The background features a collection of colorful combs in various shapes and sizes, including orange, blue, red, purple, and teal. Below the combs is a vibrant, wavy ribbon that transitions through a spectrum of colors from yellow to red to purple. A large, faint watermark of the word 'HAIR' is visible in the background.

Unraveling the Roots of Hair loss Disorders in Females

Melissa Adair, DNP, FNP-BC, DCNP

Assistant Professor

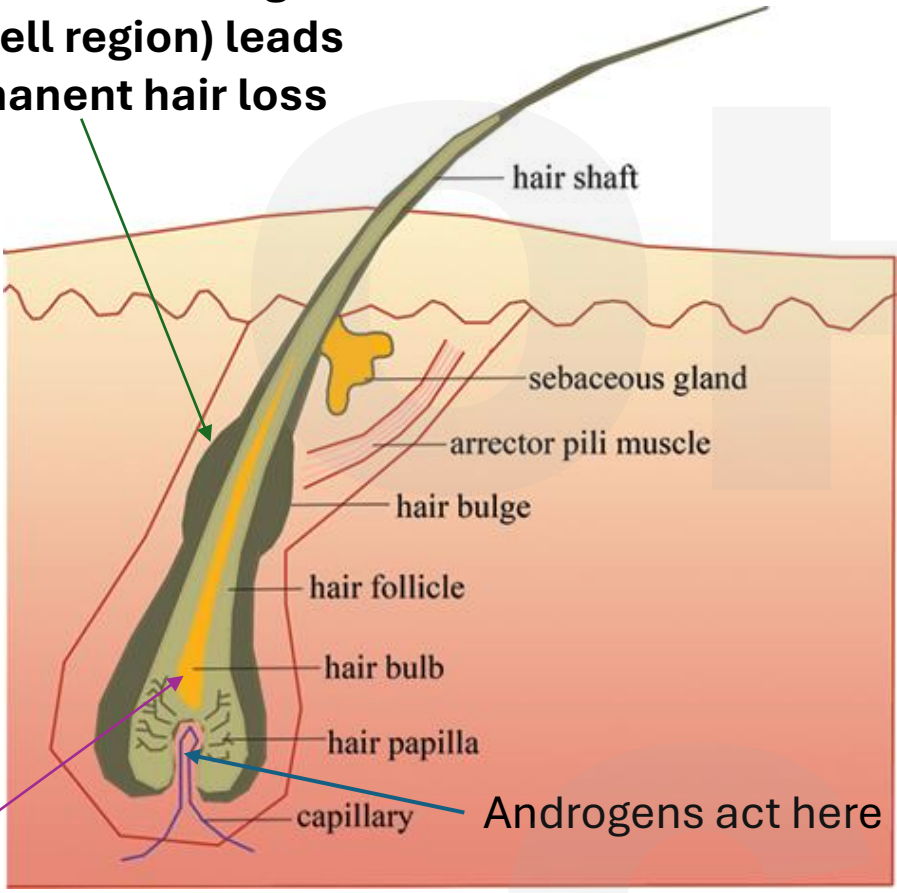
Oregon Health & Science University

Department of Dermatology

I have no disclosures

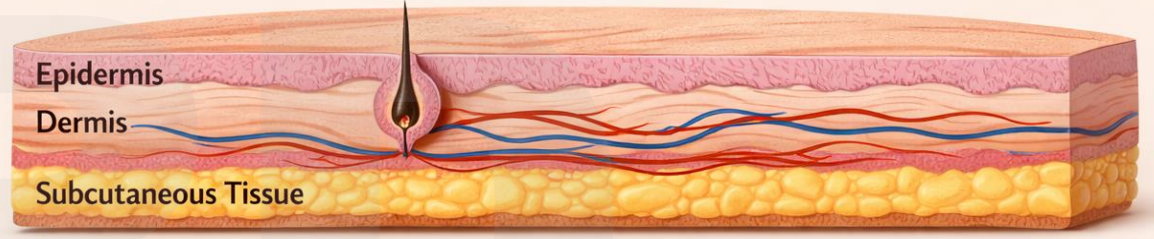
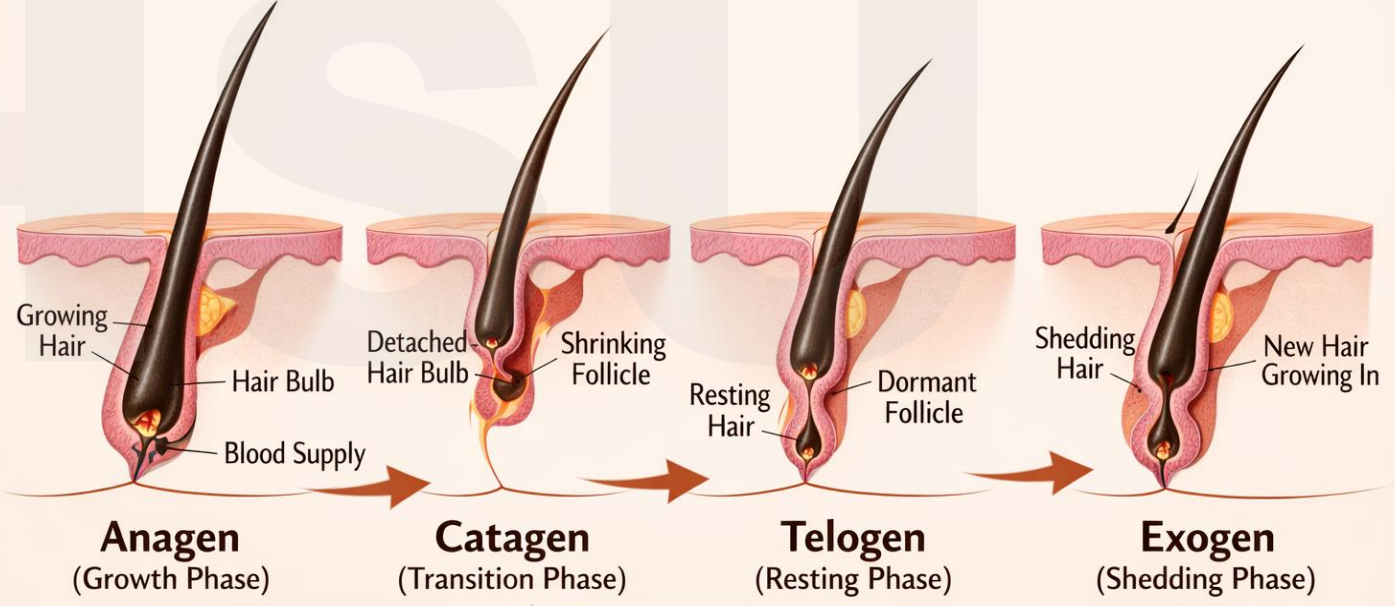
I will be discussing the off-label use of medications

Inflammation in bulge (stem cell region) leads to permanent hair loss



Inflammation in bulb leads to reversible hair loss

Hair Growth Cycle



Hair Follicle Anatomy and Cycle



Why do we care about hair?

