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Herbal medicines as an effective therapy in hair loss – A review

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ABSTRACT

Though hair loss (alopecia) is not a debilitating or life threatening sickness, the very thought of becoming bald can lead to emotional stress and traumatic experience for those who suffer from premature or excessive hair loss. Many will try anything and everything to bring back their locks. Or at least, some of their once full head of hair. Hair loss sufferers spend billion of dollar annually on remedies ranging from drugs, vitamins to special tonics and shampoos. Conventional treatments of hair thinning includes drugs therapy and hair transplant. Minoxidil and Propecia (Finasteride) are the only two drugs approved by the FDA for hair growth in men. Minoxidil is the only drug available for women with androgenetic alopecia. These drugs have been proven to show positive results for balding conditions on the vertex region of the scalp. Though these drugs are effective, many are wary of their unknown long-term effect and potential side-effects. This has led to increase interest in alternative remedies such as herbal medicine.

Key words: Hair loss, Herbs, Herbal medicine

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Hair loss

Hair loss is the thinning of hair on the scalp. The medical term for hair loss is alopecia. Alopecia can be temporary or permanent. The most common form of hair loss occurs gradually and is referred to as "androgenetic alopecia," meaning that a combination of hormones (androgens are male hormones) and heredity (genetics) is needed to develop the condition. Other types of hair loss include alopecia areata (patches of baldness that usually grow back), telogen effluvium (rapid shedding after childbirth, fever, or sudden weight loss); and traction alopecia (thinning from tight braids or ponytails).

History of Hair Loss

Although hair loss is regarded as a modern day problem nothing could be further from the truth. The ancient Egyptians were searching for a cure over four thousand years ago. The bible also has a few mentions of hair loss within its pages. Hair loss, its problems and the search for a cure is not anything new. For thousands of years, men and women of all countries and races have shared the tragedy of premature hair loss and the hope of discovering a cure. There is indeed a vast fortune just waiting to be collected for anyone finding the elusive cure.

Hair Loss and the Bible

One of the earliest mentions of hair loss is in the bible, below are a few instances. Kings From there Elisha went to Bethel. As he was walking along the road, some youths came out of the town and jeered at him. "Go on up, you baldhead!" they said "go on up, you baldhead!" He turned round, looked at them and called down a curse on them in the name of the Lord. Then two bears came out of the woods and mauled forty-two of the youths. And he went on to Mount Carmel and from there returned to Samaria.

Hair Structure [3, 5]

We will begin by defining the hair. Hair is composed primarily of proteins (88%). These proteins are of a hard fibrous type known as keratin. Keratin protein is comprised of what we call "polypeptide chains." The word, polypeptide, comes from the Greek word "poly" meaning many and "peptos" meaning digested or broken down. In essence, if we break down protein, we have individual amino acids. Many (poly) amino acids joined together form a "polypeptide chain". Two amino acids are joined together by a "peptide bond", and the correct number of amino acids placed in their correct order will form a specific protein; i.e. keratin, insulin, collagen and so on. The "alpha helix" is the descriptive term given to the polypeptide chain that forms the keratin protein found in human hair. Its structure is a coiled coil. The amino acids link together to form the coil and there are approximately 3.6 amino acids per turn of the helix (coil). Each amino acid is connected together by a "peptide bond". The peptide bond is located between the carbon atoms of one amino acid extending to bond with the nitrogen atom of the next amino acid.

A Helix Coil: In the organization of a single hair, three "alpha helices" are twisted together to form a "protofibril". This is actually the first fibril structure of the hair. Nine protofibrils are then bundled in a circle around two or more to form an eleven-stranded cable known as the "microfibril". These microfibrils are embedded in an amorphous unorganized protein matrix of high sulfur content and hundreds of such microfibrils are cemented into an irregular fibrous bundle called a "macrofibril". These macrofibrils are grouped together to form the cortex (or the main body) layers of the hair fiber. Packed dead cells surround these structures and are known as the cuticular layers of the hair. In the center of these structures lies the medullary canal, which is actually apart of the excretory system and houses any foreign debris, heavy metals, synthetics and medications that are thrown off by the body and eventually released through the canal.

