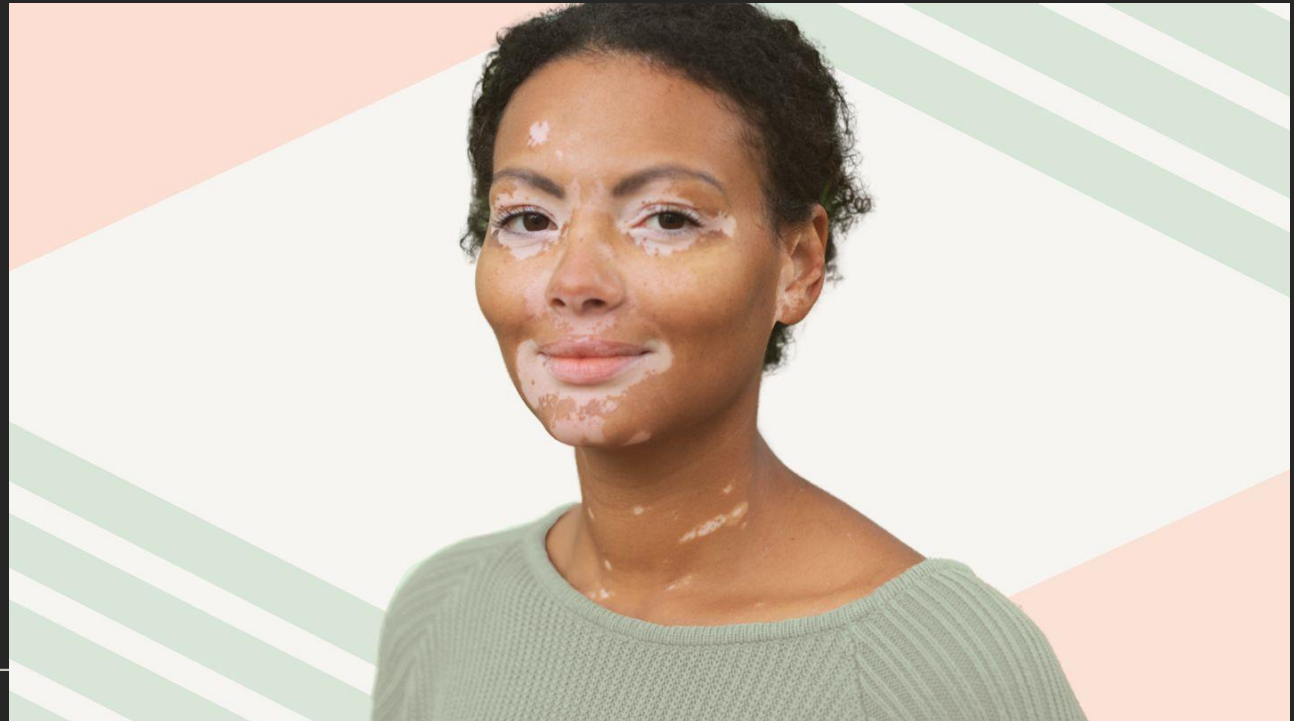
Pimecrolimus (Elidel)

- Drug class: topical calcineurin inhibitors that decrease inflammation
- FDA approval for: Mild-moderate atopic dermatitis
- Most common side effect: application site irritation/burning



OPZELURA (ruxolitinib)

- Topical JAK inhibitor – non-steroid cream used BID
- Treats eczema by targeting the source of itch and inflammation
- Also indicated for vitiligo
 - Repigments the skin



Dupixent

- Monoclonal antibody blocking IL-4 and IL-13
- Approved >6 months
- Indicated for:
Prurigo Nodularis,
Atopic Dermatitis,
Asthma



Side effects- eye irritation, recommend lubricating eye drop before starting

RINVOQ (UPADACITINIB)

(JAK) inhibitor

-Atopic dermatitis

-Typically use when fail Dupixent or if they are needle-phobic

-3+ years of safety data

-start at 15 mg daily dosage

Labs: CBC with diff, CPK level, lipid assessment, HCG in female childbearing potential, Quant gold