- Self-image
- Sun protection
- Thermoregulation
- Increased incidence of anxiety, depression, ADHD, paranoia, and OCD (especially with concern for relapse) with alopecia areata.
- Patients perceive their hair loss to be more severe than the clinical assessment by their provider
- Patients frequently report providers were “dismissive,” “unsupportive,” or “insensitive” regarding their hair loss and offered “no tests” and “no treatment”

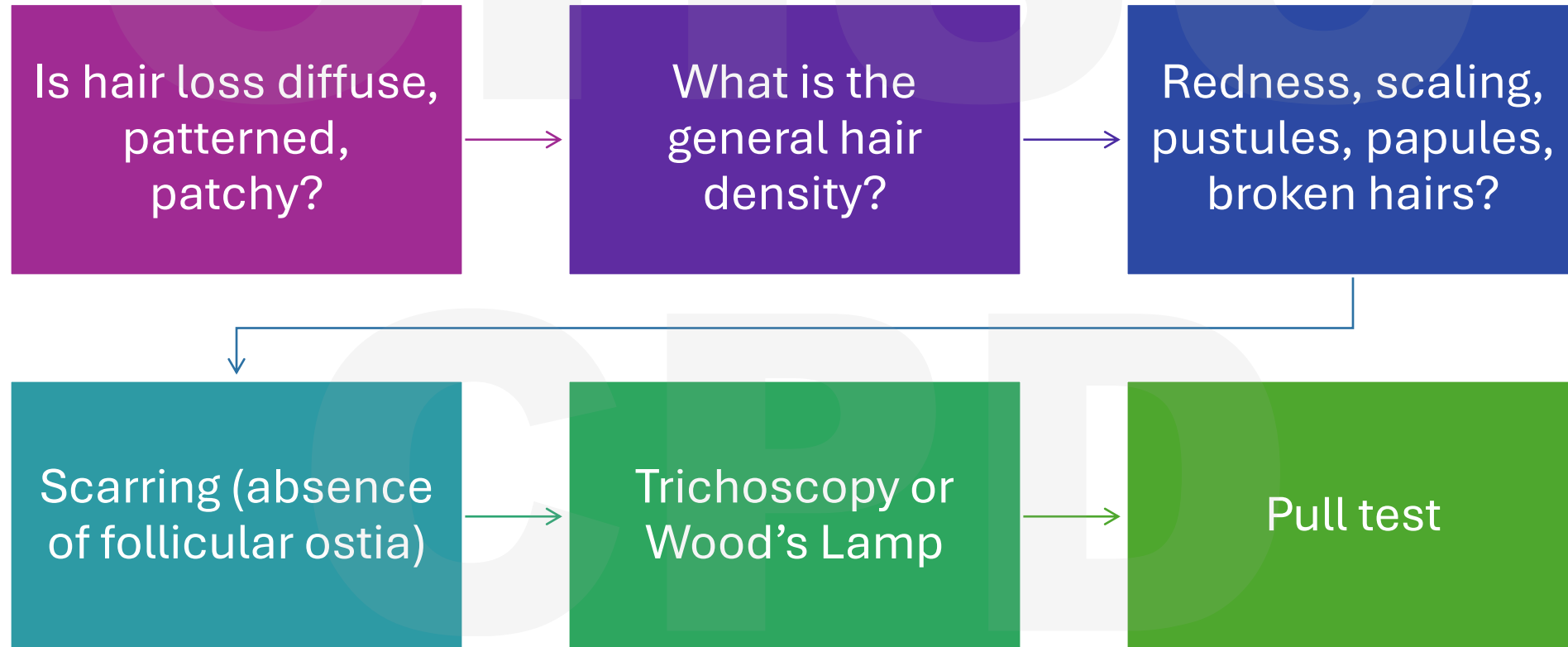
Your patient arrives reporting hair loss—
What will you do first?

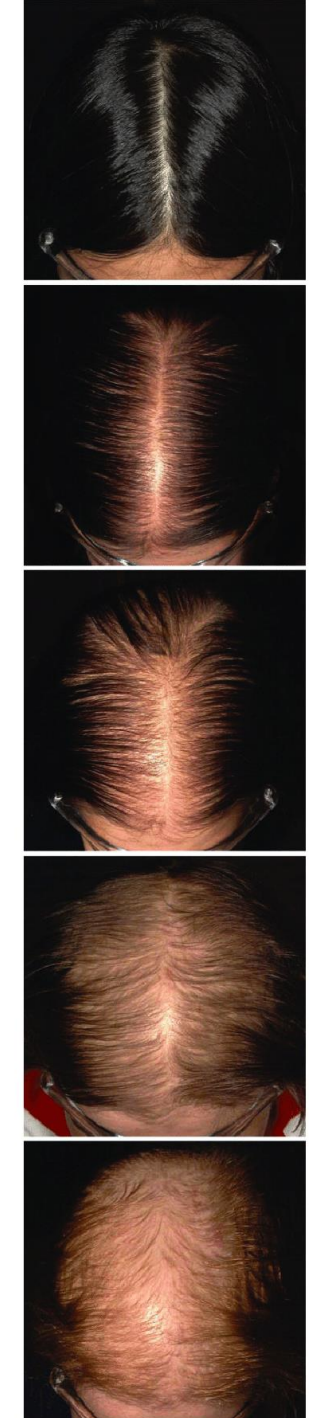


History-taking is key

- Onset: acute vs slowly progressive
- Location of hair loss (scalp, eyebrows, eyelashes, axillae, extremities)
- Shedding?
- Hair thinning?
- Patchy or diffuse?
- Hair breakage?
- Associated itching, pain, scaling, redness, or bumps?
- Dietary restrictions, crash diet, vegetarian?
- Hair care (heat, tension, frequency of washing)
- Stress?
- Postpartum?
- History of Vitamin D deficiency, iron deficiency?
- History of anemia?
- New medications prior to hair loss onset (about 3 months prior)
- Illness or surgery prior to onset? (about 3 months prior)
- Family history of hair loss?
- History of autoimmune disease? Thyroid disease?
- Nail changes?
- Excessive hair growth elsewhere?
- History of hormone therapy, hysterectomy, PCOS?
- Systemic symptoms?

