

KERACTIVE

Composition

Active Ingredients

L-Cysteine
L-3,4- Dihydroxyphenylalanine (L -DOPA)
L-Methionine
PTMBP / buflomedil
L-Tyrosine
Vitamin B1(Thiamine)
Vitamin B3 (Niacinamide)
Vitamin B5 (D-Pantothenic Acid)
Vitamin B6 (Pyridoxine)
Vitamin B8 (D-Biotin)
Vitamin P (Rutin)
Zinc Sulfate

Amino Acids

L-Alanine
L-Arginine
L-Asparagine
L-Aspartic Acid
L-Glutamic Acid
L-Glutamine
Glycine
L-Histidine
L-Isoleucine
L-Leucine
L-Lysine
L-Phenylalanine
L-Proline
Pyruvic acid
L-Serine
L-Threonine
L-Tryptophan
L -Valine

Minerals

Ammonium Metavanadate
Ammonium Molybdate 4H2O
Calcium Chloride 2H2O
Cupric Sulfate 5H2O
Ferrous Sulfate 7H2O
Magnesium Sulfate
Manganese Sulfate
Nickel Chloride 6H2O
Potassium Chloride
Sodium Phosphate Dibasic
Sodium Chloride
Sodium Metasilicate
Sodium Selenite

Vitamins

Choline Chloride
Cobalamine (Vitamin B12)
Folic Acid Ca
Myo-Inositol
Riboflavin

Other components

Adenine
Benzyl Alcohol
D-Glucose
Phenol Red
Procaine
Putresine
Safranin
D-L-6,8-Thioctic Acid
Thymidine

Packaging

Box of 10 vials of 5.0 ml e.a.

Bibliography

Bergfeld WF. Alopecia: histologic changes. *Adv Dermatol.* 1989;4:301-20;discussion 321 Buffey JA, Messenger AG, Taylor M, Ashcroft M, Westgate GE, MacNeil S. Extracellular matrix derived from hair and skin fibroblasts stimulates human skin melanocyte tyrosinase activity. *Br J Dermatol.* 1994 Dec;131(6):836-42 Budde J, Tronnier H, Rahlfs VW, Frei-Kleiner S. Systemic therapy of diffuse effluvium and hair structure damage. *Hautarzt.* 1993 Jun;44(6):380-4 Cotsarelis G, Millar SE. Towards a molecular understanding of hair loss and its treatment. *Trends Mol Med.* 2001 Jul; 7(7):293-301 Courtois M, Loussouam G, Hourseau C, Grollier JF. Hair cycle and alopecia. *Skin Pharmacol.* 1994;7(1-2):84-9 Di Buono M, Wykes LJ, Cole DE, Ball RO, Pencharz PB. Regulation of sulfur amino acid metabolism in men in response to changes in sulfur amino acid intakes. *J Nutr.* 2003 Mar;133(3):733-9 Emerit I, Filipe P, Freitas J, Vassey J. Protective effect of superoxide dismutase against hair greying in a mouse model. *Photochem Photobiol.* 2004 Jun 1;80(6):1053-6 Fratini A, Powell BC, Hynd PI, Keough RA, Rogers GE. Dietary cysteine regulates the levels of mRNAs encoding a family of cysteine-rich proteins of wool. *J Invest Dermatol.* 1994 Feb;102(2):178-83 Fratini A, Powell BC, Rogers GE. Sequence, expression, and evolutionary conservation of a gene encoding a glycine / tyrosine-rich keratin-associated protein of hair. *J Biol Chem.* 1993 Feb 25;268(6):4511-8 Hirobe T. Structure and function of melanocytes: microscopic morphology and cell biology of mouse melanocytes in the epidermis and hair follicle. *Histol Histopathol.* 1995 Jan;10(1):223-37 Liu SM, Mata G, Figliomeni S, Powell BC, Nesci A, Masters DG. Transsulfuration, protein synthesis rate and follicle mRNA in the skin of young Merino lambs in response to infusions of methionine and serine. *Br J Nutr.* 2000 Apr;83(4):401-9 MacKinnon PJ, Powell BC, Rogers GE. Structure and expression of genes for a class of cysteine-rich proteins of the cuticle layers of differentiating wool and hair follicles. *J Cell Biol.* 1990 Dec;111(6 Pt 1):2587-600 Maudeionde T, Rosenfield RL, Shuler CF, Schwartz SA. Studies of androgen metabolism and action in cultured hair and skin cells. *J Steroid Biochem.* 1986 May;24(5):1053-60 Mulinari-Brenner F, Bergfeld WF. Hair loss: an overview. *Dermatol Nurs.* 2001 Aug;13(4):269-72,277 Powell BC, Nesci A, Rogers GE. Regulation of keratin gene expression in hair follicle differentiation. *Ann N Y Acad Sci.* 1991 Dec 26;642:1-20 Powell BC, Rogers GE. The role of keratin proteins and their genes in the growth, structure and properties of hair. *EXS.* 1997;78:59-148 Reis PJ, Sahl T. The nutritional control of the growth and properties of mohair and wool fibers: a comparative review. *J Anim Sci.* 1994 Jul;72(7):1899-907 Rogers GE. Hair follicle differentiation and regulation. *Int J Dev Biol.* 2004;48(2-3):163-170 Shapiro J, Wiseman M, Lui H. Practical management of hair loss. *Can Fam Physician.* 2000 Jul;46:1469-79 Springer K, Brown M, Stulberg DL. Common hair loss disorders. *Am Fam Physician.* 2003 Jul 1;68(1):93-102 Stenn K.S, Paus R. Controls of hair follicle cycling. *Physiological Review.* Jan 2001;81(1):449-494 Sulaimon SS, Kitchell BE. The biology of melanocytes. *Vet Dermatol.* 2003 Apr;14(2):57-65 Thiedke CC. Alopecia in women. *Am Fam Physician.* 2003 March 1;67(5):1007-11 Tomita Y, Seiji M. Inactivation mechanism of tyrosinase in mouse melanoma. *J Dermatol.* 1977 Dec;4(6):245-9 Van Neste D, Tobin DJ. Hair cycle and hair pigmentation: dynamic interactions and changes associated with aging. *Micron.* 2004;35(3):193-200.