*Repeat labs (lipid and CBC) at 12 weeks

-Immunizations before starting



Topical Retinoid

- Vitamin A
- Reduces severity of scarring
- Unclogs pores
- Decreases oil production



Benzoyl peroxide



- 1st line for mild acne
- Comes as a wash/cream/gel
- Antibacterial and anti-inflammatory agent
- Examples: *Clean and Clear*, *Panoxyl*
- Used 1-2x daily



- Most common side effects:
- contact dermatitis
 - xeroderma
 - erythema
 - peeling

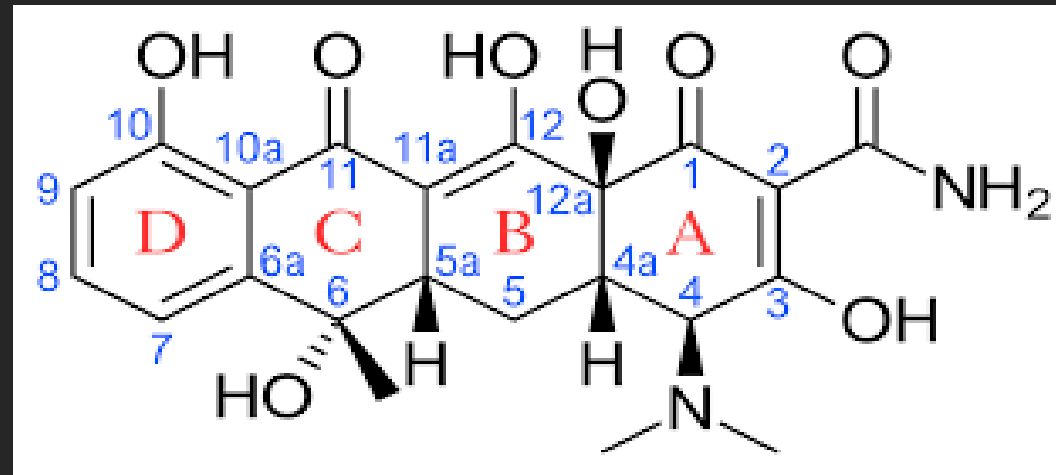
Aczone (Dapsone) 5% or 7.5%

- FDA approved for acne vulgaris
- Used 1-2x/day usually in the morning
- Works well in female pattern cystic acne
- Side effects: dryness, peeling, erythema
- Pregnancy category C



Tetracyclines

The preferred oral antibiotic for acne



Makes up approximately 75% of all antibiotics prescribed in dermatology

Doxycycline

- Drug class: Tetracycline
- Very lipophilic and better able to penetrate and accumulate in the sebaceous glands
- Dosed once or twice daily
- Absorption is decreased by co-administration with food (especially dairy)
- Side effects: GI distress, photosensitivity, pill esophagitis

- Oracea 40 mg – sub antimicrobial dosage to treat inflammatory acne/rosacea lesions



Minocycline



- Strongly anti-microbial against *C. acnes*, numerous anti-inflammatory mechanisms
 - MCN has a long half-life
 - Excellent absorption that is not substantially impaired by food (dairy included)
 - Dosed once daily, with or without meals. These two factors may increase the likelihood of compliance in acne vulgaris, a disease whose treatment is commonly fraught with adherence difficulties.
-

Sarecycline (Seysara)



- FDA approved in 2018, has fastest onset of the tetracyclines
- Approved for: inflammatory lesions of non-nodular moderate to severe acne vulgaris
- Weight-based, aiming for 1.5 mg/kg/day

- In its clinical trials, GI side effects were uncommon and photosensitivity was not noted



Epiduo Forte (Adapalene 0.3% Benzoyl Peroxide 2.5% gel)

- FDA approved for acne vulgaris
- Safely treats acne in adults/children who are at least 9 years old
- Side effects: xerosis, scaling, burning, erythema, photosensitivity, irritant dermatitis