Next: take a look





1
2
3
4
5

Androgenetic Alopecia

- Polygenic and multifactorial, possible role of DHT
 - May be preceded by a shedding event
 - Diffuse thinning on vertex
 - Retention of frontal hair line
 - Widening of the frontal midline part
- Miniaturized hairs can be seen on dermoscopy
 - Typical onset is perimenopause

Hormonal Influence on the Female Hair Follicle

Androgens influence hair follicles based on body site (stimulate facial hair except eyelashes, axilla, pubis, chest; and inhibit hair on scalp)

In females, androgens are produced by adrenal glands, ovaries, brain, placenta (during pregnancy)

Adrenal glands produce DHEA and DHEA-S (weak androgens)

Ovaries and adrenal cortex produce testosterone (from androstenedione)

Testosterone converts to DHT via enzyme 5-alpha reductase. DHT affinity (2.5-5 times greater) for androgen receptors than testosterone

Androgen receptors located in hair papilla cells are activated by testosterone and DHT

Prolactin can prolong anagen phase in female frontotemporal scalp follicles.

17 β -estradiol and 17 α -estradiol can increase anagen and decrease telogen phase. Minimal impact of estradiol on testosterone metabolism.

Female hair follicle has higher aromatase activity than male hair follicle. Aromatase has “detoxifies” by removing excess androgens

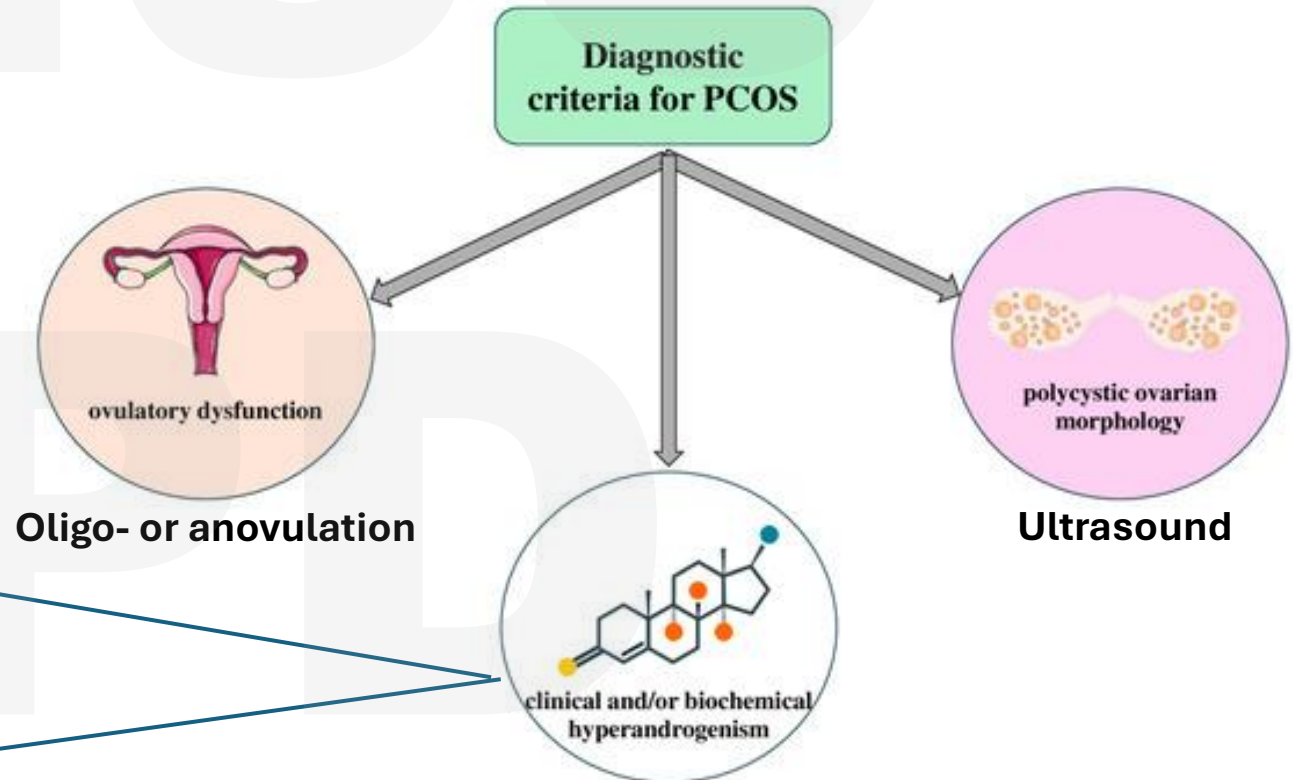
Progesterone decreases conversion of testosterone to DHT at the hair follicle level

Polycystic Ovarian Syndrome

Rotterdam criteria (requires 2 out of 3)



- Affects ~8% of females of reproductive age
- Cutaneous signs: acanthosis nigricans, hirsutism, acne, and hair loss
- Biochemical testing: initial laboratory work-up includes serum total and free testosterone, SHBG, DHEAS, prolactin, TSH



Androgenetic alopecia treatment

Main goal of treatment is to stop progression—set realistic expectations

ALWAYS TAKE PHOTOS!!