Bonding in Keratin Protein: When the hair is in its normal unstretched state. It is referred to as A of alpha keratin. The original configuration of the hair is held in place by the bonding found in the cortex layers of the hair. As we



stated earlier, keratin protein begins with an alpha helix building into protofibrils, microfibrils, macrofibrils, and then cortex layers. The bonds in the hair are located within each and every alpha helix.

The Hydrogen Bond: The first bond we will discuss is the hydrogen bond. This bond is located between the coils of the alpha helix and is responsible for the ability of the hair to be stretched (elasticity) and return back to its original shape. The hydrogen bonds allow us to change the shape of the hair temporarily with the aid of water. These bonds are electrolytically controlled and are the most readily broken down and the most readily reformed. These bonds are responsible for approximately 35% of the strength of the hair and 50% of the hair's elasticity (some would argue up to 99.9% of the hair's elasticity).

The Salt Bond: The salt bond is also an ionic (electrolytically controlled) bond formed by the electron transfer from the side chain of a basic amino group (an amino acid with an COO^- group) to the side chain of an acidic amino acid, i.e. NH_3^+ . (This is two positive and negative charges attracting one another.) This occurs in a position parallel to the axis line of the rotation of the helix of the hair. The salt bond is responsible for approximately 35% of the strength of the hair and 50% of the hair's elasticity.

The Cystine Bond : The cystine bond also known as the disulfide bond, sulfur bond, or just S bond is formed by cross-links between cystine residues (amino acids) of the main polypeptide chains. This bond is perpendicular to the axis of the hair and between the polypeptide chains. Because of its position in the hair, it is responsible for the hair's toughness or abrasion resistance. (It actually holds the hair fibers together.) These cross-links are frequent in the hair fiber, with maximum of frequency of one cystine bond every four turns of the alpha helix. This is what enables us to permanent wave the hair.

The Sugar Bond: The sugar bond is formed between the side chain of an amino acid having an OH group and an acidic amino group. This bond is also formed perpendicular to the axis of the hair. Because of its position, it gives the hair toughness but little strength (5%). Some moisture is contributed to the hair as a by-product of this bonding.

Chemistry of the Hair

Understanding for Hair Health

To understand hair loss and hair growth products, it is important to understand the chemistry of the hair. The hair come in three different varieties on humans - Lanugo, Vellus and Terminal hairs. Briefly, Lanugo are these hairs we might refer to as peach fuzz when babies are born. Lanugo are light hairs you might find on your stomach, back or on your neck. They tend to be short and with little pigmentation. Terminal hairs are the thick follicles with melanin pigmentation. The chemical composition of the hair helps to determine its shape. The chemical nature of the hair is 97% protein and therefore is made-up primarily of amino acids - amino acids being the building blocks of proteins.

Proteins are organic compounds that make up all living matter. There are three types of proteins:

Simple Proteins - simple amino acids

Conjugated Proteins - combination of simple proteins with other materials

Derived Proteins - proteins formed by heat, chemicals, enzymes interacting with simple proteins.

Proteins make up all cells in our body, but are made up of amino acids. Amino acids in turn are molecules formed by oxygen, nitrogen, carbon and hydrogen. These molecules are held together by peptide chains. These peptide chains form into a helical coil.



This helix coils then becomes one of many strands and coils that make up the hair and its cortex. Amino acids require nutrition for the cortex and follicle to develop. Nutrition to the cortex, helix coil and medulla allow for:

Faster growing hair

Natural hair growth

Scalp and follicle stimulation

Alopecia hair loss treatment Hair Loss Hormones- When Genetics and Body Chemistry Combine

To Cause Hair Loss

The scientific term for hair loss is "alopecia." When caused by hair loss hormones, the term becomes "androgenic alopecia." There are many causes for hair loss, including heredity factors, aging, illness and infectious diseases, nervous disorders, toxic substances, injury, and severe radiation. But hair loss hormones, combined with genetic factors, are responsible for the most common types of baldness. What begins as a few lost hairs after shampooing progresses to a receding hairline and thinning hair. When hair loss occurs in a specific pattern on the head, it is called "male pattern baldness." Male pattern baldness is genetic in cause, due to an autosomal dominant gene. Starting at the temples, male pattern baldness will progress until there is only a U-shaped fringe of hair around the head. Some men may have only a receding hairline and/or baldness at the top (crown) of the head. Hair loss hormones are the culprits here, assisted by heredity.

