



CONCEPT OF HAIR – AN AYURVEDA PROSPECTIVE

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ABSTRACT

Healthy, long, and vibrant hair helps a lot in the improvement of personality. Therefore, keeping hair in a healthy state is entirely important for human-being, because just like the face, hair is also a mirror of a healthy state of the body. Hair is one of the characteristic features of mammals and has various functions such as protection against external factors; producing sebum, apocrine sweat, and pheromones; impact on social and sexual interactions; thermoregulation, and being a resource for stem cells. Extensive knowledge of anatomical and physiological aspects of hair can contribute to the understanding and healing of different hair disorders. The Ayurvedic text mentions that the skin is a rolling landscape called *Kesha Bhoomi* (Scalp) and the *Kesha* (Hair) as grass growing on it. So, the health of hair or its beauty care with Ayurveda measures will not be accomplished without the knowledge of the Ayurveda perspective of the *Kesha* (Hair) & *Kesha Bhoomi* (Scalp).

Keywords: *Kesha*, *Kesha Sharira*, Hair anatomy, Hair physiology

INTRODUCTION

Beautiful long, shiny hairs are among the assets of a person. They are to be maintained and protected with utmost care. Hair is far more complex than it appears

on the surface, it not only plays a vital role in the appearance of both men and women, but it also helps to transmit sensory information as well as create gender

identification. By week 22, a developing fetus has all of its hair follicles formed¹. At this stage of life, there are about 5 million hair follicles on the body. There is a total of one million on the head, with 1000 of those follicles residing on the scalp². This is the largest number of hair follicles a human will ever have since we do not generate new hair follicles at anytime during the course of our lives. Most people will notice that the density of scalp hair is reduced as they grow from childhood to adulthood due to scalps expanding as we grow.

1. CONCEPT OF SKIN

The skin is formed predominantly by the *Vata* element. It is the seat of *Vayu Mahabhuta*³. The subtype of *Vata-Vyana Vayu* expresses the colour of the skin and secretes the sweat from the sweat glands⁴. The *sweda* (sweat) is the waste of *Medo-Dhatu*, the sebum (*Majja, Mala*) is the waste of *Majja Dhatu*, and the hair & nails are the waste of *Asthi* (bone) *Dhatu*⁵. The skin has specialized appendages like sweat glands, hair follicles, sebaceous glands, etc. Skin is classified as thin or thick depending upon the thickness of the epidermis - thick skin – Palms (vola) and soles (planta), glabrous (hairless), and thin skin – Everywhere else typically pileous (haired).

2. **CONCEPT OF HAIR:** Layers of Skin consist mainly: of the epidermis, dermis, and hypodermis (subcutaneous layer).

2.1 SCALP ANATOMY

The scalp is the hair-bearing area of the head extending into the forehead up to the supraciliary area or the soft tissue covering seen in the superior portion of the frontal, parietal and occipital bones. The scalp is made of 5 layers, i.e., Skin, Superficial Fascia, Epicranial Aponeurosis, Loose Areolar Tissue, and Pericranium.

2.2 ORIGIN OF HAIR (KESHOTPATTI)

The hair (*Kesha*) is formed through the waste (*Mala*) of *Asthi Dhatu* and anything detrimental to *Asthi Dhatu* will be harmful to the hair⁶. When the skin & hair is exposed to the wind it causes aggravation of *Vata Dosha* resulting in dryness. *Prana Vata* conveys the sensations to the brain and *Vyana Vata* is respon-

sible for 'standing on ends' of the hair. Depletion of *Asthi Dhatu* and sweat causes hair loss⁷.

2.3 KESHA SAMKHYA

The total number of human hairs is 3½ crores⁸, Charaka has enumerated that the total human hair to be 29956 including *Kesha, Shmashru*, and *Loma* is equal.⁹

2.4 KESHOTPATTI KALA

During gestational life, *Keshotapatti Kala* by different Acharya is *Chakrapani, Harita*, and *Vagbhatta* 3rd, 4th and 6th month respectively^{10, 11, 12}.

2.5 KESHA POSHANA

The *Kitta* part (excretory part) of *Ahara Rasa* is responsible for the production and nutrition of urine, stool, sweat, all three *Dosha* and ear, eyes, nose, mouth, *Loma*, feces of genital organs and hair of the head and beard, hairs of the body, nail, etc. are confirmed¹³. The Nourishment of *Kesha* is from the end part of *Dhamani*, which is attached to the *Lomakuppa*¹⁴, and its nourishment depends entirely upon the *Rasa-Dhatu* (lymph). De-arrangement in *Rasa-Dhatu* causes premature graying¹⁵. Optimum *Majja* and *Medo Dhatu* keep the hair oily¹⁶. Hair becomes hard and dry in *Vata Prakriti* person¹⁷. The hair is one of the "*Pitruja Bhava*" means the structure, color, and quantities of hair of a progeny are dependent on the paternal side¹⁸. The hair of *Medasara Purusha* is unctuous in its complexion, and hair (on the head, face, and body)¹⁹.