Topical 5% minoxidil or low dose oral minoxidil 0.625mg (minimum) to 5mg (max)

Spironolactone 50mg to 200mg daily (not effective in lower doses)—teratogenic*

Finasteride 2.5mg -5mg (females require higher doses than males)—teratogenic*

Dutasteride 0.5mg TIW or once daily—teratogenic* long half life*

Low level light devices for at home use (combs work better than caps)

Platelet-rich plasma (PRP)

Mesotherapy

Supplements (pumpkin seed oil, rosemary oil, marine botanicals)

Hair transplant



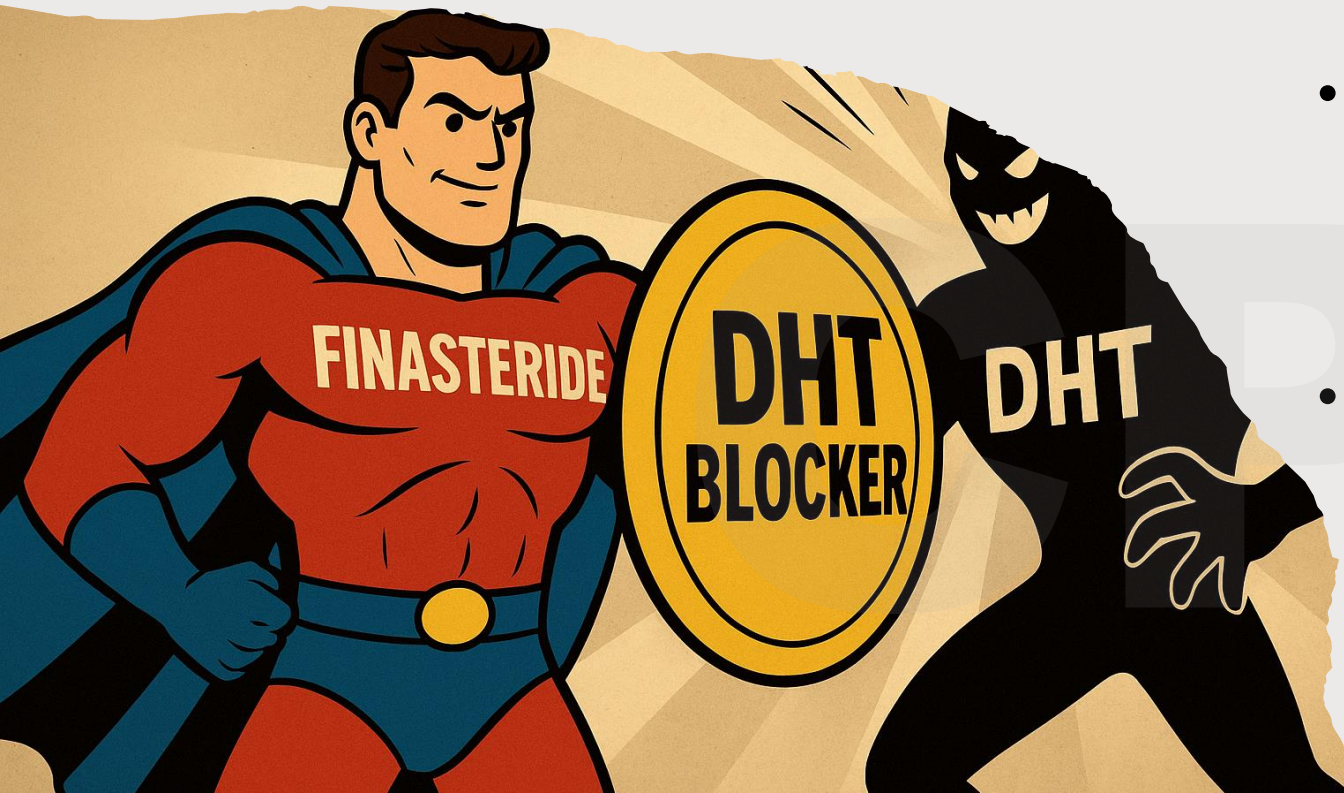
Spironolactone

- Start with 50mg once daily. If tolerating well at two weeks, may increase to 100mg daily, and up to 200mg if needed.
- SEs: lightheadedness, dizziness, breast tenderness, spotting between periods, transient hyperkalemia, hypotension, increased urination.
- May cause birth defects in male fetus. Encourage reliable birth control.
- Monitoring: Blood pressure each visit. If over age 45, check renal function and potassium yearly

Finasteride

Dosing for females:
2.5mg (half pill) to 5mg daily

Off-label use



- Type 2 5-alpha reductase inhibitor: decreases conversion of testosterone to DHT
- **TERATOGENIC**: can cause feminization of male fetus. No blood donation.
- Side effects: headaches, depression, nausea, hot flashes, decreased libido, and reduced intensity of orgasm.
- Controversial: hypothetical increased risk of estrogen-mediated malignancies (breast cancer) because it generates a relative estrogen excess.
- Retrospective study (2024) of 810 women exposed to 5-alpha reductase inhibitors showed no increased risk of breast cancer and benign breast disorders compared to controls

Dutasteride

Dosing for females is 0.5mg either three times per week or once daily (more effective)

- Type 1 and 2 5-alpha reductase inhibitor
- SEs of dutasteride similar to finasteride, but the sexual side effects seem to be less frequent compared to finasteride.
- Three times weekly dosing has no sexual side effects or gynecomastia
- **TERATOGENIC:** can cause feminization of male fetus. No blood donation.

Low level light devices

- Diode or LED delivering 630-670nm wavelength (usually 650nm)
- Targeted thermal injury stimulates hair growth and decreases inflammation; MOA not entirely known; may stimulate mitochondria, generate ROS and antioxidants to prolong anagen and inhibit catagen
- SEs: sunburn type sensation, pruritus, headache. Hypothetical risk of retina damage
- Contraindicated: pregnancy, photosensitizing meds, scalp malignancies
- Response takes at least 12-16 weeks with optimal results at 1 year
- Combs have the best data
- Increases in hair regrowth, thickness, and patient satisfaction



Platelet-rich plasma (PRP)

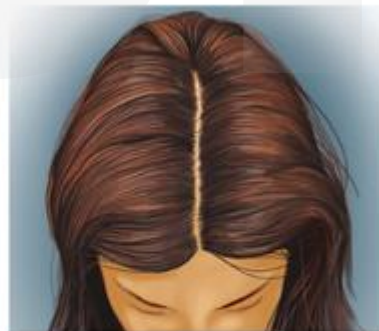


- Plasma composition from a person's own whole blood, centrifuged to separate PRP from the remaining components of blood.
- Contains three to five times the baseline number of platelets found in whole blood.
- Platelets in PRP contain growth factors that can promote hair growth.