Hair Growth Cycle

Growth phase of about 30-45 days explaining why they are so much shorter than scalp hair. We all lose about 100 hairs per day, out of the 100,000 contained by the average scalp. Lifespan: The average lifespan of a single hair is 4.5 years; the hair then falls out and is replaced within 6 months by a new hair. Each hair follicle undergoes a cycle of activity. The hair grows to a maximum length, then hair growth ceases and the hair is shed and replaced. At any one time we only have around 85% of our hair on our head at a time, the rest being in the resting stages. The hair growth cycle has three distinctive phases:

Anagen: the period of active growth

Catagen: the period of breakdown and change

Telogen: the resting stage before resumption of growth

Anagen: The epidermal cells surrounding the dermal papilla form the germinal matrix or root of the hair. These cells are constantly dividing, and as new cells are formed they push the older ones upwards where they begin to change shape. By the time the cells are about one-third of the way up the follicle they are dead and fully keratinised. A scalp hair will grow actively for between one and a half and seven years (three years being an average growth period).

Catagen : This is the end of the active growth period, and is marked by changes occurring in the follicle. The hair stops growing and becomes detached from the base of the follicle forming a club hair. The hair bulb begins to break down, resulting in the follicle becoming shorter. A small section of the outer root sheath remains in contact with the group of cells that formed the papilla. This period of breakdown or change lasts about three weeks. As the inner root sheath breaks down, the hair remains in the follicle due to its shape. On average, 1% of follicles are in the catagen stage.

Telogen: The section of remaining root sheath still in contact with the papilla is known as the secondary or root germ. It is from this germ that a new hair can grow. The shortened follicle rests for about three months. The hair may be brushed out at this time or at the onset of anagen. On average 14% of follicles are in the telogen stage. After the telogen stage the cycle returns to anagen and the root germ begins to grow downwards and forms a new bulb around the dermal papilla. It is the lower end of the germ that forms the new bulb, producing a new hair. The upper part of the germ forms the new cells that lengthen the follicle below the club hair. The new hair may push the old hair out. Sometimes therefore you may see two hairs in the same follicle.

Hair Loss Causes [14]

Hair loss causes are a quite controversial issue as there is no general agreement about what are the main factors that cause loss of hair. As a matter of fact, different clinics have their own opinion on this problem and develop their own ways of treatment accordingly. Regrow-hair.org is by no means preconceived in this case, so in this section we'll give you a synopsis of different views of medical professionals taken together. Some scientists consider the male hormone testosterone to be one of the major hair loss causes. Testosterone is closely connected with heredity. If a man has inherited the necessary genes for loss of hair, a little of testosterone is formed by some of the hair roots into a derivative called dihydrotestosterone. And in fact, it is dihydrotestosterone that is responsible for hair loss. So dihydrotestosterone is present in the surface sebum of hereditably predisposed people. When a hair is shed it enters the follicle reacts inside there chemically. Dihydrotestosterone miniaturizes the hair root and follicle and the new hair growing through it will be finer. When the new fine hair is later shed dihydrotestosterone again miniaturizes the follicle and hair root and so on until baldness occurs. Thus, male hormones, precisely, testosterone, are sponsoring baldness. Actually, male hormones start "working" when a man is sexually mature, so there's little danger of hair loss before puberty. Another point of view that is to some extent opposed to the theory of inherited disposition is focuses attention on *the blood flow*. So it is not testosterone and male hormones that are considered to be the main cause of hair loss but a poor blood flow to the scalp, insufficient nutrients in blood and poor drainage of waste products through the lymphatic systems. Considering this opinion as a prevalent on presupposes appropriate ways of treatment that center around the increase of the blood flow in the scalp. Loss of hair in men and women is also considered to be caused by excessive oil in the scalp. This oil, that is also called sebum, clogs the pores of the scalp and stifles follicle growth. In time the hair root is asphyxiated, making it impossible for new hair to grow. If the scalp is not cleaned properly sebum becomes wax that clogs the pores. Thus, the new hair cannot come out. A few hairs that manage to push through this wax is so weak that they are ready to fall out at any time. These three factors are the most common ones. Among other hair loss causes there are also the following:

- Emotional strains, stresses and nervous disorders
- Aging,
- Infections,
- Hormonal imbalance,
- Polluted environment,
- Toxic substances,
- Injury and impairment,
- Radiation.

It is normal to lose between 50-100 hairs a day, this is part of the hair renewal process. However most people suffer from excessive hair loss at one time in their life. There are many reasons for this including medication, radiation, chemotherapy, and exposure to chemicals, hormonal and nutritional factors, thyroid disease,



generalized or local skin disease, and stress. Many of these causes are temporary and a few are permanent. These are some of the more common reason for hair loss.

Alopecia Areata [1-2]

This type of hair loss is believed to be caused by the immune system reacting to hair follicles as if they were antibodies and shutting them down. The hair loss is usually limited to a coin sized area and all the hair in the area is lost leaving a totally smooth round patch. In a more severe rarer condition called Alopecia Totalis, all hair on the entire body is lost, including the eyelashes. Treatments include topical medications, a special kind of light treatment, or in some cases drugs.

Stress [7]

Stress can cause hair loss in some people. Usually it occurs 3 months after the stressful event has occurred and it may take 3 months after the stress period has ended for the hair growth to resume. In most cases it is temporary if the person is not predisposed to genetic or Androgenic Alopecia, if they are stressed may trigger the onset of genetic hair loss.

Herbs for hair loss

If you are looking for the hair loss remedy using herbs, you have come to the right place. We provide very comprehensive information about herbs for hair loss, and we hope that you will find your answers here and get back to your original hair. Some herbs for hair loss products information are also listed at this site.

Can Herbal Hair Remedy Help To Bring Back Your Looks?

Though hair loss (alopecia) is not a debilitating or life threatening sickness, the very thought of becoming bald can lead to emotional stress and traumatic experience for those who suffer from premature or excessive hair loss. Many will try anything and everything to bring back their locks. Or at least, some of their once full head of hair. Hair loss sufferers spend billion of dollar annually on remedies ranging from drugs, vitamins to special tonics and shampoos.

Conventional treatments of hair thinning includes drugs therapy and hair transplant. Minoxidil and Propecia (Finasteride) are the only two drugs approved by the FDA for hair growth in men. Minoxidil is the only drug available for women with androgenic alopecia. These drugs have been proven to show positive results for balding conditions on the vertex region of the scalp.

Though these drugs are effective, many are wary of their unknown long-term effect and potential side-effects. This has led to increase interest in alternative remedies such as herbal medicine.

Herbs For Hair Loss [10, 12,13]

Here we take a look at some of the herbs that are believed to reduce the rate of hair loss and at the same time stimulate new hair growth.

Algae Extract

Seaweeds or sea vegetables have long known to have curative power as they contain high level of essential amino acid, minerals and vitamins. Out of thousands of different species found throughout the world's oceans, about 400 species are used by people as medicine, health supplement, skin care, fertilizers etc. Some seaweeds such as Atlantic Kelp, Himanthalia Elongata are used as hair growth remedies. They act as anti-oxidant to reduce and heal damages to the scalp and hair and also provide rich source of essential building blocks (e.g. amino acid and vitamins) to help in growing new hair and adding the shine to the hair.

Channelled Wrack (*Pelvetia Canaliculata* Extract)



Channelled Wrack is derived from a seaweed (Phaeophyta). It contains isoflavones, which in recent studies have been demonstrated to have potent antioxidant properties, comparable to that of the well-known antioxidant vitamin E that can help to revitalize, renew and refresh the skin of the scalp. Channelled Wrack also inhibits testosterone binding factors that can lead to hair loss in women. It is used in hair loss product as it promotes hair growth and improves hair thickness.

