

PROSPECT OF HERBS AS HAIR GROWTH POTENTIAL

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ABSTRACT

Herbal medicine is still the main-stay of about 70-80% of the world population mainly in the developing countries for Primary Health Care because of better cultural acceptability better, compatibility with the human body and lesser medicine or only palliative therapy is available. Even in this era of antibiotics, radiotherapy and strict drug laws, a very large number of herbal products are consumed and marketed throughout the world as health nutrients, food supplements, and curing agents for disease control. It has been observed that a number of herbs and their extract are used for hair growth activities some are described as follow: Petroleum ether extract of aerial parts of *Tridax procumbens* showed luxurious growth of hair in albino rats. Nearly 70% ethanolic extract of leaves of *Ginko biloba* was shown to be effective for hair growth activity. Methanolic extract of *Potyporus umbellatus* has shown excellent hair growth activity in rats. Combined extract *Emblica officinalis*, *Lawsonia inermis*, *Nardostachys jatamansi*, *Cyperus rotundus* and *Corchorus* prevent the falling of hairs and enhancement of hair growth activity. Proanthocyanidins from grape seeds promote the proliferation of mouse hair follicle cell *in vitro* and convert hair cycle *in vivo* similar to Minoxidil 2% solution which is synthetic and has numbers of side effect. Herbal cosmetics are in vogue these days. Nowadays, people have become aware of using herbal cosmetics. Now a day's cosmetology is a well-defined science based on experiences gathered over centuries. The safety and efficacy of natural herbs could not find any suitable match i.e., cannot be replaced by synthetics. There is once again revival of preference for natural products.

Keywords: Herbal medicine, Herbal cosmetics, Natural herbs, Hair growth activity, Hair cycle.

INTRODUCTION

Humans have hair that serves a most important role in their lives. It is a universal problem, having affected both sexes of all races to different extents for as long as mankind has existed. Hair loss is a common and ever increasing problem in cosmetics as well as primary health care practice. It is a universal problem, having affected both sexes of all races to different extents for as long as mankind has existed. To date, the etiology of alopecia is unclear and genetic factors appear to play a significant role in their pathogenesis.

Hair loss is a dermatologic disorder, and the search for natural products with hair growth promoting potential is continuing [1,2]. Hair loss, dandruff, hirsutism, alopecia is a common patient complaint and a source of significant psychologic and physical stress [3]. Androgens are considered to be one of the most important causes for alopecia apart from a variety of other factors [4]. Natural products in the form of herbal formulations are available in the market and are used as hair tonic, hair growth prominent, hair conditioner, hair cleansing agent, antidandruff agent, as well as for the treatment of alopecia and lice infection. Hair loss results from numerous other factors such as aging, genetic predisposition, thyroid imbalance, malnutrition or imbalance diet, chronic illness, hormonal effects of birth control pills, pregnancy, or menopause, certain medications and radiation therapy/chemotherapy used for treating cancer. The most common cause of hair loss is a hereditary condition known as androgenetic alopecia (AGA) also known as male pattern hair loss female pattern hair loss (FPHL) and alopecia areata (AA) are the most common forms of nonscarring hair loss, people are now a day's spending a great part of their earnings for hair care [5].

HAIR

Hairs can be defined as - "modified epithelial structure formed as a result of keratinization of germinative cells" [6]. Hair is an epidermal appendage that lies with the dermis. Every hair emerges from a tubular invagination referred to as follicle. The follicle resembles a slim pocket inside the epidermis as if a tiny finger had pushed the epidermis down into the dermis and underlying subcutaneous tissue. The cut

down severe is penetrated by means of the dermal papilla an upward protrusion of connective tissue, which produces microscopic cells of several varieties from which the hair is shaped and developed via mobile elongation and keratinisation.