Recommended Photo Series



1. Frontal Hairline



2. Mid-scalp



3. Right temple



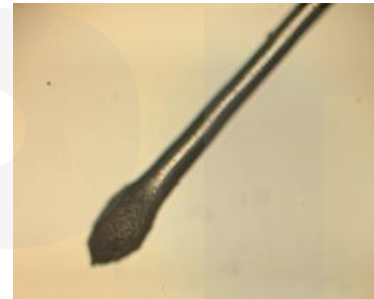
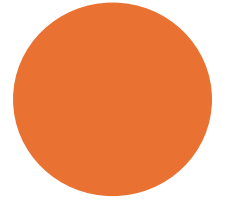
4. Left temple



5. Crown

Telogen effluvium

- Increased number of anagen hairs synchronously enter telogen phase and are shed from **entire scalp** (may also include pubic and axillary hair).
- >100-150 hairs lost per day
- Positive pull test
- Usually self-resolves within six months; may persist longer and become chronic.
- Occurs 3 months after an inciting factor, examples: childbirth, febrile or infectious disease, SLE, severe stress, surgery, thyroid or parathyroid abnormalities, decreased nutrient intake (crash diet, starvation), discontinuation of hormones, and starting new medications.
- Labs: TSH, CBC, ferritin (consider B12, zinc, ANA, folate)
- If treatment needed, same as for androgenetic alopecia



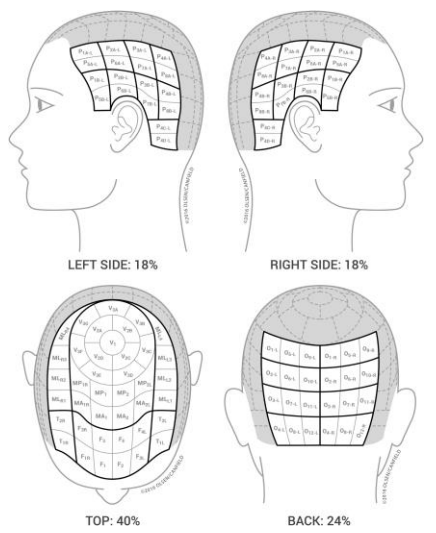
Telogen club hair

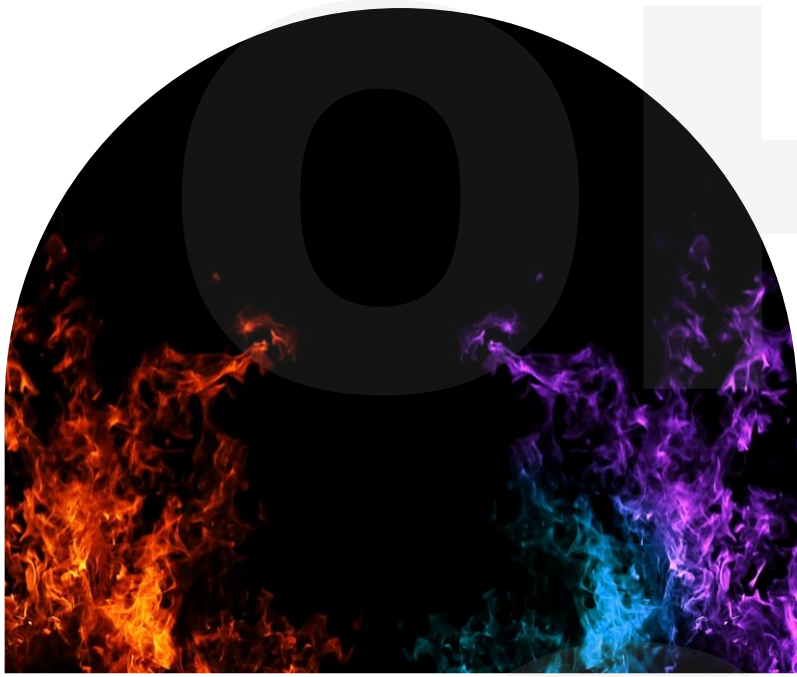




Alopecia areata

- T lymphocyte-mediated autoimmune disease of hair follicle bulb (non-scarring)
- Typically, focal patches, or may be diffuse
- Often accompanies other autoimmune conditions (Thyroid common) and atopy
- Check TSH with reflex to T4
- Calculate scalp involvement by using patient's thumb size as 1%
- If less than 10% involvement, may wait (hair usually grows back in <1 year), or:
- Topical steroids (clobetasol for scalp) once daily x4 weeks, then decrease to TIW
- Topical or oral minoxidil (same dosing as for androgenetic alopecia)
- Intralesional kenalog 5mg/mL (0.1mL per 1cm spacing); may repeat every 6 weeks
- Severe disease may require JAK-I or methotrexate





Common inflammatory, scarring
scalp disorders
in females

Lichen
planopilaris (LPP)

Frontal fibrosing
alopecia (FFA)

Central centrifugal
cicatricial
alopecia (CCCA)

Discoid Lupus
(DLE)



Lichen planopilaris (LPP)



- Follicular form of lichen planus occurring at stem cell bulge, scarring and permanent hair loss
- Caused by cell-mediated immunity dysfunction which results in loss of immune privilege of hair follicle
- Can present with cutaneous or oral lichen planus
- Most common in women, especially white women between the ages of 40-60
- Can occur anywhere on the scalp, but prefers the vertex (baseball cap distribution)
- Patients may report itching, scaling, pain, or shedding
- You may see red macules or papules and scaling around hair follicles, shiny white patches, stand alone hairs



Trichoscopy in LPP

- Loss of follicular openings
- Milky red globules= area of disease activity
- Pili torti hairs
- Peripilar scale
- Linear vessels

Management of LPP



- **Refer to dermatology**
- **START 1st line treatment with Clobetasol 0.05% solution three times per week to scalp**
- **Systemic treatments may include:**
- **Doxycycline 20mg BID, 50mg BID, or 100mg BID depending on amount of inflammation (expect to continue this for at least 12 months)**
- **Finasteride (same dosing as in AGA)**
- **Hydroxychloroquine**
- **Methotrexate**
- **Cyclosporine**
- **Mycophenolate mofetil**
- **Serial photography and dermoscopy to evaluate effect**

