

Human hair growth

From Wikipedia, the free encyclopedia



This article **needs additional citations for verification**. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. *(May 2012)*(*Learn how and when to remove this template message*)

The **growth of human hair** occurs everywhere on the body except for the **soles of the feet**, the **lips**, palms of the hands, some external **genital** areas, the **navel**, **scartissue**, and, apart from **eyelashes**, the **eyelids**.^[1] Hair is a **stratified squamous keratinized epithelium** made of multi-layered flat cells whose rope-like **filaments** provide structure and strength to the **hair shaft**.

Hair follows a specific growth cycle with three distinct and **concurrent** phases: **anagen**, **catagen**, and **telogen**. Each phase has specific characteristics that determine the length of the hair.

The body has different types of hair, including **vellus hair** and **androgenic hair**, each with its own type of cellular construction. This varied construction gives the hair unique characteristics, serving specific purposes, mainly warmth (redundant in modern humans) and protection.^[*citation needed*] Most humans develop the longest thickest hair on their scalps and (mostly observed in males) faces. This hair will usually grow to several feet before terminating, but many humans develop much longer hair.

Contents

- 1 **Growth cycle**
 - 1.1 **Anagen phase**
 - 1.2 **Catagen phase**
 - 1.3 **Telogen phase**
- 2 **Growth inhibitors and disorders**
 - 2.1 **Chemotherapy**
 - 2.2 **Alopecia-related syndromes**
 - 2.3 **Radiation therapy to the head**
 - 2.4 **UV-B**
- 3 **Treatments for hair loss**
- 4 **See also**
- 5 **References**

Growth cycle [edit]

The three stages of hair growth are the **anagen**, **catagen**, and **telogen** phases. Each strand of hair on the human body is at its own stage of development. Once the cycle is complete, it restarts and a new strand of hair begins to form. The rate or speed of hair growth is about 1.25 centimetres or 0.5 inches per month, or about 15 centimetres or

6 inches per year. Expressed in a more scientific way, hair grows at a rate of about 4.6 yoctometres per femtosecond.

Anagen phase [[edit](#)]

The anagen phase is known as the growth phase. This is the phase where the hair physically grows approximately 1 cm per month.^[2] It begins in the **papilla** and can last from two to six years.^{[3][4]} The span at which the hair remains in this stage of growth is determined by genetics. The longer the hair stays in the anagen phase, the longer it will grow. During this phase, the cells in the **papilla** divide to produce new hair fibers^[contradictory], and the follicle buries itself into the **dermal** layer of the skin to nourish the strand. About 85% - 90% of the hairs on one's head are in the anagen phase at any given time.

Catagen phase [[edit](#)]

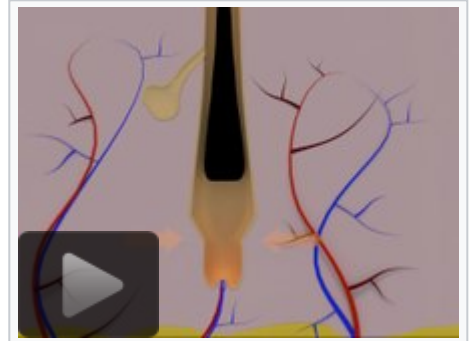
The catagen phase, also known as the transitional phase, allows the follicle to, in a sense, renew itself. During this time, which lasts about two weeks, the hair follicle shrinks due to disintegration and the papilla detaches and "rests," cutting the hair strand off from its nourishing blood supply. Signals sent out by the body (that only selectively affect 1 percent of all hair of one's body at any given time) determine when the anagen phase ends and the catagen phase begins. The first sign of catagen is the cessation of melanin production in the hair bulb and apoptosis of follicular melanocytes.^[5] Ultimately, the follicle is 1/6 its original length, causing the hair shaft to be pushed upward. While hair is not growing during this phase, the length of the terminal fibers increase when the follicle pushes them upward.

Telogen phase [[edit](#)]

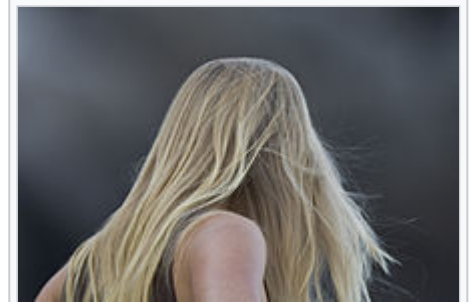
During the telogen or resting phase (also known as shedding phase) the follicle remains dormant for one to four months. Ten to fifteen percent of the hairs on one's head are in this phase of growth at any given time. In this phase the epidermal cells lining the follicle channel continue to grow as normal and may accumulate around the base of the hair, temporarily anchoring it in place and preserving the hair for its natural purpose without taxing the body's resources needed during the growth phase.

At some point, the follicle will begin to grow again, softening the anchor point of the shaft initially. The hair base will break free from the root and the hair will be shed. Within two weeks the new hair shaft will begin to emerge once the telogen phase is complete. The process results in normal hair loss known as **shedding**.