There are about 1,000,000-2,000,000 hair follicles (HFs) on the scalp by myself. Additional HFs are observed all over the place the physique; hair is present in every discipline of the epidermis besides the arms, soles, and lips. The presence of hair in a typical place makes a terrible effect, whereas hairs on the head are part of the total appeal and the great thing about man or women. From an evolutionary factor of view, hair on humans is far on our mammal cousins. Each covering emerged to provide warmth. Hair is likely one of the central components of the body and considered to be an accessory constitution of integuments together with sebaceous glands, sweat glands, and nails. Human hair is quite often composed of fibrous I²-keratin proteins. Hair fiber is not steady in their full length, but instead outcomes from compact agencies of cells inside the fiber follicle, from which three extra common morphological accessories of hair constitution originate: There are multi-cellular cuticle sheath, the fibrous cortex and the medulla [7]. At the follicular level, a single layer of cells offers upward thrust to the cuticle, a protective layer overlaying the core of the fiber. It is made from β-keratins and displays a scaled constitution and possessing between seven and ten superimposed layers with the cuticle edges pointing toward the tip of the fiber (Fig. 1).

HAIR GROWTH CYCLE

The hair development undergoes a repetitive cycle the place the Anagen section followed by using the Catagen and the Telogen phase [8]. Within the Anagen section, the hair is actively growing at the same time within the catagen segment it is characterized by the degeneration and resorption of the lower region of the HF. The resting section, the place the hair is inactive, is called Telogen phase, after this segment the growth of the HF restarts (Figs. 2 and 3).

In the scalp, a hair growth cycle has three essential phases: Anagen, catagen, and telogen. The anagen segment is the progress cycle most

commonly the past 3-5 years. On a healthful scalp, there are roughly 100,000 hair and 90% of the follicles are consistently within the anagen segment of hair development. The catagen stage follows the end of the development interval when a follicle begins to end up dormant. The telogen stage is a dormant or resting interval that lasts 3-4 months. When the dormant section ends, a historical hair falls out. A HF then returns to the anagen stage and a brand new hair begins to develop. A natural fee of hair progress is about 1/2 an inch per 30 days relying on HFs and age of a character. On normal, 50-60 scalp hairs are lost day-to-day in a normal hair growth cycle and new hairs begin to grow from these follicles. Hair loss starts of evolved when much less new hair starts the re-growth stage.

CAUSES OF HAIR DISEASES/HAIR LOSS

Hair loss is a dermatologic disorder, and the search for natural products with hair growth promoting potential is continuing (Fig. 4). Hair loss,

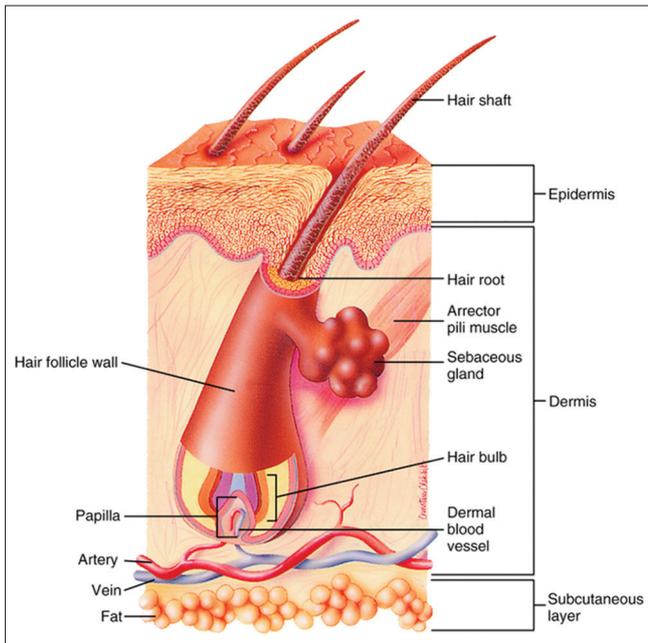


Fig. 1: Structure of hair follicle

dandruff, hirsutism, and alopecia is a common patient complaint and a source of significant psychologic and physical stress Androgens are considered to be one of the most important causes for alopecia apart from a variety of other factors [9].

HAIR DISORDER [9,10]

According to Ayurveda, hair diseases are described as following:

1. Khalitya means loss of hairs
2. Palitya means premature hair graying
3. Indralupta means alopecia areta, alopecia totalis, alopecia universalis.