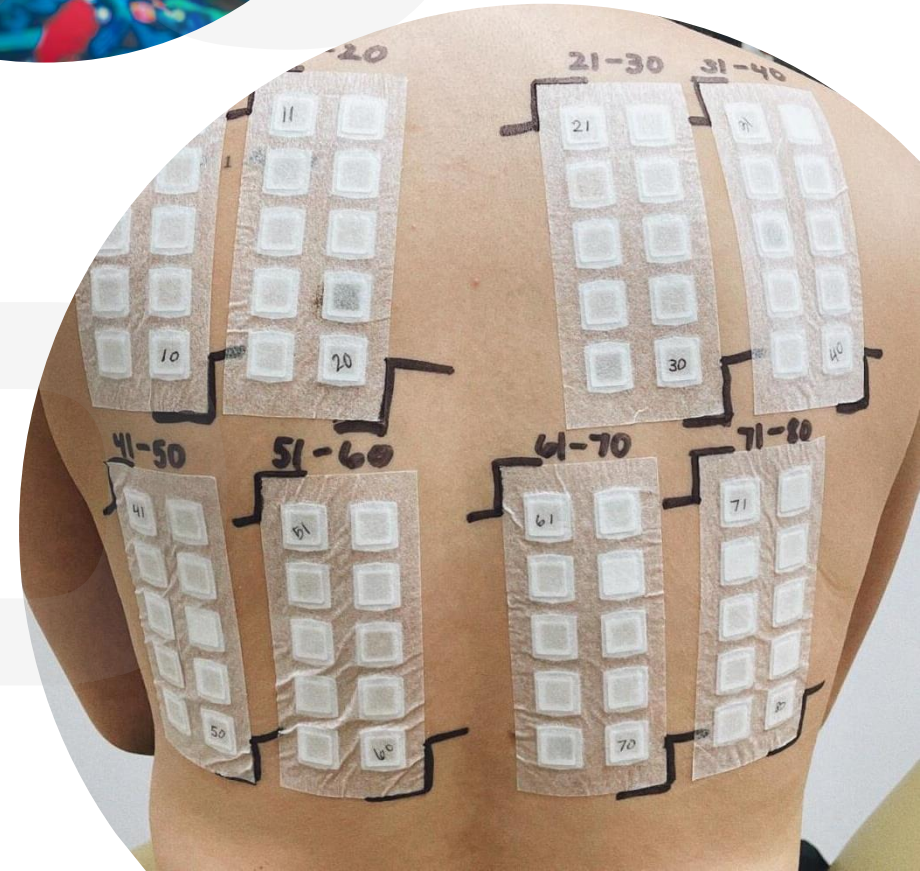
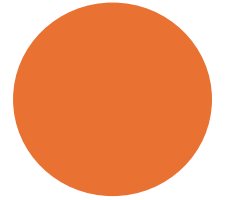


Frontal fibrosing alopecia (FFA)

- Scarring alopecia presenting as a symmetric band-like zone of hair loss on anterior hair line
- Often affects postauricular scalp and lateral eyebrows
- A patterned variant of lichen planopilaris
- Keys to diagnosis: Alopecia of frontal hair line, lateral brows. Perifollicular erythema and scaling. Lonely hair sign. Hypopigmentation of the superior forehead, facial papules.

Possible associations with FFA

- FFA was very uncommon until the 1990's
- Has become increasingly common since 2000's and has been the most common type of cicatricial alopecia since 2012
- Hypothesis of possible association with widespread use of chemical sunscreen.
- Titanium dioxide has been identified in hair samples of FFA in three different studies
- Recommend zinc sunscreen
- Higher rates of allergic contact dermatitis in individuals with FFA (especially balsam of Peru, benzoyl peroxide, and linalool)





Management of FFA

- **Mild inflammation:**
- Topical tofacitinib 2% cream or tacrolimus 1% solution once nightly
- Or clobetasol solution TIW (caution skin atrophy)
- **Moderate inflammation:**
- Add Intralesional Kenalog 2.5mg/mL inject 0.1 mL every 1cm along the inflamed areas q2 months
- Add Finasteride (2.5mg-5mg daily for females)
- **Severe inflammation:**
- Hydroxychloroquine 200mg once or twice daily (5mg/kg/day)
- Isotretinoin 20mg daily (especially for facial papules)
- Serial **photography** and dermoscopy to evaluate effect of treatment

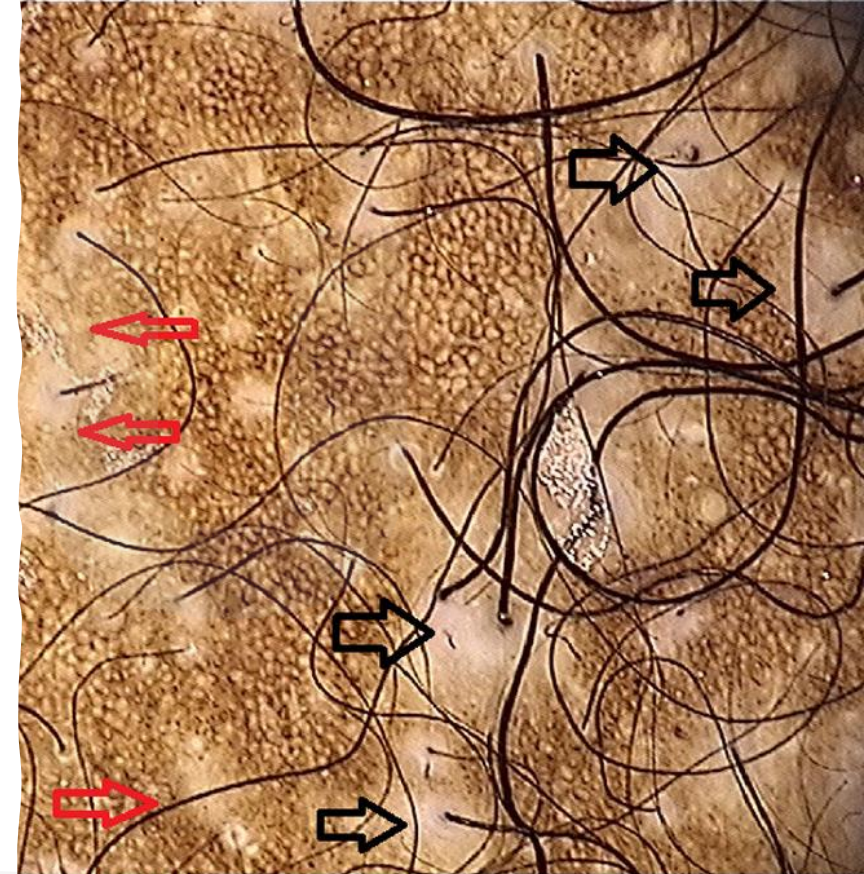
Central centrifugal cicatricial alopecia (CCCA)

