

A black silhouette of a woman's head and shoulders is positioned on the right side of the frame, facing right. The silhouette is partially obscured by a dense, intricate pattern of green vines, leaves, and small flowers that swirl around it, extending from the top left towards the center. The background is a solid, light gray.

Hair: The Long 'n Short of It

From Root to Tip — The Science of Hair Health


✨ Hair Through History, Myth, and Legend





Medusa – Power Turned to Fear

In Greek mythology, Medusa's hair of writhing serpents symbolized both beauty and danger. Once a beautiful maiden, she was cursed by Athena — her hair transformed into snakes, her gaze turning men to stone.

 *Folklore takeaway:* Hair has long been seen as a vessel of energy and power — something to be revered, feared, or controlled.

💪 Samson – Strength in the Strands

In the Book of Judges, Samson's miraculous strength lay in his uncut hair, a sign of his covenant with God. When Delilah betrayed him and his hair was shorn, his power vanished — only to return as his hair regrew.

💡 *Symbolism:* Hair as divine vitality and personal empowerment. Cut the hair, cut the life force — or so the ancients believed!





👑 Guinevere – Beauty, Betrayal, and Grace

King Arthur’s queen, often described as “golden-haired,” embodied the ideal of medieval beauty and nobility. Yet her hair also became a metaphor for her allure — the golden thread that entangled hearts and kingdoms alike.

💡 *Symbolism:* Hair as the shimmering boundary between purity and passion.



Rapunzel – The Tower and the Tresses

“Rapunzel, Rapunzel, let down your hair!” Her impossibly long braid bridged separation and connection — a lifeline of love and liberation.

💡 *Symbolism:* Hair as both confinement and freedom, a link between isolation and intimacy.





Across Cultures

- In many traditions, **cutting hair** marked new beginnings or mourning.
- **Braids** represented unity and connection.
- **Loose hair** signified freedom or sensuality.
- **Shorn heads** could symbolize humility, purification, or spiritual rebirth.



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10/17/2025





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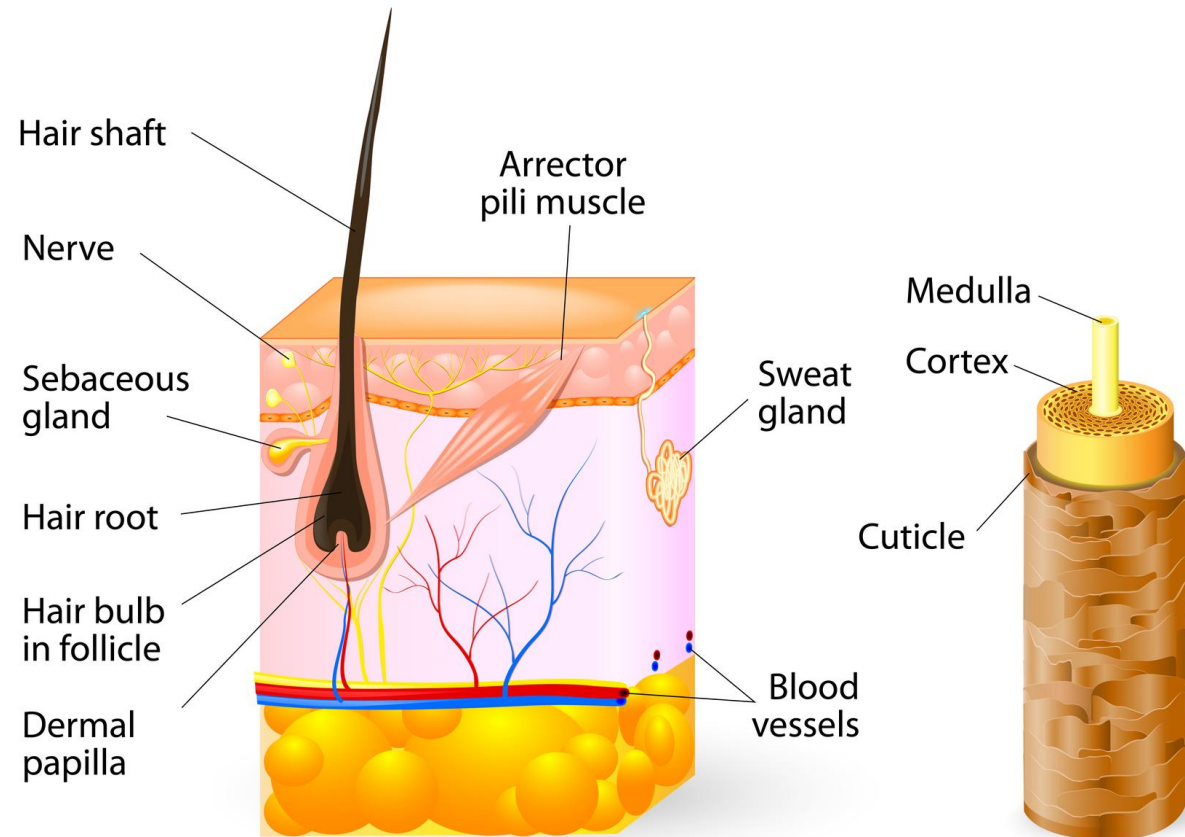
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What Is Hair, Anyway?