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KERACTIVE

of hair follicles



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The biostimulation treatment of hair follicles

■ Dermal papilla and cycle of hair production

Hair is extremely complex, consisting morphologically of several different cells and chemical species (**Fig. 1**). The hair root lies below the surface of the skin enclosed within a **hair follicle** which is in turn entirely encased in connective tissue and acts as the **hair producing unit**. The core of any hair follicle is the hair fiber, composed of three different types of epithelial cells: medullary, cortical and cuticular. The medulla, or innermost layer, is only present in large thick hair. The Inner Root Sheath (IRS) surrounding the hair fiber is composed of three cell types: the inner root sheath cuticle, Huxley's layer, and Henle's layer. This IRS is surrounded by another cellular envelope known as the Outer Root Sheath (ORS). These cells are in contact with the **dermal papilla** situated at the base of the hair follicle.

The dermal papilla is fed by the bloodstream, which carries nutrients to produce new hair, and plays an essential role in the induction and maintenance of hair growth.

Under normal circumstances, hair growth in each **hair follicle** follows a cycle consisting of three main stages (**Fig. 2**): anagen (growing phase), catagen (transition or rapid involution phase) and telogen (resting phase).

Normally, this cycle of hair production and inactivity will continue for the duration of the individual's life. **Other factors can, however, influence and inhibit hair production by aberrant hair follicle cycling and changes in the hair follicle morphology**, leading in some cases to the physical destruction of the hair follicle. Pattern baldness or androgenic alopecia is the result of genetic programming for permanent hair loss, whereas increased hair shedding, or temporary hair loss, can have many different causes: poor nutrition and diet, hormones, age, medication, infections, stress, use of chemicals, rapid weight loss, illnesses, disease, hair-care practices, etc.

KERACTIVE reaches the hair at its root and in particular at the dermal papilla which is vital for the development of hair follicles. The formulation of **KERACTIVE** has been designed to stimulate new hair growth by rejuvenating damaged hair follicles and to create a healthy environment for new hair to grow.