- Scarring alopecia that typically affects middle-aged females of African descent. Prevalence is 3% to 6% in this population. There is often a family history
- Pathogenesis is multifactorial, and a mutation in the PADI3 gene has been identified as contributory.
- It is thought that hair practices, such as hot combs, relaxers, tight braids, and sewn-in weaves may trigger CCCA
- Typically starts as an alopecic patch on the central vertex which expands. It may be associated with papules, pustules, erythema, or scaling, but typically the inflammation is subtle.
- May have pruritus or burning sensation of the scalp



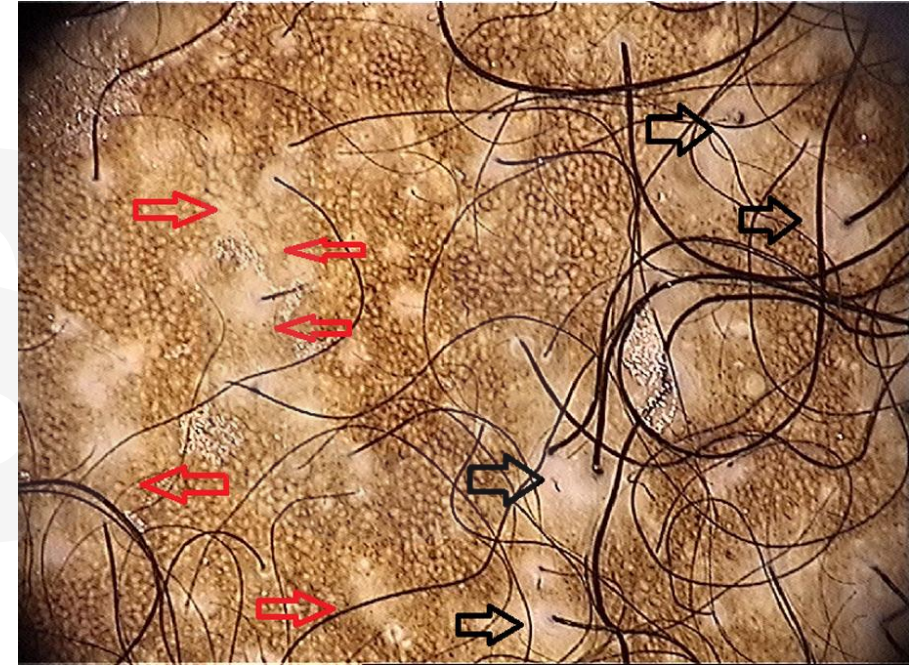
Trichoscopy of CCCA

- Most common feature is peripilar white/gray (sensitive and specific for CCCA)
- Irregular honeycomb network (hyperpigmented rete ridges and hypomelanotic dermal papillae)
- Irregular pinpoint white dots
- Hair shaft variability
- White patches in follicular dropout
- Black dots, broken hairs
- No peripilar casts in CCCA



Management of CCCA

- If suspicious for CCCA, needs scalp biopsy
- Discuss possibility of contributory hair practices and recommend avoidance hot combs, relaxers, tight braids, sewn-in weaves
- START clobetasol 0.5% ointment three times per week to the affected area of the scalp
- START ketoconazole 2% shampoo once weekly, leave on 5 minutes then rinse.
- START Doxycycline 20mg BID, 50mg BID, or 100mg BID depending on amount of inflammation (expect to continue this for at least 6 months)
- Consider starting metformin 500mg daily
- Monitor with serial photos and dermoscopy (peripilar white/gray halos and peripilar erythema)



CCCA Consensus Recommendation (2024) of 16 hair specialists:

Treatment for central centrifugal cicatricial alopecia—Delphi consensus recommendations

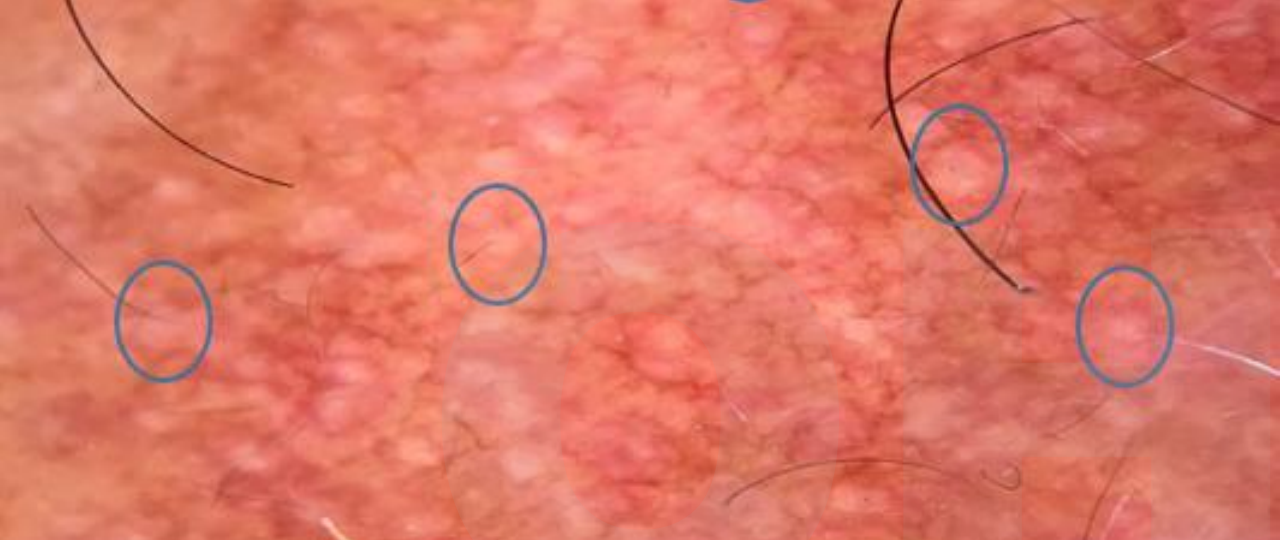
Tiaranesha Jackson, MPH,^a Yacine Sow, BA,^b Jewell Dinkins, MS,^c Crystal Aguh, MD,^d Katherine Omueti Ayoade, MD, PhD,^e Victoria Barbosa, MD, MPH, MBA,^f Cheryl Burgess, MD,^g Valerie Callender, MD,^h George Cotsarelis, MD,^c Pearl Grimes, MD,ⁱ Valerie Harvey, MD, MPH,^{j,k} Chesahna Kindred, MD, MBA,^l Jenna Lester, MD,^m Kristen Lo Sicco, MD,ⁿ Tiffany Mayo, MD,^o Amy McMichael, MD,^p Michelle Oboite, MD,^{c,q} Temitayo Ogunleye, MD,^c Elise Olsen, MD,^r Achiamah Osei-Tutu, MD,^s Melissa Piliang, MD,^t Maryanne Senna, MD,^u Jerry Shapiro, MD,^v Antonella Tosti, MD,^v Cheri Frey, MD,^w Prince Adotama, MD,ⁿ and Susan C. Taylor, MD^c