2.6 SWEDAVAHA STROTAS IN RELATION TO KESHA

Lomakuppa Moola of *Swedavaha Srotas* is responsible for the *Snigdhatava* of *Tvacha* and the maintenance of *Romakoopa*. *Sweda Kshaya* leads to *Romachyuti*.²⁰

3. EMBRYOLOGY OF THE HAIR

In embryogenesis, the establishment of a dermal papilla is vital to the development of all hair follicles and associated modified structures like sebaceous glands. A dermal papilla is a group of specialized dermal fibroblast cells, derived from the embryonic mesoderm. These dermal papilla cells begin to aggregate in the dermis just below the epidermis. For humans, this initial aggregation begins when the embryo is approximately 60 days old. The development

of a dermal papilla marks the site for the future development of a hair follicle. It can take up to 110 days before hair follicles can be seen to start developing on the arms and legs. The mesoderm-derived dermal papilla and the ectoderm-derived epidermal plug apparently "communicate" with the result of further proliferation of epidermal matrix cells and differentiation into the various sheath and hair fiber structures²¹. This gradual differentiation of the hair plug first begins with the development of three distinct buds of the cells on the same side of the down growth one above the other. The cell bud closest to the epidermis may develop into an apocrine (sweat-type) gland. However, this only happens in a minority of hair follicles, primarily those on the scalp, genitals, and anus. Isolated apocrine glands may develop in connection to hair follicles elsewhere, but they are usually few and far between. These layers begin to keratinize higher up the hair follicle while the cells close to the dermal papilla remain undifferentiated and continue to multiply. The multiplying cells can't push out into the dermis because of the surrounding fibrous capsule. The only way out is up. The cells push up and away from the dermal papilla pushing other cells in front of them. Hence, the development of a hair follicle requires a continuum through induction, initiation, elongation, and differentiation²². The basic hair follicle structures are complete throughout the skin of an embryo by 160 days. The accumulation of dermal papilla cells below the undifferentiated epidermis is then stimulated to grow down into the dermis as a hair "peg". Interaction between the hair peg and the dermal papilla cells promotes differentiation into a mature hair follicle.

4. ANATOMY OF THE HAIR

The hairs are elastic threads-like structures derived partly from undifferentiated cells of the foetal epidermis. Hair is found on almost every part of the body surface except on the palms and the soles, hair

differs in length (short or long), thickness (thick or thin), and color (black, brown, or blonde) in different parts of the body and different races (curly or straight).

There are three types of Hair -

I. VELLUS HAIRS are on the faces & trunks of adults, even in bald persons, it may be present and thick bristles seen in the nose and ears which with <2mm diameter is thin, light-colored & barely noticeable hairs that develop on most of a person's body during childhood.

II. TERMINAL HAIRS, known as androgenic hair. They are thick, medullated, long, pigmented, and >2mm in diameter.

III. LANUGOS HAIRS are short, fine, non-medullated, and non-pigmented, which is darker and visible to humans and neonates.

5. NUMBER OF HAIR

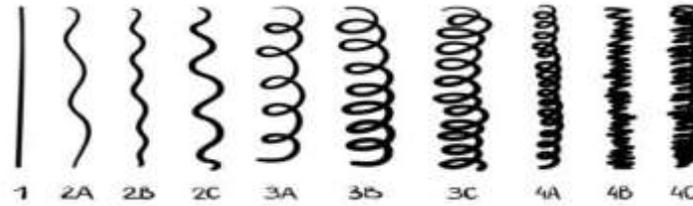
Generally, there are approximately 1 lac hairs all over the body or 1000 hairs to the square inch on the scalp and out of them 1% are in the catagen phase at any time and the rest are completing their three years cycles, Women generally have more hair per inch than men.

6. COLOUR OF HAIR

The color depends on the size and number of melanin granules present, the presence or absence of a red pigment, and the thickness of the hair shaft. It may be brown, black, ash-colored, blonde, or red. The colour of hair is due primarily to melanin.