Spironolactone

- Drug class: Aldosterone antagonist (Diuretic)
 - Used in dermatology for female pattern acne
 - Dosing: 50 mg - 150 mg daily
 - No blood monitoring before/during
 - Pregnancy category C – inhibits testosterone production
-
- Side effects:
 - Breast tenderness
 - Menstrual irregularities
 - Hypotension
 - Hyperkalemia



Hydroxyzine (Atarax)

- **Drug class:** Antihistamine
 - Works to reduce the effects of natural chemical histamine in the body. Histamine can produce symptoms of itching
 - FDA approved for pruritus/urticaria
 - Dosing: 25 mg PO q6-8h prn
 - **Most common s/e:** drowsiness, dizziness, ataxia, weakness, slurred speech, headache, agitation, bitter taste, nausea
-

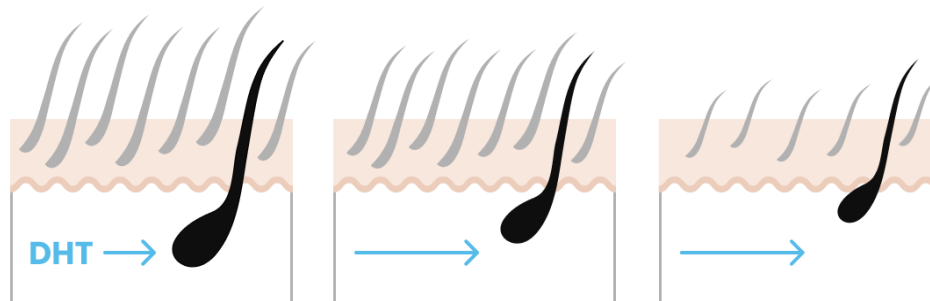
Finasteride (Propecia)

- Used for hair loss
- Slows down hair loss/stimulates new growth
 - 1 mg po QD for men

Been associated with depression, suicidal thoughts and sexual dysfunction (including decreased sex drive and erectile dysfunction)

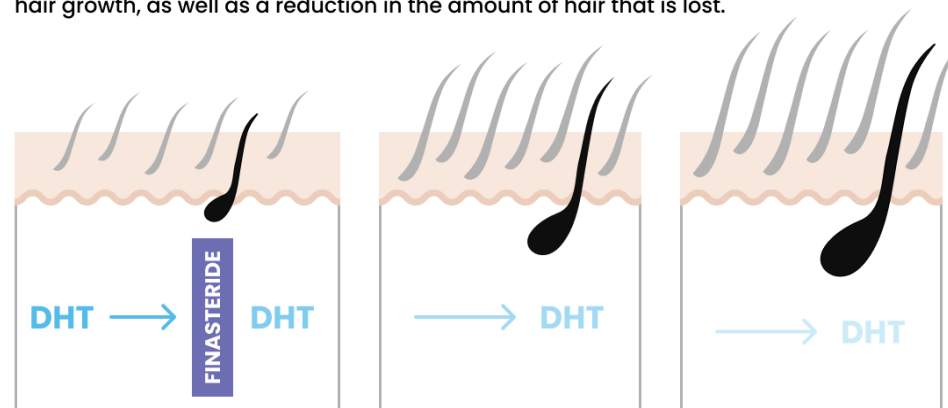
HOW DHT AFFECTS HAIR FOLLICLES

DHT causes hair follicles to shrink, resulting in hair loss. This is known as male pattern baldness.



HOW FINASTERIDE AFFECTS DHT

Finasteride blocks the action of DHT. This allows hair to regrow from follicles, which were previously affected by DHT. This results in an increase in overall hair growth, as well as a reduction in the amount of hair that is lost.