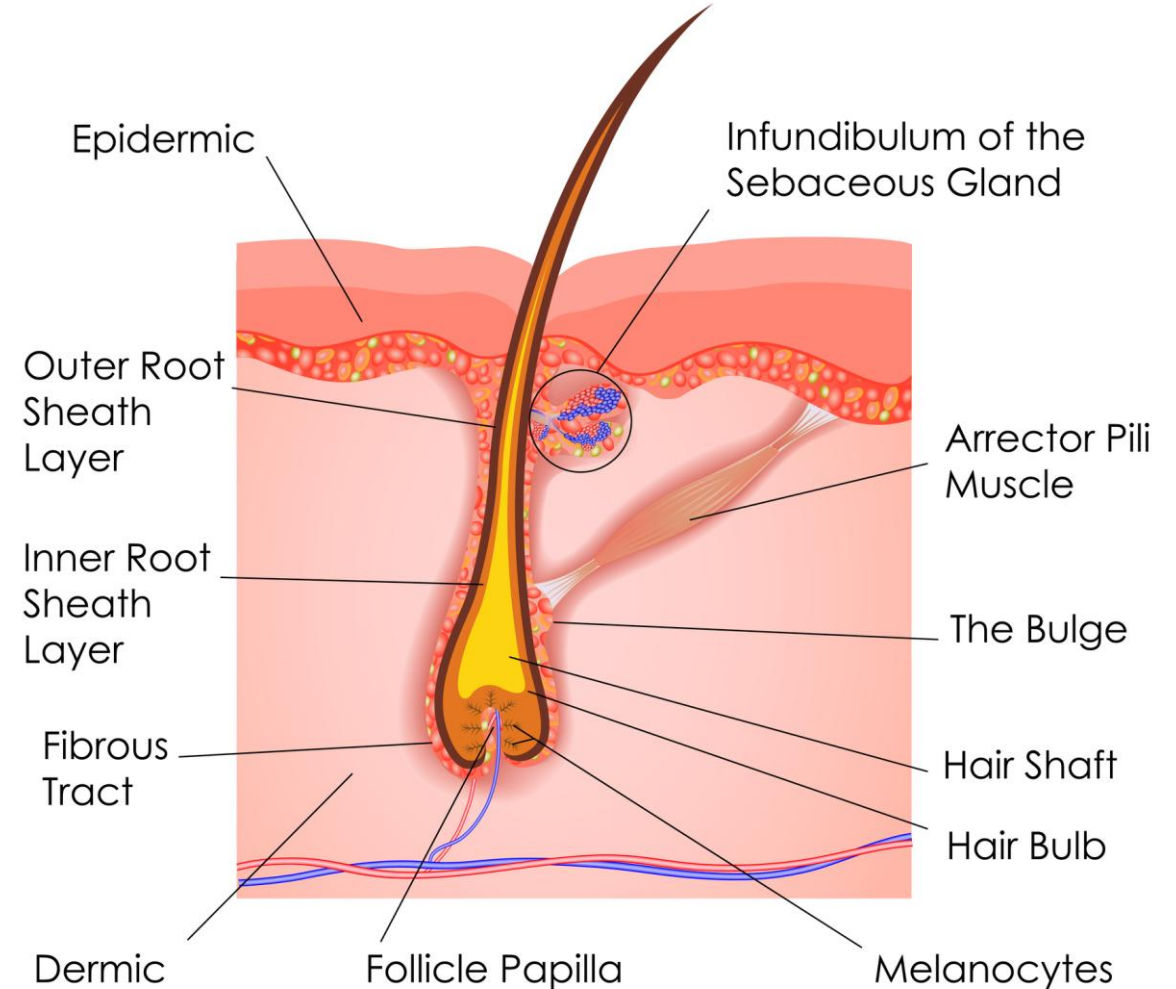
- Composed mainly of **keratin** — same tough protein as nails & skin
- Each strand anchored in a **follicle** within the scalp
- The **bulb** at the base = living part, rich in blood vessels
- **Sebaceous glands** keep hair lubricated & protected
- Think of it as a **tiny factory** fueled by nutrients, hormones & oxygen

HAIR ANATOMY



Hair Anatomy – Quick Reference

- **Epidermis:** Outer skin layer protecting and anchoring the follicle.
- **Infundibulum:** Upper follicle segment, where oil glands empty sebum.
- **Outer Root Sheath:** Outer support layer connecting follicle to skin.
- **Inner Root Sheath:** Inner lining that shapes and guides the hair shaft.
- **Arrector Pili Muscle:** Tiny muscle that raises hair, causing “goosebumps.”
- **The Bulge:** Stem-cell zone for follicle renewal and skin repair.
- **Hair Shaft:** Visible, keratinized portion above the skin surface.
- **Hair Bulb:** Living base where new hair cells are produced.
- **Follicle Papilla:** Vascular projection feeding and oxygenating the bulb.
- **Melanocytes:** Pigment cells giving hair its color.
- **Fibrous Tract:** Connective sheath anchoring the follicle in the dermis.
- **Dermis:** Deeper skin layer supplying blood, nerves, and support.