7. CURVATURE/SHAPE OF HAIR

Accounting for mainly four shapes of hair: Straight Hair, Wavy Hair, Curly Hair, and Coily Hair Again, further divided into 3 – 3 types, namely curved hair is recognizable, viz. Wavy Hair, Helical Hair with loops of constant size (as in Melanesians and Europeans), spiral hair with the diminishing size of loops distally (as in Negroes), and peppercorn hair (with spiral hairs in clusters and knots).



Picture No. – 1 Shape of Hair
(With courtesy to <https://www.google.com/url>)

8. STRUCTURE OF HAIR

The hair is made of a hard protein called keratin, which is actually dead and entirely made up of epithelial cells. Each hair consists of a shaft (located above the epidermis) and a root (hair bulb, which is a living part of the hair and surrounded by papilla and exists below the epidermis) that lies deep inside the skin underneath the root. The skin forms a socket-like structure, known as the hair follicle. The cells of the bulb divide every 23 to 72 hours, remarkably, faster than any other cell in the body. The major compartments of the hair from outermost to innermost include the connective tissue sheath, the outer root sheath, the inner root sheath, the cuticle, the hair shaft cortex, and the hair shaft medulla, each characterized by distinct expression of the hair follicle specific keratin.

8.1 HAIR SHAFT

It is made up of three layers, which are visible outside of the skin. The inner layer is the medulla, which may even be absent, the second layer is the cortex containing natural pigment (melanin) and moisture, which make up the majority of the hair shaft and 3rd outermost layers are the cuticle cells (overlapping keratin cells) work as a protective scale to protect the inner structure of hair, which creates shining and smoothness. The cuticle is made up of flat overlapping cells that cover the hair shaft from the root until it exists from the epidermis, which is a tightly formed structure made of single-like overlapping transparent scales. The cortex and the medulla both hold the hair pigment, giving its color.

8.2 HAIR FOLLICLE

The living part of the hair, a tube-like depression or pocket in the scalp surrounds the hair root. It lies underneath the surface of the skin and extends into the

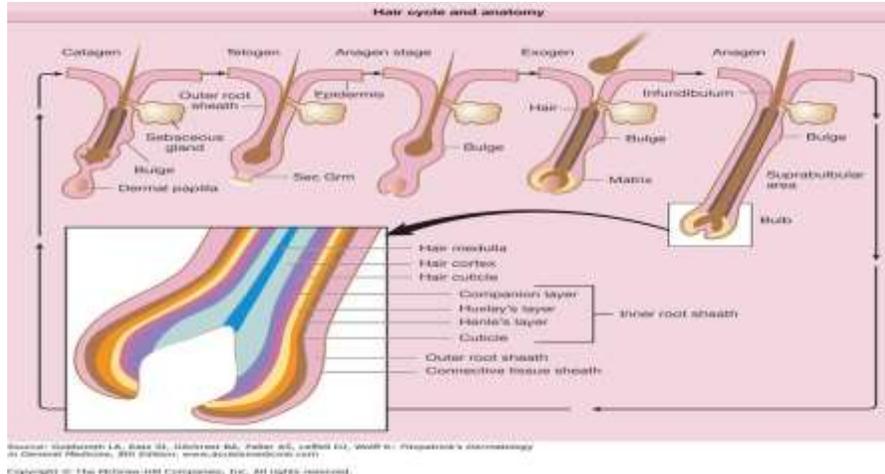
dermis. The follicle is a primary structure from which hair can grow, surrounded by an Inner root sheath and Outer root sheath that protects the growing hair shaft. The hair bulb is the region of the follicle that actively produces the lowest part of the hair strand; the thickened club-shaped structure that forms the lower part of the hair root.²³ Hair follicle is further divided into the upper and lower follicle; the upper follicle consists of the infundibulum; it extends from the pillar orifice above to the entrance of the sebaceous gland below and the isthmus is the short mid-section of the follicle-bounded superiority by the sebaceous duct and inferiority by the insertion of arrector pilorum muscle. Inferior extends from the insertion of muscle to the base of the follicle and the lower follicle, onion-shaped, consists of the supra bulbar and the bulbar areas. The upper follicle is permanent, but the lower follicle regenerates with each hair follicle cycle. The upper segments of the isthmus and infundibulum are permanent. The entire follicle beneath the isthmus disappears during the involuntary stages of the hair cycle and again reforms during the growth cycle.

8.3 OUTER ROOT SHEATH

The outer root sheath is continuous with the epidermis at the infundibulum and continues down to the bulb. The cells of the outer root sheath change considerably throughout the follicle. The outer root sheath in the infundibulum resembles the epidermis and forms a granular layer during keratinisation.

8.4 INNER ROOT SHEATH

The inner root sheath extends from the base of the bulb to the isthmus and contains four parts from the outermost to innermost 4 layers: Companion layer, Henle's layer, Huxley's layer, and Cuticle.