Growth inhibitors and disorders [[edit](#)]



Hair-follicle cycling



Hair grows at different speeds and different lengths. Its composition causes different colors and textures, which influence how long the hair strands grow.



Marianne Ernst, a German "Long hair model".

In most people, scalp hair growth will halt due to follicle devitalization after reaching a length of generally two or three feet. Exceptions to this rule can be observed in individuals with hair development abnormalities, which may cause an unusual length of hair growth.

Chemotherapy [edit]

Most **chemotherapy** drugs work by attacking rapidly dividing cells. Rapid cell replication is one of the hallmarks of cancer; however, hair follicle cells also grow and divide quickly. Consequently, the chemotherapy drugs usually inhibit hair growth. The dose and type of medicine will determine the severity of hair loss. Once the course of chemotherapy has ended, new hair growth may begin after three to 10 weeks.

Alopecia-related syndromes [edit]

Main article: [Baldness](#)

Alopecia is a hair loss disease that can occur in anyone at any stage of life. Specifically **Alopecia areata** is an **autoimmune disease** that causes hair to spontaneously fall out. It is mainly characterized by bald patches on the scalp or other parts of the body, and can ultimately cause baldness across the entire body. This disease interferes with the hair growth cycle by causing a follicle to prematurely leave the **anagen**, or active growth, phase and enter the resting, or **telogen** phase. The hair growth in the affected follicles is lessened or stopped completely.

Traction alopecia is caused by adding too much strain on the hair on one's head. Tight ponytails and other styles that require added tension to the hair are often what cause this disease. It can also occur on the face in areas where the hair is often styled. Plucking or waxing one's eyebrows frequently, for example, can yield suppressed hair growth in the area.

On the scalp, the hair is usually known to be lost around the hair line, leaving the densest amount of hair at the crown. Small **vellus hair** will often replace the hair that is lost.

Radiation therapy to the head [edit]

Human hair follicles are very sensitive to the effects of **radiation therapy** administered to the head, most commonly used to treat cancerous growths within the brain. Hair shedding may start as soon as two weeks after the first dose of radiation and will continue for a couple of weeks. Hair follicles typically enter the resting **telogen** phase and regrowth should commence 2.5 to 3 months after the hair begins to shed. Regrowth may be sparser after treatment.

UV-B [edit]

UV levels of either 20 or 50 mJ cm⁻² in the UV-B range have been shown to inhibit hair growth, reduce hair **melanin** and damage **hair follicles**.^[6]

Treatments for hair loss [edit]

1. Minoxidil

- Increases length of anagen (hair growth portion of hair cycle) phase and enlarges miniaturised hair follicles^[7]
- Indicated for androgenetic alopecia^[7]

2. Finasteride

- Inhibits 5 alpha reductase, which blocks the conversion of testosterone to dihydrotestosterone, which is an androgen involved in hair loss (specifically, androgenetic alopecia)^[7]

- Indicated for androgenetic alopecia in men^[7]

See also [edit]

- Evolution of hair

References [edit]

- ↑ *Natural Hair Growth*. Cardiff, United Kingdom: Health4sure. 2018.
- ↑ Therapeutic Guidelines Limited (November 2015). "Hair Loss Disorder [revised 2017 Nov]". *eTG Complete [Internet]; Melbourne Australia*. Retrieved 17 February 2018.
- ↑ Ruszczak, Zbigniew (2012). "Hair Disorders and Alopecia". In Elzouki, Abdelaziz Y.; Harfi, Harb A.; Nazer, Hisham M.; Stapleton, F. Bruder; Oh, William; Whitley, Richard J. *Textbook of Clinical Pediatrics*. pp. 1489–508. doi:10.1007/978-3-642-02202-9_146. ISBN 978-3-642-02201-2.
- ↑ Braun-Falco, Otto (2000). *Dermatology* (2., completely rev. ed.). Berlin: Springer. p. 1101. ISBN 9783540594529.
- ↑ Araújo, Rita; Fernandes, Margarida; Cavaco-Paulo, Artur; Gomes, Andreia (2010). "Biology of Human Hair: Know Your Hair to Control It". *Biofunctionalization of Polymers and their Applications*. Advances in Biochemical Engineering/Biotechnology. **125**. pp. 121–43. doi:10.1007/10_2010_88. ISBN 978-3-642-21948-1. PMID 21072698.
- ↑ Lu, Zhongfa; Fischer, Tobias W; Hasse, Sybille; Sugawara, Koji; Kamenisch, York; Krengel, Sven; Funk, Wolfgang; Berneburg, Mark; Paus, Ralf (2009). "Profiling the Response of Human Hair Follicles to Ultraviolet Radiation". *Journal of Investigative Dermatology*. **129** (7): 1790–804. doi:10.1038/jid.2008.418. PMID 19158839.
- ↑ ^a ^b ^c ^d "The University of Notre Dame Australia : EzProxy Login". *amhonline-amh-net-au.ipacez.nd.edu.au*. Retrieved 2018-07-18.

VTE	Development of skin	show
VTE	Human hair	show

Categories: Human hair