Ginkgo Biloba

Ginkgo Biloba[11] is a very popular herbal remedy that is thought to help with many problems, among them improving the circulation of blood to the brain and skin. The majority of herbalists who prescribe this for loss of hair do so believing that the increase of blood to the brain and skin delivers more nutrients to the hair follicles and so promotes hair re-growth.

Green Tea (Camellia Sinesis)

Green tea is another popular herbal remedy as it is believed that the enzyme 5-alpha-reductase is inhibited by the catechins found in the green tea. Some herbalists claim that you will reduce the risk of male pattern type baldness if you drink several cups of green tea or take it in capsule form on a daily basis.

He Shou Wu or Fo-Ti (Polygonum Multiflorum)

He Shou Wu is an ancient Chinese herb that has been used for centuries for hair loss and baldness. It is frequently available in both tea and capsule form and is one of the main ingredients found in many commercial remedies for the treatment of hair loss. In a recent study published by American Botanical Council (read article), the authors note that this Chinese botanical shows promise as a hair and color restorative and is capable of inducing terminal hair to grow instead of vellus hair (the fine baby hair growth associated with use of minoxidil).

Pygeum (Pygeum Africanum)

Pygeum is taken from the bark of the evergreen tree and works in a very similar way to green tea. It has been used to treat problems with the prostate for many years in China and can be taken in pill or capsule form.

Saw Palmetto (Serenoa Repens)

Saw palmetto is a very popular choice among with hair loss; this is due to the fact that it also has the ability to protect the prostate. Not only does it encourage the hair to re-grow but it also slows down the loss of hair.

Stinging Nettle (Urtica Diocia)

Stinging Nettle blocks the conversion of testosterone into DHT; this is the main cause of hair loss in men. It can be bought in either pill or capsule form and is said to be more effective when used in combination with saw palmetto or pygeum.

Dong Quai (Chinese Angelica)

Like He Shou Wu, Dong Quai is a traditional Chinese herb that is used to stop hair loss and even regrow hair. Dong Quai contains phytoestrogens, which reduces the formation of DHT.

Panax Ginseng :



Used in Asia for thousands of years, Ginseng's well known benefits include promoting vascular circulation and regulating cellular metabolism. Used in shampoo or hair tonic, Ginseng helps to nourish and strengthen hair. The above herbs were relied on by many long before scientists started creating hair loss drug or treatment. While there are skeptics who laugh at these remedies, others beg to differ. After all, what works for some, may not work for others.

Natural Herbal Hair Loss Treatment Products [9-10]

If you look around in the market, you would notice that there are many herbal remedies for hair loss that incorporate one or more of the above ingredients. Though they come in various forms (pills, tablets, tonic), these herbal hair loss solutions are created as a feasible and safe option for men and women to tackle their hair loss problem. The function and effects of the herbs vary. Hence it is important for you to understand what goes into the product when considering which remedy is best for you. For your easy comparison and evaluation, we seek out the credible ones and highlight those ingredients which are beneficial to hair loss condition. The main advantage that these products have over the drugs is that they address the problems effectively with no side effect. You can learn more about these herbal solutions by visiting their websites [11-25].

CONCLUSION

Hair loss is not just a cosmetic problem but psycho-sociological problem also. Androgen antagonism, potassium channel opening, Angiogenesis (through endogenous substances) and 5-alpha reductase inhibitions are the major non-surgical therapeutic strategies for hair growth promotion. Exploring the herbal drugs for the promotion of hair growth is the vital need of this era. The potential of end number of herbal drugs in hair growth promotion has been studied. But still more scientific documentation of herbal/ayurvedic drugs is needed for the same. This can be attained by careful and accurate characterization of the active phytoconstituents, elucidation of molecular mechanism of their actions, demonstrations of the real efficacy by in vivo studies on proper animal models of hair loss and finally by demonstration of their safety and effectiveness in clinical trails.

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