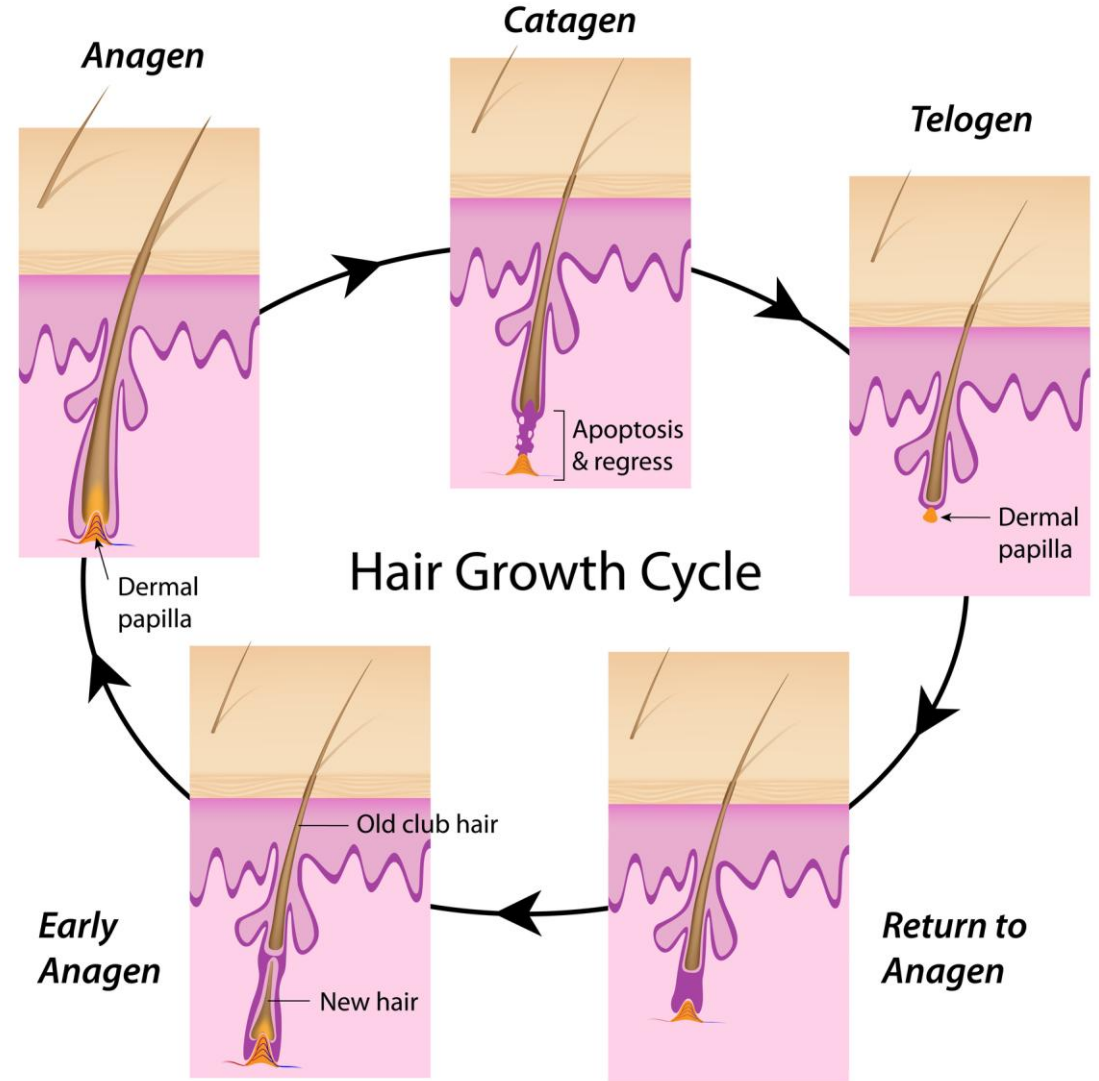
Biology

Hair Anatomy



How Hair Grows

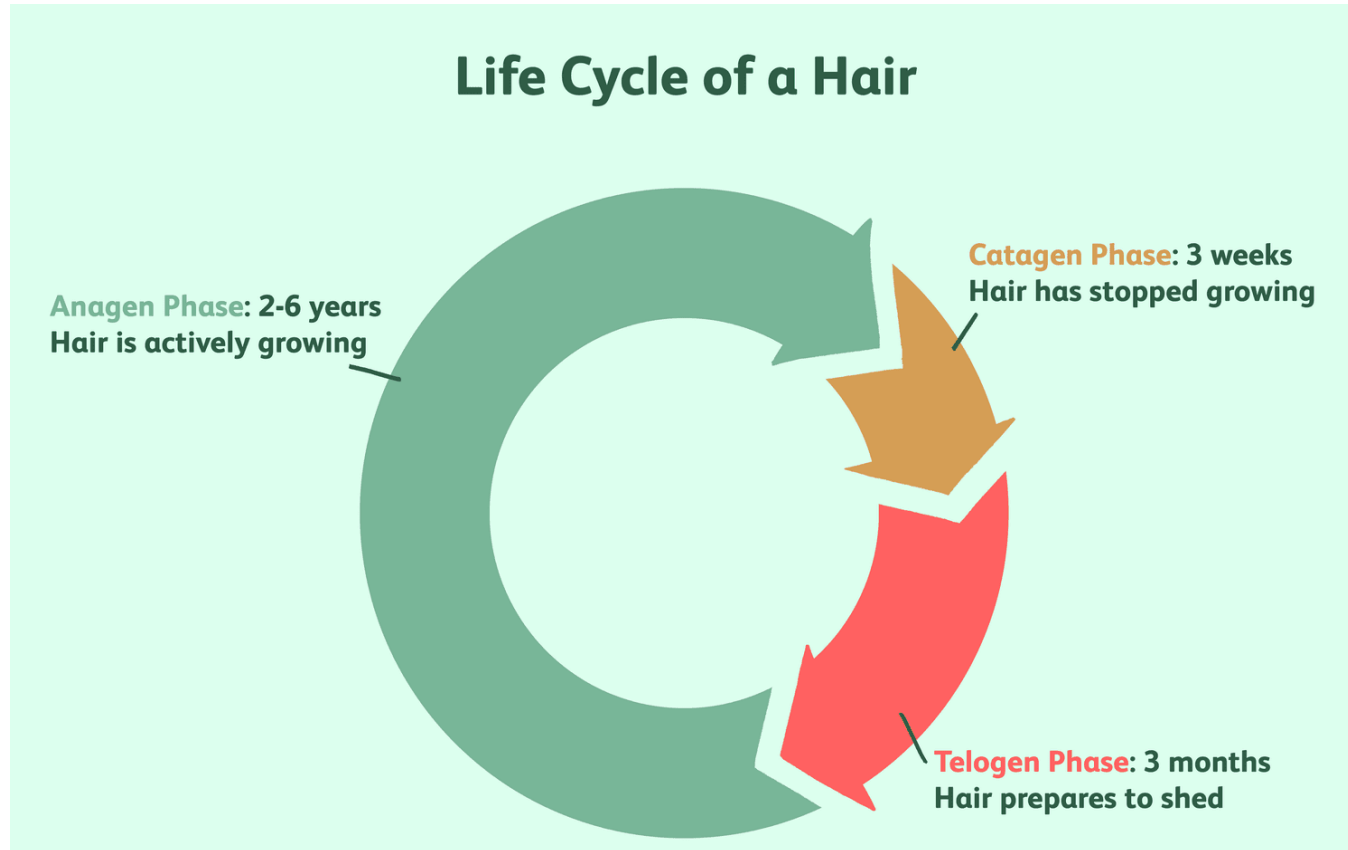
- Growth rate: $\sim\frac{1}{2}$ inch per month (6 inches per year)
- Follows a 3-phase cycle:
 - **Anagen (growth):** 2–7 years
 - **Catagen (transition):** a few weeks
 - **Telogen (resting/shedding):** \sim 3 months
- Each follicle grows on its **own independent timer**



🤔 The Anagen Phase: 2-7 YEARS??

Yes indeed — and it's one of the most fascinating aspects of hair biology!

- The **anagen phase** (the *growth* phase) truly does last anywhere from **2 to 7 years** for most scalp hair — and that huge range explains why some people can grow their hair down to their waist while others can't get past their shoulders, no matter how patient they are.
- A few key points:
- Each follicle has its **own genetic timer** determining how long it stays in anagen.
- On average, **85–90%** of your scalp hairs are in anagen at any given moment.
- The **longer** your anagen phase, the **longer** your potential maximum hair length.





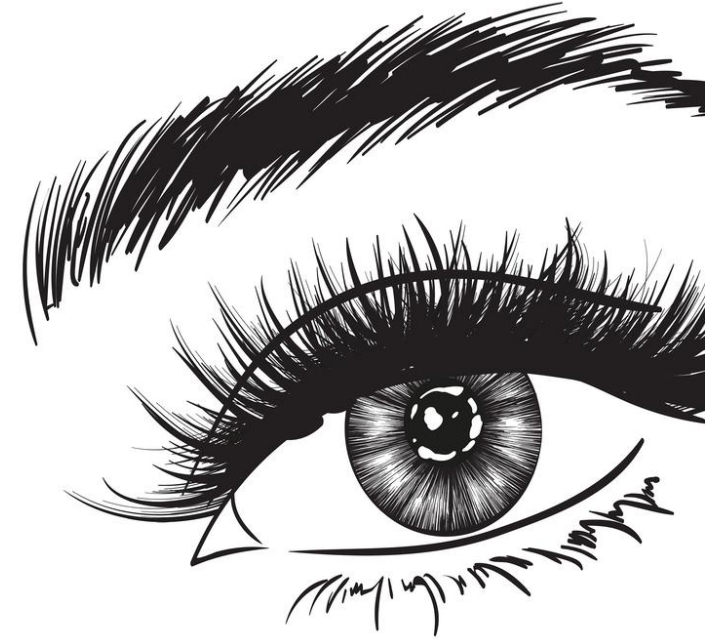
Genetic Blueprint

- Each follicle is “programmed” for a certain anagen duration — usually **2–7 years**, though in some lucky individuals it can last **10+ years**.
- Short anagen = hair reaches a certain length, then stops growing and sheds sooner.
- Long anagen = hair keeps growing before transitioning to rest.
That’s why some people can grow hair to their waist while others plateau around the shoulders no matter what they do.



But what about...

- **Eyebrows, eyelashes, and body hair** have much shorter anagen phases (just weeks to a few months), which is why they don't grow indefinitely.
- Nutrition, hormones (especially thyroid and androgens), and overall health can influence how long each follicle stays in that phase.
- After anagen, the follicle shifts to **catagen** (a brief transition lasting a few weeks), then **telogen** (a 2–3-month resting phase before shedding and regrowth).
- So yes — that “2–7 years” is the real deal, and it's what makes hair both predictable and personal!





So, What Do You Want?