- Minxoidil 5%
(Rogaine)

Used in hair loss for men and women

Works by dilating small blood vessels to stimulate hair regrowth by enhancing cell proliferation

Takes up to 4 months of consistent use to notice improvement

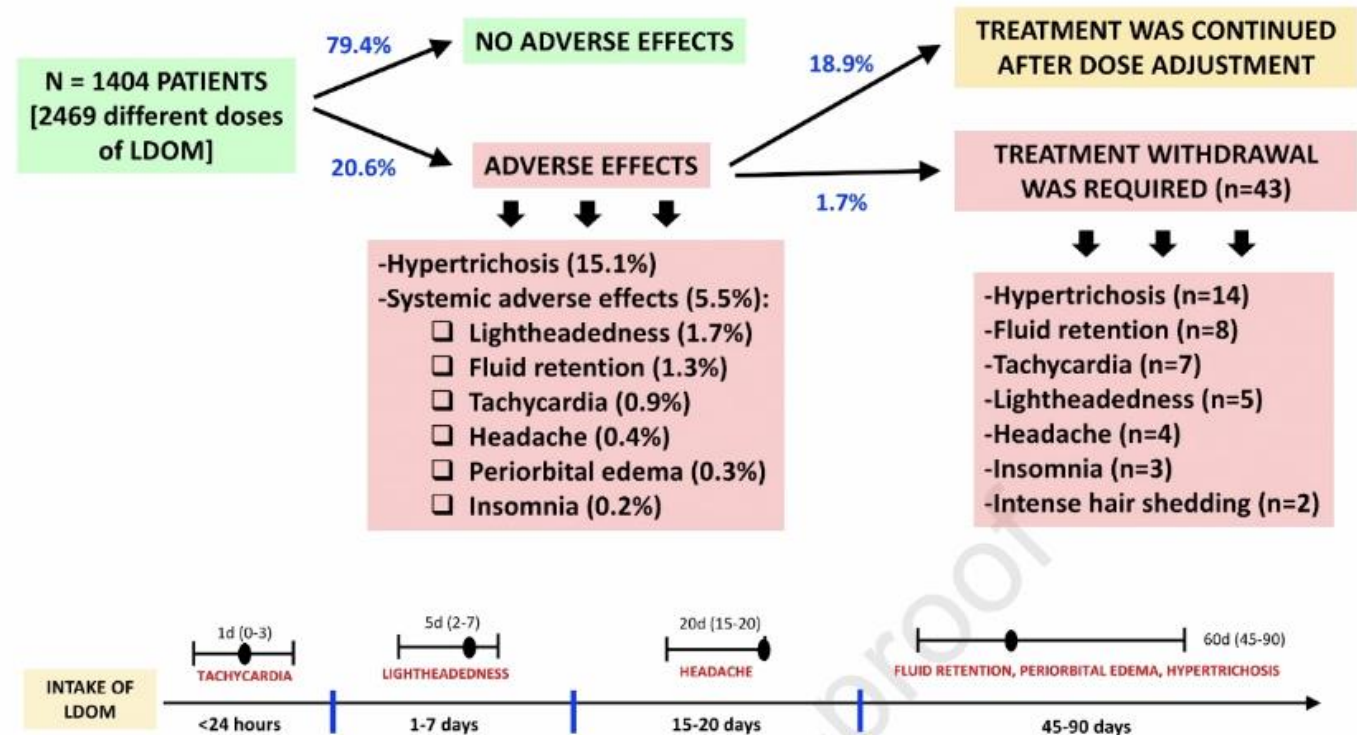
Pregnancy Category C

Oral Minoxidil

- Androgenetic Alopecia (AGA)
- Male/Female pattern hair loss
- Minoxidil 2.5 mg
Dosing: start 1/4th tab daily x 2 weeks, if tolerating well with no side effects May increase to 1/2 tab daily

Patient to watch for dizziness upon standing and changes in blood pressure. If any swelling in legs or shortness of breath is noted discontinue

Safety of Low Dose Oral Minoxidil





Glycopyrrolate (Robinul, Robinul Forte)

- Drug class: **anticholinergics**
- Treatment for hyperhidrosis
- Comes as 1 mg or 2 mg, can be taken daily titrating upwards weekly based on treatment response/tolerability (8mg daily is maximum dosage)
- Side effects: dry mouth, constipation, nasal congestion, sinusitis, upper respiratory infections, headache, urinary retention, vomiting)



5-Fluorouracil (Efudex)