AGA and FPHL

The most common form of hair loss affecting men is AGA. As many as 50% of Caucasian men are affected by age 50 [11,12] and up to 80% by age 70. The use of the medical term AGA reflects the current knowledge regarding the important role of both androgens and genetic inheritance in this form of alopecia. Testosterone is the major circulating androgen in men and is metabolized to dihydrotestosterone (DHT) in tissues. DHT is thought to be the key androgen required for the induction of AGA [13]. The conversion of testosterone to DHT in HFs is predominately mediated by the enzyme 5-reductase, which exists as 2 isoforms, Types I and II. Both isoforms are found in scalp follicles; however, the conversion of testosterone to DHT in HFs is predominately mediated by Type II 5-reductase, and it has been shown that men who are genetically deficient in Type II 5-reductase do not experience AGA. FPHL is somewhat less common than AGA, affecting up to 25% of women under age 50 and up to 40% of women by age 70. Although the androgen-dependent nature of AGA in men is well established, the relationship of androgens to the development of FPHL is more complex. Although women with hyperandrogenism certainly have a high incidence of FPHL (up to 86%), many women with FPHL do not have the elevated blood level of androgen hormones.

Both AGA and FPHL are indistinguishable on a histological level and result from altered HF cycling and progressive miniaturization of the HFs. In both conditions, the duration of the anagen phase shortens, whereas the duration of the telogen phase remains the same or lengthens, causing a reduction in the anagen to telogen ratio from around 10-12:1 to 5:1. Because hair length is determined by the anagen phase, each passage through the cycle causes the length of the new anagen hair to be shorter than its predecessor.