- If your goal is **longer, thicker hair**, the ideal scenario is to:
- **Extend** the length of the anagen phase (keep follicles “awake” longer)
- **Shorten** the telogen (rest/shedding) phase
- **Optimize growth rate** (usually about ½ inch per month, but can increase slightly with excellent nutrition and circulation)

Why Hair Turns Gray

- Color from **melanocytes** producing **melanin**
- With age or oxidative stress → fewer active melanocytes
- **Hydrogen peroxide buildup** in follicles bleaches pigment
- Nutrient factors: **B12, folate, copper, catalase** deficiency
- Possible reversibility with antioxidant or PABA support



Different Types of Hair

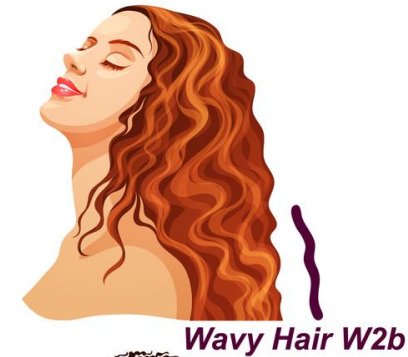
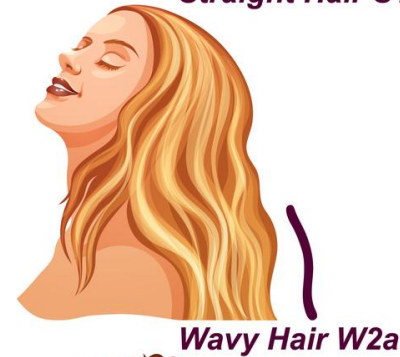
- **Shape determines texture:**
 - Round follicle → straight
 - Oval → wavy
 - Flat/elliptical → curly
- Ethnic variation = follicle angle, density, and sebum content
- **Color:** ratio of *eumelanin* (brown/black) to *pheomelanin* (red/yellow)
- After chemo or injury: follicle “reboot” can change texture or color!



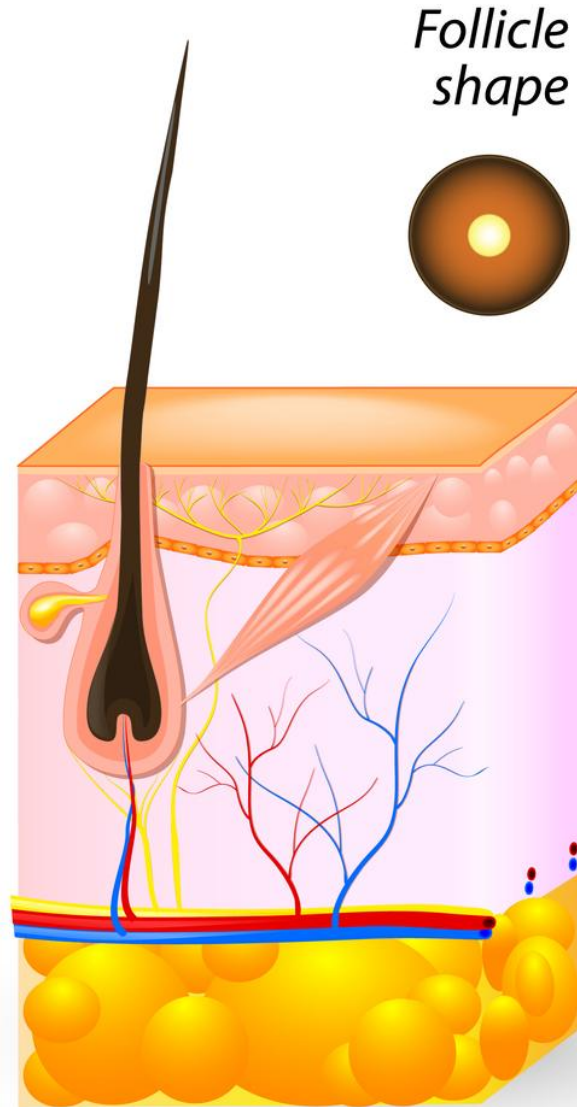
Follicle Shape & Hair Characteristics

Why some strands curl and others stay straight.

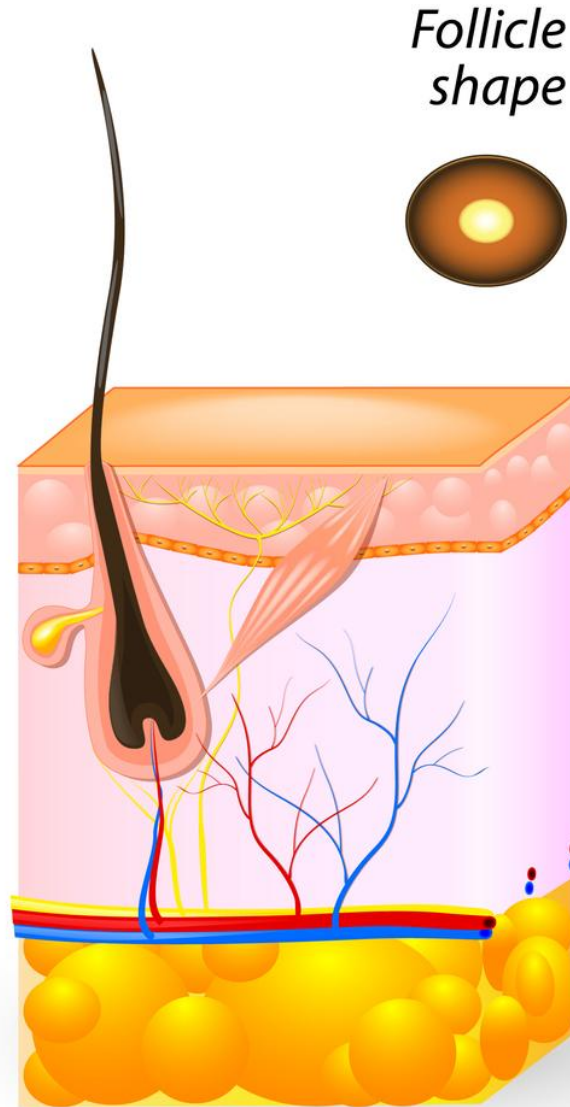
Hair texture depends on the **shape and angle of the follicle** beneath the scalp. The geometry determines how keratin cells are laid down within the shaft.