- Drug Class: Topical Antineoplastic
- Disrupts DNA synthesis, interferes with RNA synthesis
- FDA approved for Actinic Keratoses & superficial basal cell carcinomas

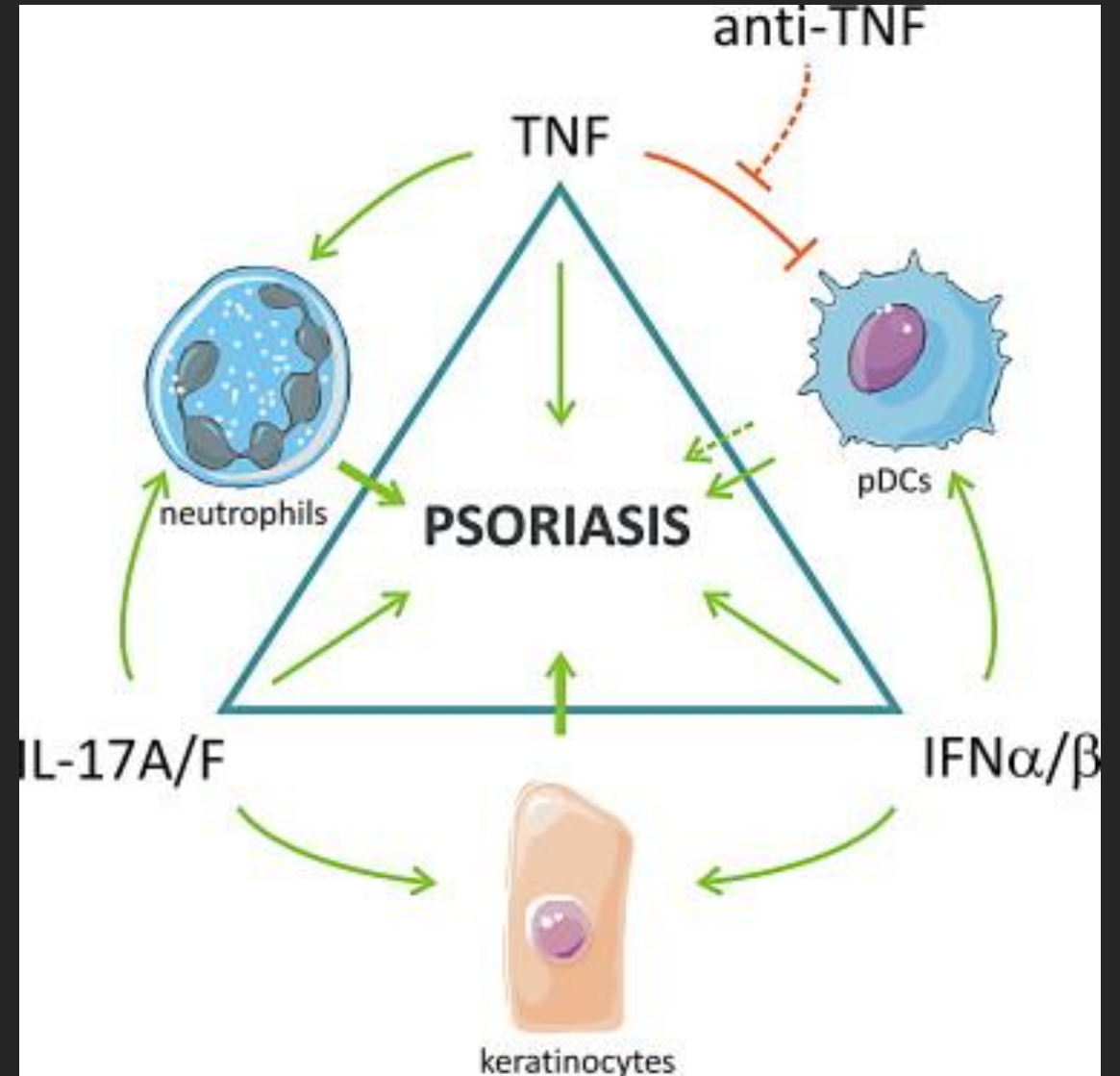
Calcipotriene + Efudex 5%

- **Extreme sun damaged skin**
- Works great on the scalp
- Typically get a BIG reaction
- 4 day BID
- -87.8% reduction in AKs
-