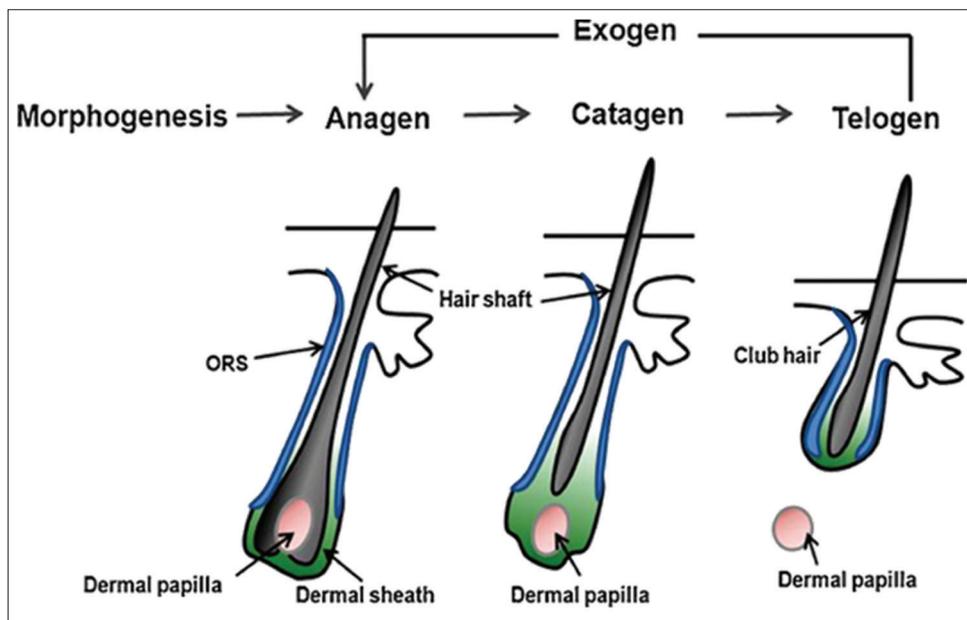


Fig. 2: Hair cycle: Anagen phase, catagen phase and telogen phase

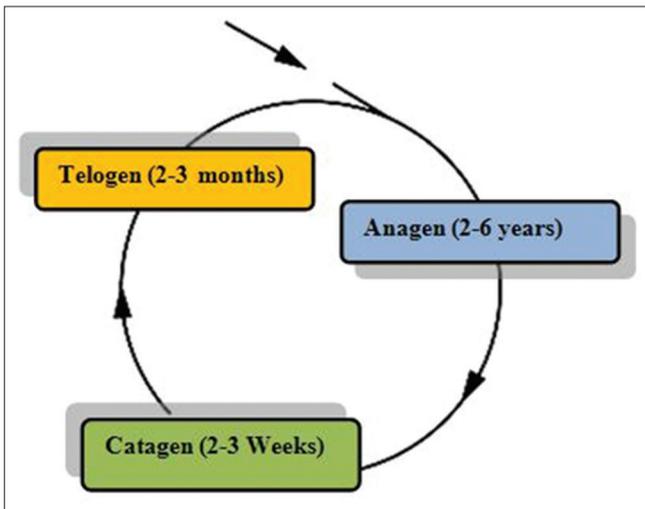


Fig. 3: Hair cycle showing anagen, catagen, and telogen



Fig. 4: Causes of hair loss

Ultimately, the anagen segment turns into so quick that it does not enable time for the brand new hair to acquire sufficient length to reach the dermis surface. Telogen hair, which now makes up a growing percentage of the total hair are more loosely anchored to the follicle than anagen hair, leading to extended hair shedding. Moreover, the latency interval between telogen hair shedding and anagen regrowth turns into longer, ultimately main to a discount in the quantity of hair gift on the scalp. Follicular miniaturization additionally occurs in both AGA and FPHL, where the scale of the follicle is decreased with each and every consecutive cycle main to hair which can be narrower and shorter and of smaller diameter over time. Consequently, a proportion of the colossal terminal follicles turn out to be miniaturized, making hair greatly finer, and more susceptible to falling out [14].

AA

Although many hypotheses to explain autoimmune disease development have been suggested by immunologists, [15,16] most of these scenarios have not been seriously considered in the context of AA. Currently, AA development hypothesis focuses on HF immune privilege collapse or the inappropriate presentation of antigens to the immune system

during normal HF cycling. Anagen stage HFs retain immune privilege, and a breach of immune privilege and exposure of unique HF antigens may result in targeting by the skin immune system [17,18]. This popular hypothesis is highly "skin-centric" and largely ignores current immunological disorder; although, it is attractive in its simplicity.

An alternative hypothesis is based on the knowledge that HF immune protection is transient, limited to the anagen growth cycle stage. Regression of the HF in catagen involves significant apoptosis [19] and immune cell infiltration. This normal HF cycling event may continuously expose the immune system to low levels of HF-derived antigens. HF specific autoantibodies found in humans and animal models in the absence of AA may be a consequence of this constant low-level exposure [19].

TYPES OF ALOPECIA

AA (primary stage): AA is a common autoimmune disease that results in the loss of hair on the scalp and elsewhere. It usually starts with one or more small, round, non-scarring smooth patches.

Mild transient AA: Patient with repeated transient AA but never converts into alopecia totalis or universalis.

Transient AA: Patient with AA in progressive phase and some of them converts into Alopecia totalis/alopecia universalis.

Ophiasis AA: Ophiasis type of AA shows a band like hair loss. It occurs mostly in the temporal or the occipital regions of the scalp, and therefore, it is more difficult to treat, as most medicines have a delayed action on these areas.

Alopecia totalis: Loss of hair from entire scalp.

Alopecia universalis - Loss of hair from the entire body including eyebrows and eyelashes.

Scarring alopecia: Any inflammatory process (burns, bacterial infections, ringworm, injury) sufficient to cause permanent loss of follicles, affected area known as scarring alopecia.

Tricotilomania: This type of hair loss is known as compulsive pulling or repetitive self-pulling by a patient himself/herself.

Traction alopecia: Hair style that tie hairs so tight can cause much traction at the root of hairs, and can develop traction alopecia.

Diffuse alopecia: Excessive Loss of hair all over the scalp without creating a patch.

DANDRUFF

Dandruff (also referred as "Pityriasis simplex") is a common embarrassing disorder, which affects 5% of the global population. Dandruff mostly occurs after puberty (between ages of 20 and 30 years), and affects males more than females [20].