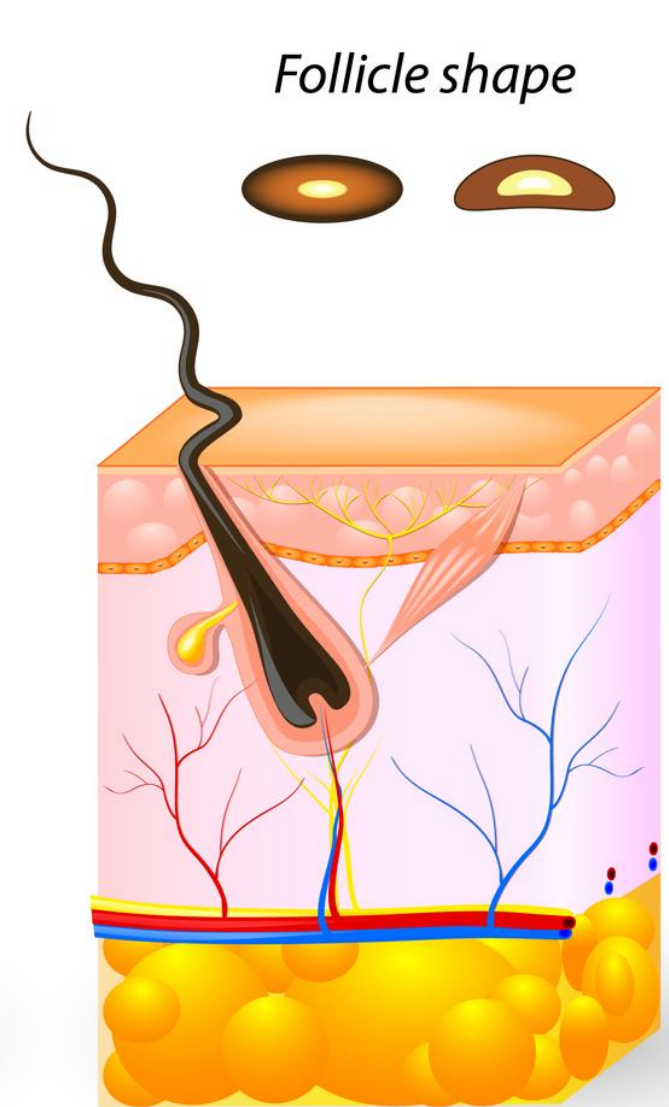
Straight hair



Kinky hair



Curly hair



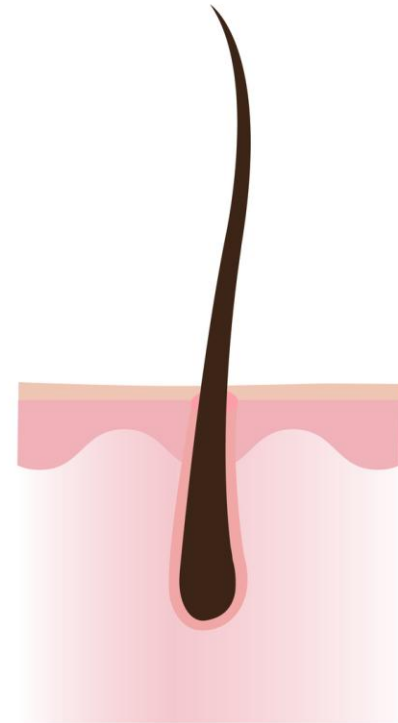
Round Follicles → Straight Hair

- Even distribution of keratin around the central core
- Symmetrical cross-section = smooth, reflective surface
- Common in East Asian populations

Asian hair follicle shape



Round to slightly
oval shaped follicles



Straight to wavy hair



Oval Follicles → Wavy Hair

- Slight asymmetry creates gentle bends as hair grows
- Intermediate cross-section; moderate shine and body

Elliptical or Flat Follicles → Curly to Kinky Hair

- Uneven keratin deposition; shaft twists on its axis
- Curves as it exits the scalp at an oblique angle
- Naturally drier due to sebum's harder path along curves





Other Influences

- **Follicle angle:** More acute to the scalp → more curl.
- **Cortical cell pattern:** Uneven cell size distribution amplifies wave or coil.
- **Genetics & ethnicity:** Largely determine follicle morphology, though hormones and age can subtly alter texture over time.

In short:

Shape below the surface shapes everything above it—texture, shine, and even how easily hair holds moisture.

Hair Color: What Determines Your Hue

The Palette Within the Follicle

Hair color is created by two main pigments produced by **melanocytes** in the bulb of the follicle:

- **Eumelanin** → brown to black tones
- **Pheomelanin** → red to yellow tones

The **ratio, density, and distribution** of these pigments determine every natural hair shade imaginable.



Blonde Hair

- Low overall melanin content
- Mostly pheomelanin, very little eumelanin
- Reflects more light → appears golden

Brown Hair

- Balanced blend of both melanin types
- Most common global hair color





Black Hair

- High eumelanin concentration
- Thick, densely pigmented shafts absorb more light

Red Hair

- Predominantly pheomelanin
- Often associated with MC1R gene variant
- Naturally fair skin due to linked pigment pathways





Gray/White Hair

- Loss or inactivity of melanocytes
- Hair grows in unpigmented (transparent) → appears white or gray



Other Factors

- **Genetics:** Primary determinant of pigment balance
- **Age:** Melanocyte decline = fading color
- **Nutrition:** Copper, B12, and catalase levels influence pigment activity
- **Oxidative Stress:** Hydrogen peroxide buildup bleaches melanin from within

✂ In short:

Your hair is painted strand by strand by tiny pigment artists in each follicle — and their color mix changes with age, health, and heritage.