Picture No. – 2 Hair Cycle and Anatomy
(With courtesy to <https://www.google.com/>)

9. HAIR FOLLICLE CYCLE

A hair follicle produces hair for a few years and then goes into rest mode for several years. The hair follicle is a tunnel-like segment of the epidermis that extends down into the dermis. The structure contains several layers that all have separate functions. The growth of human hair is cyclical. However, each follicle functions as an independent unit and undergoes intermittent stages of activity and quiescence. Hair follicles, much like all cells, have cycles. A natural part of the cycle involves shedding around 50 to 100 hairs per day. Each follicle produces hair for 2 to 6 years and then takes a break for several months. While the hair follicle is in its rest phase, the hair falls out. There are around 100,000 follicles on the scalp, but because each follicle rests at a different time and others produce hairs, hair loss is usually unnoticeable. More

noticeable hair loss occurs when there is a disruption to the growth and shedding cycle, or if the hair follicle is obliterated and replaced with scar tissue. Hair follicles populate the entire skin surface with the exception of the palm, soles, and dorsa of terminal phalanges of the digits, the glans penis, and mucocutaneous junctions. Hair is different biologically and morphologically, in different parts of the body.

Hair on the scalp grows about 0.3 to 0.4 mm/day or about 6 inches per year, and the rate of 0.37 to 0.44 mm/day or approximately 1 cm/month. Unlike other mammals, human hair growth and shedding are random and not seasonal or cyclical. Each hair follicle perpetually traverses through three stages: Growth (Anagen), Involution (Catagen), and Rest (Telogen)

24.



Picture No. – 3 Life cycle of a Hair
(With courtesy to <https://www.google.com/>)

GROWTH (ANAGEN)

The growing and active phase is the "anagen" of the hair. The cells in the root of the hair are dividing rapidly. A new hair is formed and pushes the club hair

(hair that has stopped growing or is no longer in the anagen phase) up the follicle and eventually out. The hair on the arms, legs, eyelashes, and eyebrows has a very short active growth phase of about 30 to 45

days, explaining why they are so much shorter than scalp hair. During this phase, the cells of the hair bulb actively divide and produce the growing hair. The average duration of anagen is 3 to 10 years.

INVOLUTION (CATAGEN)

The catagen phase is a short transitional stage and about 3% of all hairs are in this phase at any time. This phase lasts for about two to three weeks. Growth stops and the outer root sheath shrinks and attaches to the root of the hair. During this phase, the matrix cells stop dividing. The hair develops a brush-like zone (club hair). The lower portion of the follicle disappears leaving behind a thin strand of epithelial cells surrounded by a thick basement membrane zone. Catagen detaches itself from the blood supply.

REST (TELOGEN)

Telogen is divided into the resting phase and shedding phase (exogen phase), usually accounting for 6% to 8% of all hairs. This phase lasts for about 100 days for hairs on the scalp and a longer duration for hairs on the eyebrow, eyelash, arm, and leg. During the resting phase, the hair follicle is completely at

rest, and the club hair is completely formed. Pulling out a hair in this phase will reveal a solid, hard, dry, white material at the root. About 25 to 100 telogen hairs are shed normally each day. Hair shedding as a separate and active phase is also known as exogen. It is a highly controlled and timed event in mammals that shed on a seasonal basis. The follicles that are shedding their hair shaft are thus in "exogen" which comprises approximately 1 percent of the telogen hair follicles. Approximately 90 to 93 percent of scalp follicles are in anagen and the rest are primarily in telogen.

REGULATION OF THE HAIR GROWTH CYCLE

Although human hair follicles apparently cycle through growth and rest independently of each other there must be a mechanism to promote anagen hair growth and the involution of the hair follicle to a resting stage. Clues to the basics of this mechanism have been known for many years. Any form of skin damage will force telogen hair follicles in rodents into anagen growth in and around the site of injury.



Picture No. – 4 Hair Cycle
(With courtesy to <https://www.google.com/>)

CONCLUSION

In the view above, there are several aspects of Ayurveda and modern, regarding human hair that should be taken into consideration to obtain increasingly more results in different fields, including biology, dermatology, and cosmetics. The concise anatomical and physiological aspects of human hair will be helpful in the field of hair research. It is determining the health of hair depends upon the health of bones and

the skin. Enhanced knowledge of the normal dynamics of the hair provides an understanding of the basis of how the follicle behaves during a disease. However, recent developments in our understanding of the biology and pathology of hair follicles in view of Ayurveda should open new dimensions for more effective therapies for hair disorders.

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