Discoid lupus erythematosus (DLE)

- Autoimmune skin disease that can lead to disfigurement and scarring alopecia
- Presents as discoid pink or violaceous papules or plaques with scale that can lead to depigmentation, atrophy, and scarring
- Predilection for conchal bowl—check here
- Most common in females in second, third, and fourth decades of life
- May be localized to face, scalp, ears, and neck or generalized
- Generalized DLE has 20% risk of associated systemic lupus; whereas, localized only has a 5% association.



Trichoscopy findings in DLE

- White halos
- Follicular red dots
- Large, irregular yellow dots with arborizing vessels: “red spider over a yellow dot”
- Interfollicular scale
- Keratotic plugs



Management of Discoid lupus erythematosus

- Evaluate entire skin to calculate involvement
- Perform punch biopsy for suspected DLE
- Check labs for SLE: ANA with reflex to IFE, anti-SSA, anti-SSB, anti-DsDNA, CBC with Diff, ESR, CMP, and urinalysis
- Recommend strict sun protection, avoidance of extreme heat or cold, and avoidance of trauma
- Advise stopping any unnecessary supplements and medications
- START high potency topical steroid (such as clobetasol 0.05% solution on scalp) once daily until lesion is smooth.
- Intralesional Kenalog 5mg/mL every 4-6 weeks
- Hydroxychloroquine or methotrexate may be needed.

References:

- James JF, Jamerson TA, Aguh C. Efficacy and safety profile of oral spironolactone use for androgenic alopecia: A systematic review. *Journal of the American Academy of Dermatology*. 2022;86(2):425-429. doi:10.1016/j.jaad.2021.07.048
- Dodd EM, Winter MA, Hordinsky MK, Sadick NS, Farah RS. Photobiomodulation therapy for androgenetic alopecia: A clinician's guide to home-use devices cleared by the Federal Drug Administration. *Journal of cosmetic and laser therapy*. 2018;20(3):159-167. doi:10.1080/14764172.2017.1383613
- Sadick NS, ed. *Platelet-Rich Plasma in Dermatologic Practice*. Springer; 2021.
- Georgescu SR, Amuzescu A, Mitran CI, et al. Effectiveness of Platelet-Rich Plasma Therapy in Androgenic Alopecia-A Meta-Analysis. *Journal of personalized medicine*. 2022;12(3):342-. doi:10.3390/jpm1203034
- Fachine COC, Valente NYS, Romiti R. Lichen planopilaris and frontal fibrosing alopecia: review and update of diagnostic and therapeutic features. *An Bras Dermatol*. 2022 May-Jun;97(3):348-357. doi: 10.1016/j.abd.2021.08.008. Epub 2022 Apr 2. PMID: 35379508; PMCID: PMC9133245.
- Moussa A, Bhoirul B, Asfour L, Kazmi A, Eisman S, Sinclair RD. Treatment of lichen planopilaris with baricitinib: A retrospective study. *J Am Acad Dermatol*. 2022 Sep;87(3):663-666. doi: 10.1016/j.jaad.2022.02.027. Epub 2022 Feb 22. PMID: 35202778.
- Jafari MA, Bazgir G, Hosseini-Baharanchi FS, Jafarzadeh A, Goodarzi A. Efficacy and Safety of Laser Therapy and Phototherapy in Cicatricial and NonCicatricial Alopecia: A Systematic Review Study. *Health Sci Rep*. 2024 Nov 4;7(11):e70180. doi: 10.1002/hsr2.70180. PMID: 39502132; PMCID: PMC11534645.
- Messenger AG, Asfour L, Harries M. Frontal Fibrosing Alopecia: An Update. *Am J Clin Dermatol*. 2024 Dec 19. doi: 10.1007/s40257-024-00912-w. Epub ahead of print. PMID: 39699852.
- Jackson T, Sow Y, Dinkins J, et al. Treatment for central centrifugal cicatricial alopecia—Delphi consensus recommendations. *Journal of the American Academy of Dermatology*. 2024;90(6):1182-1189. doi:10.1016/j.jaad.2023.12.073
- Tosti A, Asz-Sigall D, Pirmez R. *Hair and Scalp Treatments: A practical Guide*. Springer Nature Switzerland. 2020
- Miteva M, Tosti A. Dermatoscopic features of central centrifugal cicatricial alopecia. *Journal of the American Academy of Dermatology*. 2014;71(3):443-449. doi:10.1016/j.jaad.2014.04.069
- Miteva, M. *Hair Pathology with Trichoscopic Correlations*. Boca Raton, FL; 2021. <https://doi.org/10.1201/9780429457609>
- Grymowicz M, Rudnicka E, Podfigurna A, Napierala P, Smolarczyk R, Smolarczyk K, Meczekalski B. Hormonal Effects on Hair Follicles. *International Journal of Molecular Sciences*. 2020; 21(15):5342. <https://doi.org/10.3390/ijms21155342>
- Housman E, Reynolds R. 2014. Polycystic ovary syndrome: A review for dermatologists. *JAAD*, 71, 847.e1-847.e10



Thank you!!

**Melissa Adair, DNP, FNP-BC,
DCNP**

Nurse Practitioner

**Oregon Health & Science
University**

Department of Dermatology

Adairm@ohsu.edu