Healthy vs. Unhealthy Hair

Healthy Hair

Smooth, shiny, resilient

Consistent thickness

Elastic & hydrated

Normal daily shedding

Unhealthy Hair

Dry, brittle, dull

Thinning or uneven

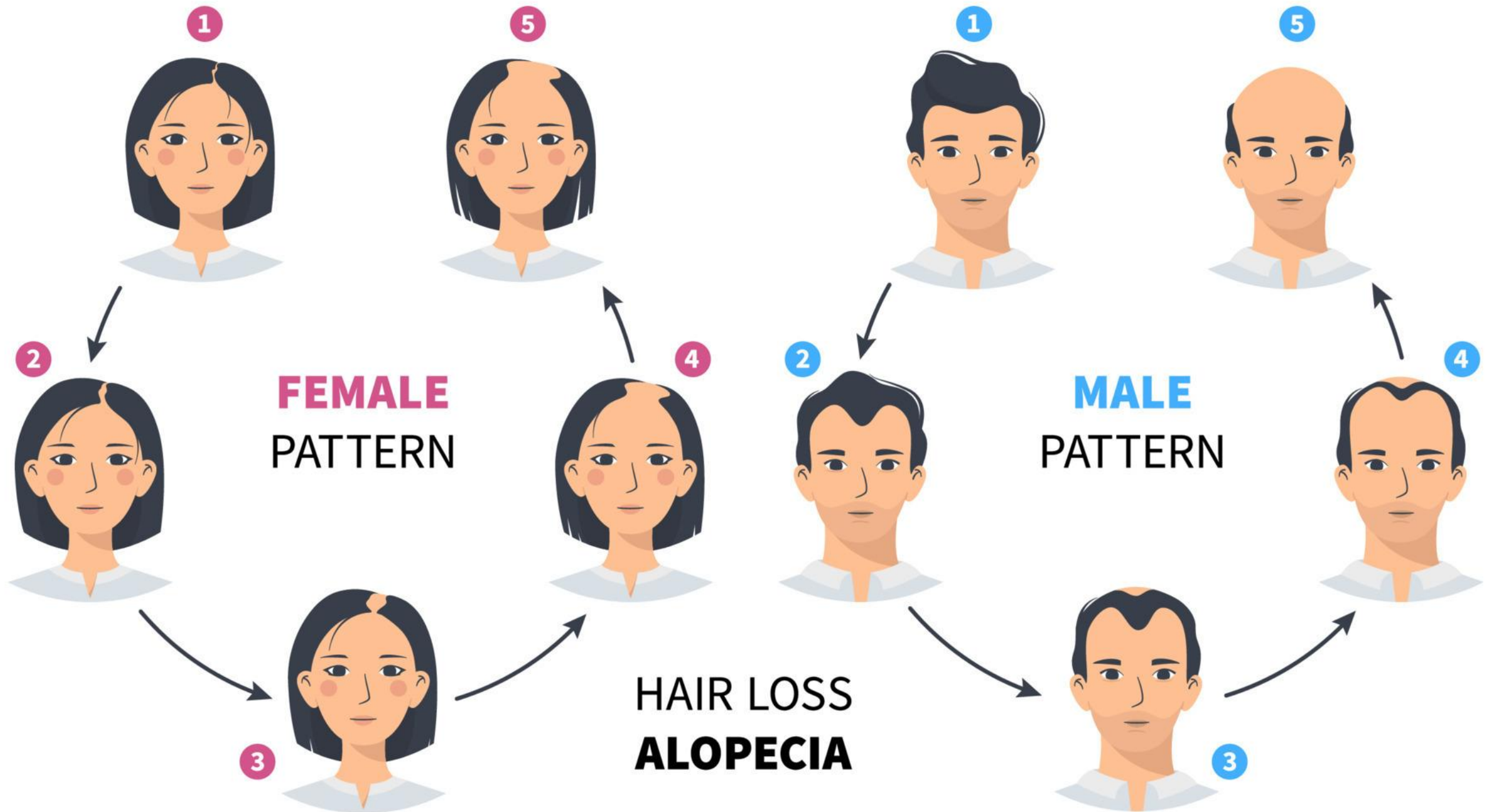
Breaks easily

Excessive loss or scalp irritation



Hair Problems & Their “Roots”

- **Male Pattern Baldness:** DHT shrinks follicles; hereditary link
- **Alopecia Areata:** autoimmune attack on follicles
- **Telogen Effluvium:** sudden shedding after stress, illness, hormones
- **Other factors:** thyroid, postpartum, nutritional deficiency, toxins





Alopecia areata



Male Pattern Baldness

What It Is:

A genetically driven, hormone-influenced form of hair loss affecting the temples and crown in a characteristic “M” pattern.

Mechanism:

- Triggered by **dihydrotestosterone (DHT)** — a potent form of testosterone.
- DHT binds to receptors in scalp follicles → **miniaturization** → shorter anagen phase → finer, weaker hairs.
- **Genetic sensitivity** of the follicle determines who’s affected, not testosterone levels themselves.

Contributing Factors:

- Genetics (maternal and paternal lineage)
- High local DHT activity
- Low scalp circulation, inflammation, oxidative stress

Supportive Approaches:

- Natural **DHT blockers**: saw palmetto, nettle root, pygeum, reishi
- Improve circulation: rosemary oil, peppermint, massage
- Optimize thyroid and nutrient status (zinc, iron, MSM, biotin)
- Consider “**Anti-DHT**” herbal formula or topical “Healthy Roots!” oil for dual inside–out action



Female Pattern Baldness

10/17/2025

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What It Is:

Diffuse thinning over the crown or part line rather than receding hairline.

Common during or after menopause, when estrogen's protective effect declines.

Mechanism:

- Increased **androgen sensitivity** of follicles on the top of the scalp
- **Lower estrogen/progesterone** → unopposed androgen influence
- **Reduced anagen duration** → slower regrowth and finer hair

Contributing Factors:

- Hormonal changes (menopause, PCOS)
- Stress and thyroid dysfunction
- Nutrient deficiencies (iron, zinc, protein, D)

Supportive Approaches:

- Balance hormones (support adrenal and ovarian function)
- DHT modulators (nettle, reishi, spearmint tea)
- Iron and ferritin optimization
- Topical rosemary or saw palmetto extracts

Alopecia Areata



What It Is:

An **autoimmune** condition where the immune system attacks the hair follicles, causing sudden, well-defined bald patches.

Mechanism:

- Follicles enter an “immune-privileged” collapse → inflammation halts growth
- Often triggered by stress, infection, or systemic inflammation

Contributing Factors:

- Autoimmune predisposition (thyroid, vitiligo, etc.)
- Nutrient gaps (vitamin D, zinc, selenium)
- Emotional or physical stress

Supportive Approaches:

- Immune modulation: **Moducare**, vitamin D, omega-3s, PEA
- Anti-inflammatory diet and stress management
- Topical soothing: rosemary, cedarwood, basil
- In stubborn cases, low-dose **naltrexone** (LDN) or medical corticosteroid therapy



Telogen Effluvium

What It Is:

Diffuse shedding following physical or emotional stress, illness, or hormonal changes — the follicles shift prematurely into the **telogen (resting)** phase.

Typical Triggers:

- Severe illness or infection (including **COVID-19**)
- Childbirth or hormonal drop postpartum
- Major surgery, crash dieting, or intense stress

Mechanism:

- A sudden systemic “shock” pauses growth across large follicle groups
- Usually **reversible** once the underlying cause resolves

Supportive Approaches:

- Correct underlying triggers (thyroid, iron, protein intake)
- Support regrowth with **MSM, biotin, silica, sea buckthorn, collagen**
- Gentle scalp massage and stress reduction
- Patience — recovery takes 3–6 months after the stressor ends



Hormonal Shifts & Hair: PCOS and the Postpartum Period

Our hormones have a profound influence on the life and vitality of our hair. Two of the most common times women notice significant changes in thickness or shedding are during **polycystic ovary syndrome (PCOS)** and the **postpartum period**. Both situations create rapid hormonal fluctuations that alter the balance between androgens and estrogens, directly affecting follicle activity and growth cycles. Understanding these patterns helps distinguish temporary shedding from true hair loss—and, more importantly, reveals clear paths to restoration once the underlying balance is restored.



Polycystic Ovary Syndrome (PCOS)

- Elevated **androgens (especially DHT)** can shrink scalp follicles → thinning on the crown or temples.
- Simultaneously increases facial and body hair — a frustrating paradox!
- **Insulin resistance** and **inflammation** exacerbate hormonal imbalance.
- **Supportive approaches:**
 - Balance blood sugar (low-glycemic diet, inositol, chromium).
 - Reduce DHT influence (saw palmetto, spearmint, reishi).
 - Support liver detoxification for hormone clearance (milk thistle, dandelion).
 - Ensure adequate zinc and omega-3 fats.