TNF

- Tumor necrosis factor (TNF) inhibitors – indicated for psoriasis
- **Infliximab** (Remicade)
- **Etanercept** (Enbrel)
- **Adalimumab** (Humira)
- **Certolizumab pegol** (Cimzia)





Adalimumab (Humira)

- Drug class: Tumor Necrosis Factor
- FDA approved for:
 - Adult and pediatric plaque psoriasis
 - Hidradenitis suppurativa
 - New biosimilar "Adalimumab" and now on formularies so cheaper cost available
 - Q2 weeks dosing

Etanercept (Enbrel)

- Drug class: Tumor Necrosis Factor
- FDA approved: Moderate-to-severe adult and pediatric plaque psoriasis
- Dosing: 50mg twice weekly x 12 weeks, then 50 mg weekly
 - Labs: CBC, CMP, Hepatitis screening, TB screening (PPD or Quantiferon Gold), HIV



- Drug class: IL-23 Inhibitors

- Guselkumab (Tremfya)
- Tildrakizumab (Ilumya)
- Risankizumab (Skyrizi)



Risankizumab (Skyrizi)

Plaque psoriasis, moderate to severe

```
graph TD; A[Plaque psoriasis, moderate to severe] --> B[IL-23]; B --> C["SUBQ: Prefilled syringe and auto-injector: 150 mg at weeks 0, 4, and then every 12 weeks thereafter."];
```

IL-23

SUBQ: Prefilled syringe and auto-injector: 150 mg at weeks 0, 4, and then every 12 weeks thereafter.

Guselkumab (Tremfya)

- **IL-23**
- **Plaque psoriasis: SubQ:** 100 mg at weeks 0, 4, and then every 8 weeks thereafter.



- Tildrakizumba (Ilumya)

Plaque psoriasis: SUBQ: 100 mg at weeks 0, 4, and then every 12 weeks thereafter.

- **IL-23**

- **Plaque psoriasis: SUBQ: 100 mg at weeks 0, 4, and then every 12 weeks thereafter.**