The ideal companion
for hair grafts

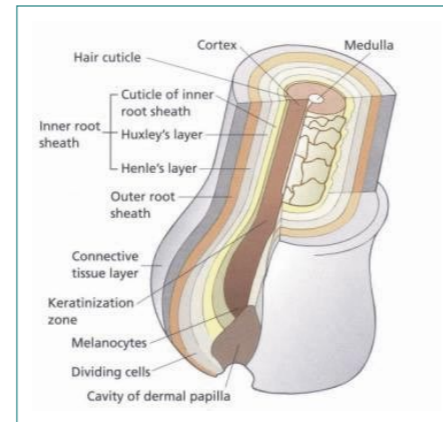


Fig. 1: Structure of the hair bulb

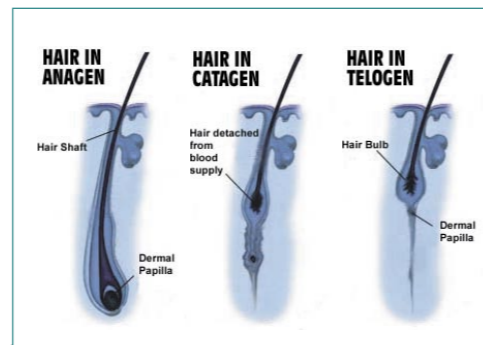


Fig. 2: Hair growth cycle

■ Indications

KERACTIVE is particularly recommended:

- To treat non-androgenic alopecia
- To repair hair prematurely damaged by environmental aggressions (sun, pollution, diet, medication, etc...)
- To stimulate hair growth and health
- To treat female hair loss
- To eliminate dandruff and seborrhea
- To create a healthy environment for hair transplants
- To treat thin and/or devitalized hair



■ Properties

Under the influence of the dermal papilla, differentiation of the epidermal cells during the anagen stage produces a hair fiber and associated products. Insufficient dermal papilla cell stimulation results in a stoppage of the growth of the hair fiber and root sheaths. The dermal papilla can become isolated in the dermis and the hair fiber can easily be pulled out leading to hair loss. **KERACTIVE slows down this process by providing the dermal papilla with the nutritional elements required for hair growth.**

The primary component of hair fiber is keratin protein, a long chain of amino acids that forms the cytoskeleton of all epidermal cells. Research has evidenced that the durability and resistance of hair fiber to degradation under environmental stress stem from the high amount of sulfur which comes from the amino acid, cysteine, in the hair fiber. The sulfur in the cysteine molecules in adjacent keratin proteins binds to form disulfide chemical bonds which are very strong and very difficult to break apart. **KERACTIVE**, by ensuring a permanent bio-availability and a proper ratio of all the **amino acids** present in healthy hair, **optimizes the production of keratin proteins.**

The cells in hair follicles produce all the keratin they require from the nutrients supplied by the blood vessels of the dermal papilla (**Fig. 3**). Any reduction in the blood and oxygen supply to the scalp results in increased hair shedding, damaged hair and slow regrowth.

It is therefore essential to restore an efficient micro-circulation in order to enhance or re-establish the phenomena of tissue exchange which ensures good dermal papilla function. Thanks to the vasodilator activity of the **PTMBP** (4-(1-Pyrrolidinyl)-1-(2,4,6-trimethoxyphenyl)-1-butanone), also called **buflomedil**, **KERACTIVE** helps to increase blood flow and therefore to irrigate and oxygenate the scalp. Derivatives of the flavonosides such as **rutin** offer a particularly **beneficial vasculo-protective effect** in that respect. They increase the resistance of the capillaries directly by stabilizing the vascular basal membrane and indirectly by increasing the uptake of free radicals.

KERACTIVE also contains all the metabolites (vitamins and minerals) required for proper functioning of the nutritional and energetic metabolism. **KERACTIVE** is particularly rich in **vitamin B** which (especially when combined with zinc) prevents hair shedding and regulates sebum secretion and dandruff caused by the build up of cellular debris which asphyxiates the hair follicles. Graying is also attenuated by Vitamin B and by **DOPA**, a melanin precursor.

Minerals (**zinc, selenium, copper, manganese**) known for their anti-oxidant properties and their role in enzymatic reactions leading to hair growth and repair are also brought by **KERACTIVE**.

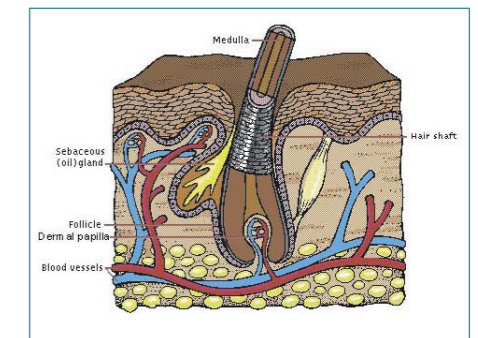


Fig. 3: Bloodstream in the dermal papilla