Postpartum Hair Loss (Telogen Effluvium)

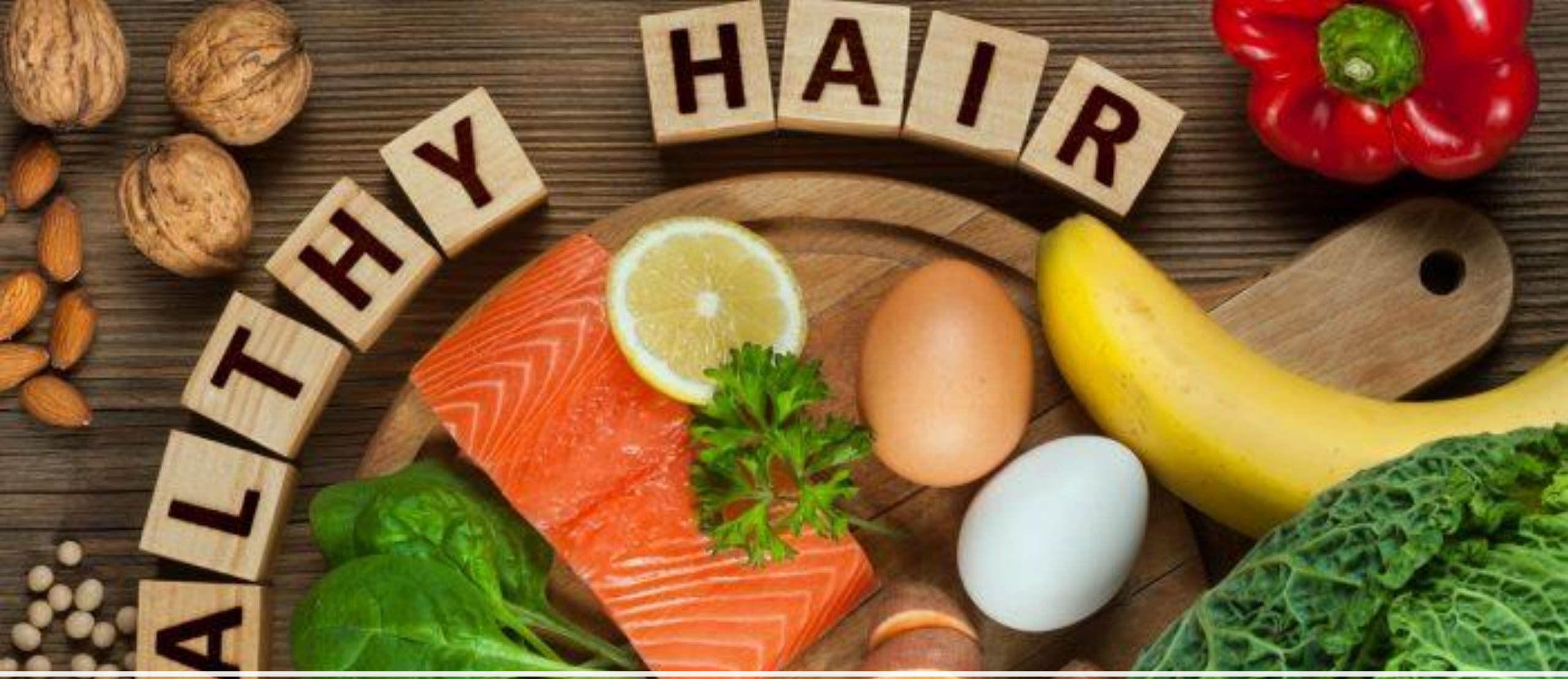
- During pregnancy, high **estrogen** keeps hair in the growth (anagen) phase → thicker hair.
- After birth, estrogen levels **drop rapidly**, triggering mass entry into **telogen** phase → shedding 2–4 months later.
- Can be worsened by thyroid changes, stress, or nutrient depletion.
- **Supportive approaches:**
 - Rebuild with protein, iron, zinc, and biotin.
 - Bio-identical progesterone
 - Manage stress, sleep, and hydration.
 - Sea buckthorn oil and collagen for follicle strength.
 - Usually self-resolving within 6–12 months.



A woman with long, straight brown hair is shown in profile, facing left. She is holding a wooden comb with her right hand, brushing her hair. Her left hand is raised, touching her hair near the crown. The background is a soft, out-of-focus white. The text "Hair Help!" is overlaid in the center, and a subtitle is below it.

Hair Help!

From thinning to thriving — nourish, balance, and grow!



Eating for Healthy Roots



Make sure to include...

- **Protein power:** Hair is ~95% keratin; include eggs, fish, grass-fed beef, lentils, nuts, and seeds.
- **Sulfur sources:** Garlic, onions, cruciferous vegetables — building blocks for keratin & collagen.
- **Iron & zinc:** Vital for follicle oxygenation and repair — red meat, pumpkin seeds, spinach.
- **B-vitamins:** Biotin, niacin, B6, B12 for energy metabolism within the follicle.
- **Omega-3 fats:** Salmon, sardines, flaxseed, walnuts — soothe inflammation, add shine.
- **Vitamin C:** Citrus, peppers, berries — enhances collagen synthesis & iron absorption.
- **Vitamin A & D:** For scalp health and follicle differentiation.
- **Hydration & minerals:** Water, sea salt, magnesium-rich greens to maintain scalp micro-circulation.

💡 *Remember:* healthy hair starts in the bloodstream long before it shows up on the brush!

Dietary Habits That Can Sabotage Hair Health

Just as good nutrition feeds strong, vibrant hair, poor dietary choices can quietly undermine it. The scalp and follicles are metabolically active tissues that depend on steady nutrient supply and balanced chemistry. Diets high in sugar, processed fats, or deficient in key amino acids and minerals can tip the body toward inflammation, hormonal imbalance, and oxidative stress—all of which show up sooner or later in the mirror. Recognizing and avoiding these dietary pitfalls helps create the internal environment hair needs to grow thick, shiny, and resilient.



1. Ultra-Processed & Sugary Foods

- Refined sugar spikes insulin → raises androgen and DHT activity → follicle miniaturization.
- Promotes systemic inflammation and glycation that weaken collagen around the follicle.



2. Excess Alcohol

- Depletes B-vitamins, zinc, and magnesium.
- Impairs liver detoxification of hormones and oxidative byproducts.



3. Low-Protein or Crash Diets

- Hair is mostly keratin — inadequate protein means the body diverts amino acids to essential organs first, not follicles.
- Rapid weight-loss plans often trigger **telogen effluvium**.



The background of the slide is a close-up, high-resolution photograph of golden-brown french fries. The fries are piled together, showing their characteristic ridged texture and varying lengths. The lighting is warm, highlighting the crisp edges and the soft interior of the potatoes.

4. Highly Refined Fats & Fried Foods

- Trans fats and repeatedly heated oils increase inflammation and reduce circulation to the scalp.
- Replace with omega-3-rich sources (salmon, flax, walnuts).



5. Excess Caffeine or Energy Drinks

- Can worsen adrenal stress and nutrient loss (esp. B-vitamins, magnesium).
- Moderate coffee or tea is fine, but overuse aggravates stress-related shedding.