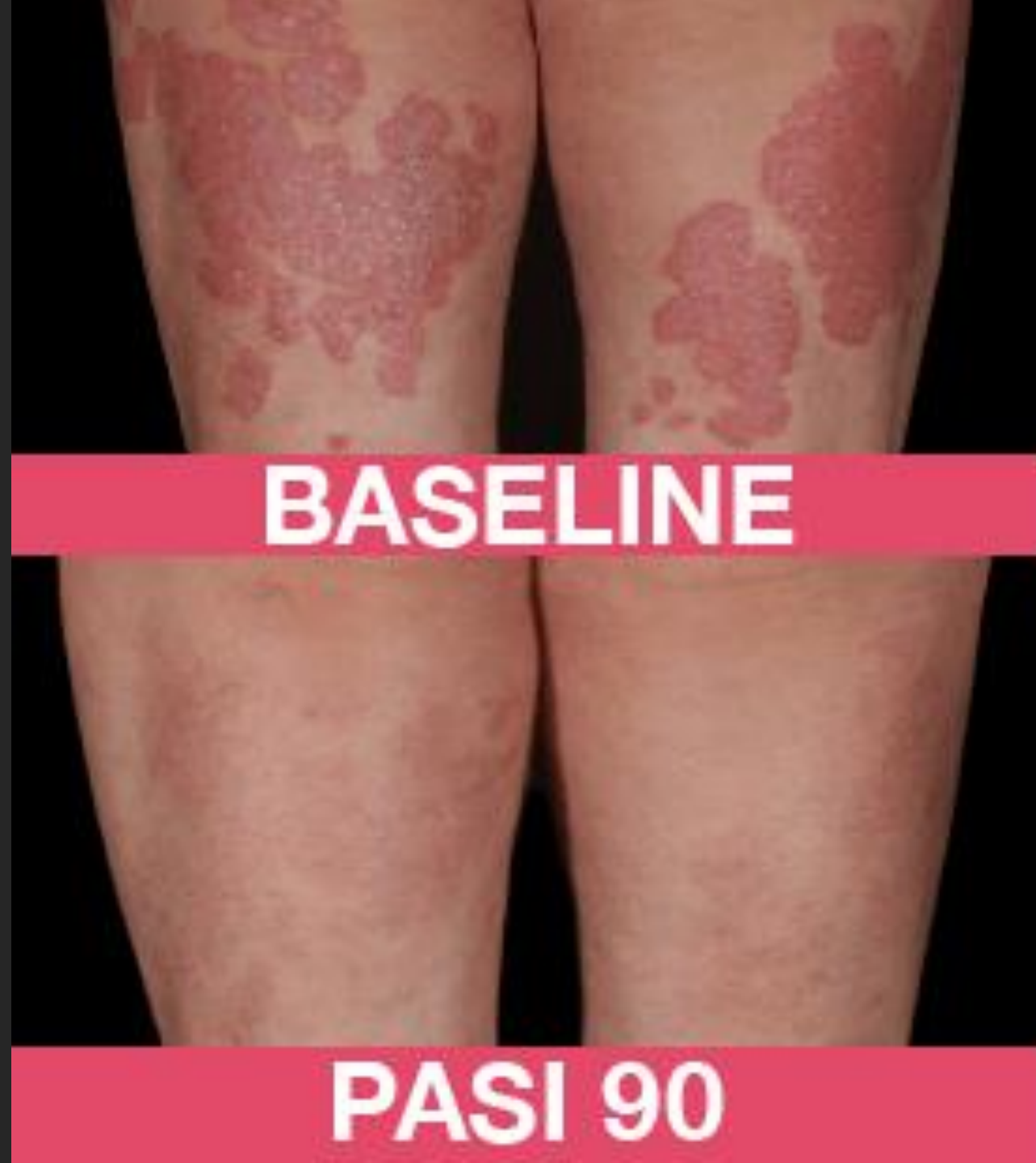
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Drug class: IL-17 Inhibitors

- Bimzelx (bimekizumab)
 - Cosentyx (secukinumab)
 - Taltz (ixekizumab)
 - Siliq (brodalumab)
-

Secukinumab (Cosentyx)

- Drug class: IL-17
- Dosing: 300 mg SQ wk 0,1,2,3,4 then every 4 weeks
- Side effects: increased risk of infection (particularly mucocutaneous candidiasis), development of new or flaring of IBD, neutropenia, hepatotoxicity, injection site reaction, elevation of LFTs



Ixekizumab (Taltz)

- IL-17 drug class
- Approved for: adult plaque psoriasis (with genital psoriasis data included on label), psoriatic arthritis and ankylosing spondylitis
- Dosing: 160 mg SQ wk 0, 80 mg wk 2,4,6,8,10,12 then every 4 weeks





Isotretinoin (Accutane, Absorica)

- Drug class: First generation retinoid
- Pregnancy category X – high rates of developmental disability, craniofacial, cardiac and CNS abnormalities
 - 1st line for severe nodular acne: Isotretinoin (accutane)
- Side effects: Xerosis, cheilitis, dryness, elevation of triglycerides, musculoskeletal pain

Isotretinoin

Medication Instructions:

- Take the pill with a fatty meal for better absorption (e.g. spoonful of peanut butter).
- DO NOT get pregnant or breastfeed while on Accutane and for one month after.
- During the course and for six months after, do not donate blood and do not have elective surgeries, waxing, piercings or tattoos.
- Tylenol, alcohol, and health food supplements are not recommended with Accutane.
- Stop all of your other acne medications and topicals when you start isotretinoin.

Other Tips:

- Taking one tablet of levocetirizine (Xyzal) nightly could help with better acne clearance and minimizing side effects.
- Taking 1 gram of omega-3 supplementation daily decreases side effects of dryness.

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Bryn@mdskinrockford.com