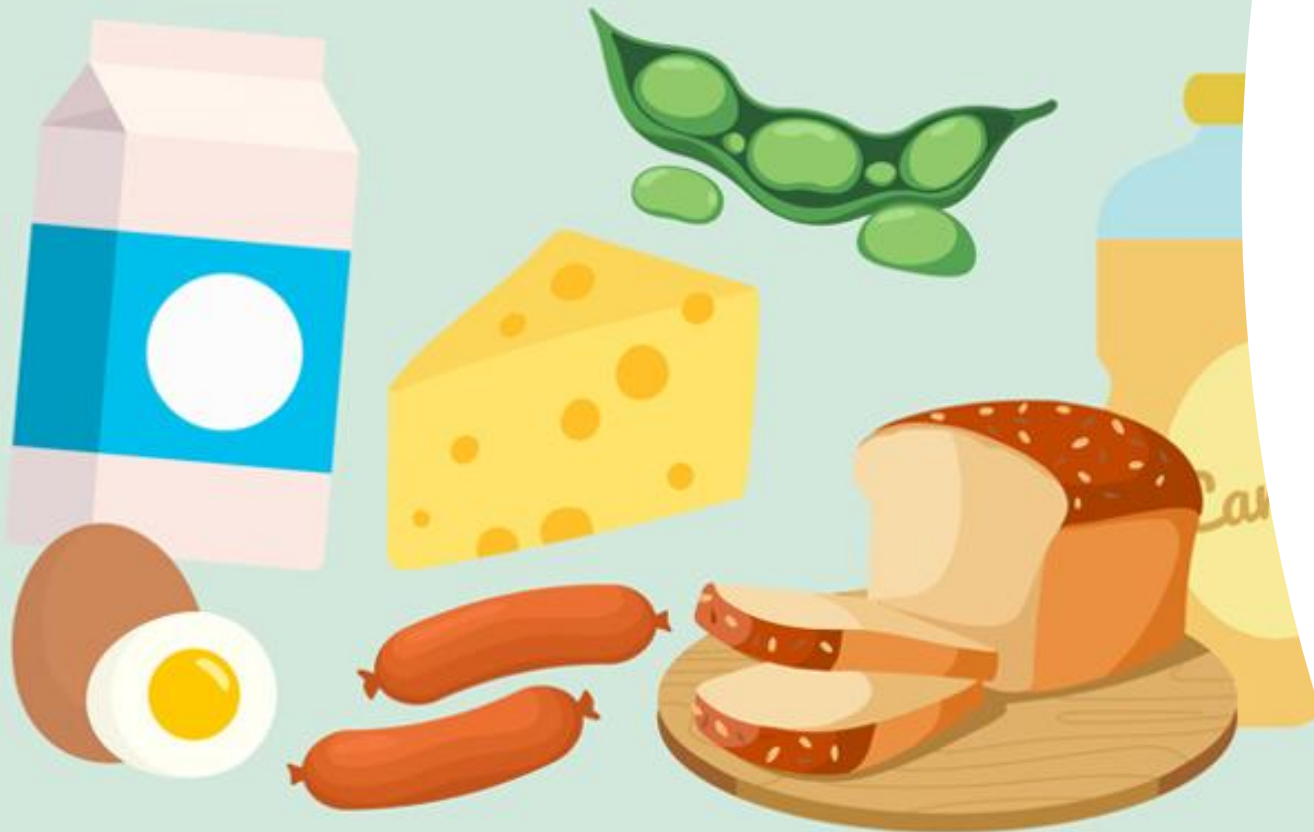
6. High-Sodium, Low-Mineral Diets

Too much refined salt and not enough potassium, magnesium, and trace minerals disturb electrolyte balance and circulation.



FOOD SENSITIVITIES

ARE YOU REACTING TO CERTAIN FOODS?



7. Food Sensitivities & Inflammatory Triggers

- For some individuals: gluten, dairy, or highly processed soy can drive immune reactivity and scalp inflammation.
- Identify and reduce triggers to calm the terrain.

From Food to Formulas:

Extra Nourishing TLC for Luxurious Locks



Hair Complex – by Silver Fern Brand

This is my favorite all-in-one hair supplement!

- Hair Complex is a unique blend of New Zealand solubilized keratin, Tibetan sea buckthorn powder, and silica-rich bamboo extract.
 - **Solubilized Keratin:** Helps fortify the hair follicle and supports collagen IV production
 - **Sea Buckthorn:** Reduces inflammation in the hair follicle and enhances hair thickness, fullness, and softness
 - **Bamboo Extract:** Strengthens hair and enhances hair shine
-





Healthy Roots!

**Herbal Oil Treatment for
Alopecia or Simply Gorgeous
Hair**

*Revitalize your scalp and restore
your shine—naturally.*



Healthy Roots!

*Herbal Oil Treatment for Alopecia or Simply
Gorgeous Hair*

Certified organic fractionated coconut oil, grapeseed oil, and cold-pressed castor oil with essential oils of Sweet Basil, Cypress, Cedarwood, Lemon, Rosemary, Patchouli, Tea Tree, and Mandarin.

To use: Apply 1 tbs oil to the scalp, rubbing in well with your fingertips. Allow to penetrate for 30-60 minutes, then wash your hair using a natural, sulfate-free shampoo & conditioner.

4 OZ

Wondrous Roots™
www.wondrousroots.org
603-439-2603

Healthy Hair Herbal Formula

Gotu Kola herb
(*Centella asiatica*), Fo-Ti
root (*Polygonum*
multiflorum), Horsetail
(Shavegrass) herb
(*Equisetum*
arvense), Stinging nettle
leaf (*Urtica dioica*)
Brahmi herb (*Bacopa*
monnieri), Rosemary
leaf (*Rosmarinus*
officinalis), Parsley leaf
(*Petroselinum crispum*),
Sage leaf (*Salvia*
officinalis). Grain
alcohol 60%, spring
water. Strength 1:5.

Wondrous Roots



BOTANICAL APOTHECARY
Healthy Hair
Nutritional Support for Hair & Scalp
1 oz

Shake well before use.
Add 1 drop to water.
comes with the dropper.
full; approximately 20
drops per "sq."
of warm water.
3-4 times daily as
needed.
Take one day off once
each seven for enhanced
overall response.

Avoid if pregnant or
breastfeeding.

Nutritional Support for Hair & Scalp

Give your hair the nourishment it craves—from the *inside out*. This blend of classic botanical allies supports healthy follicles, scalp circulation, and the nutrient pathways essential for vibrant, resilient hair growth.*

- **Ingredients & Actions:**
- **Gotu Kola (*Centella asiatica*):** Enhances circulation to the scalp and strengthens connective tissue.
- **Fo-Ti (*Polygonum multiflorum*):** A revered longevity herb in Chinese medicine, traditionally used to prevent premature graying and promote thicker hair.
- **Horsetail (*Equisetum arvense*):** Rich in silica for strong, lustrous hair and resilient connective tissue.
- **Stinging Nettle (*Urtica dioica*):** Provides trace minerals like iron and zinc while gently balancing excess DHT.
- **Brahmi (*Bacopa monnieri*):** Nourishes the nervous system, helping reduce stress-related hair loss.
- **Rosemary (*Rosmarinus officinalis*):** Supports scalp microcirculation and stimulates growth.
- **Parsley (*Petroselinum crispum*):** Adds chlorophyll and essential nutrients for healthy follicles.
- **Sage (*Salvia officinalis*):** Promotes scalp tone and may help slow hair graying.
- **Menstruum:** 60% grain alcohol, spring water. 1:5 extraction strength.

An illustration of a hair salon scene. A woman with long blonde hair is sitting in a chair, looking at a magazine. A hairdresser with short blonde hair is standing behind her, using a hair dryer on her hair. The background features silhouettes of people and a decorative pattern of four glowing squares.

The Long and Short of It:

Healthy Hair Reflects Whole-Body Health

Closing Points:

- Hair mirrors *everything* happening inside — nutrition, hormones, stress, and circulation.
- Strong, vibrant hair isn't about chasing a miracle product; it's about **restoring balance**.
- Feed your follicles from the inside with diet and supplements as appropriate
- Be patient — hair grows only about half an inch per month, but consistent care pays off.
- When your body thrives, your hair can't help but follow.