Dandruff is characterized by scaling of the scalp and is frequently associated with seborrhea [21], and seborrhea is the precursor of seborrheic dermatitis [22]. The yeast, *pityrosporum ovale* is the causative microorganism of dandruff. *Pityrosporum ovale* feed on the dermal lipids and proteins and facilitates lipase activity, which releases proinflammatory free fatty acids causing dermal inflammation and tissue damage. The lipase activity indicates that in addition to hypersensitivity, *pityrosporum ovale* releases toxic chemicals, which contribute to the development of a fungal infection [23]. According to the symptoms, dandruff is classified into two types - dry (common) and oily dandruff.

HIRSUTISM

Unwanted hair happens in each man and ladies. Hirsutism is difficult to define objectively because of racial, cultural and fashion norms.

In women, hirsutism is most mostly idiopathic and presumed to be because of HF hypersensitivity to usual levels of circulating androgens. The next most usual purpose is polycystic ovary syndrome. Androgen-secreting tumors are rare. Females with expanded serum androgens often even have menstrual irregularity, extreme acne or untimely AGA. Hirsute females simplest require investigation when they have related virilization or menstrual irregularity, and estimation of serum testosterone, serum dehydroepiandrosterone sulfate, and free androgen index are enough screening checks. Normally, serum testosterone is larger than twice the upper limit of the typical variety when an androgen-secreting tumor is a gift. Hirsutism will have to be uncommon from hypertrichosis (the widespread overgrowth of non-androgen-dependent hair) which is on the whole obvious before puberty, evenly disbursed over the again and limbs and does now not respond to antiandrogen cure. Medications reminiscent of minoxidil, diazoxide, cyclosporin, and prednisolone can intent hypertrichosis.

TELOGEN EFFLUVIUM

Telogen effluvium is a slowing of recent hair progress on account of surprising extreme stress, adopted with the aid of a delayed shedding of hair. The stress induces an excessive share of follicles to enter the resting stage, and a few months after the worrying occasion, all the resting follicles start to shed hairs at concerning the identical time.

SUDDEN HAIR LOSS

Anagen effluvium is the sudden loss of growing hairs as a result of chemicals or radiation. Cancer treatments such as chemotherapy and radiation therapy halt the growth phase of HFs and result in the sudden shedding of hair. Some medications (i.e., diuretics, blood thinners, acne medications and birth control pills) can also cause hair loss as a side effect.

BROKEN HAIRS

Hair shaft breakage is when part of a hair breaks off; however, the growing end stays in the follicle and continues to grow. Hair shaft breakage results in thinner hair, and may also be caused by excessive styling, chemical substances, solar, and chlorine in swimming pools.

NUTRITIONAL DEFICIENCIES

Nutritional deficiencies are rarely a cause of hair loss. In rare cases, certain nutritional deficiencies can cause weak hair shafts that tend to break off.

OTHER HAIR LOSS CAUSES

Distinct chronic diseases can effect in hair loss. Hormone-related irregularities can include hair loss among different symptoms. Skin infections can effect in hair loss. Trauma, akin to burns and injury to HFs, can cause permanent hair loss. They can be further manifested clinically as:

Congenital disorders of hair growth: This type of hair disorder is genetically not environmentally. It is also called hypertrichosis because it results in defects in normal growth of HF in the embryonic stage. It is one kind of alopecia.

Acquired disorders of hair growth: This type of disorder is more complex in nature and is caused by biological factors of hair [24].

Split ends: It is commonly faced, women. When the hair is dry and brittle then results in split ends.

Frizzy hair: This is caused by the decreasing in normal hair moisture level. High brushing condition leads to frizzy hair.

Flaky scalp: It is white flakes of dead skin that prevent growth of hair and causes hair loss. This problem is most common in women.

Dull, gummy hair: It occurs due to the use of hard water for washing hair.

Hair loss due to a side effect of the beauty treatments: Any beauty treatments such as hair colors, dye, straightening, softening, rebounding, and perming which contains harsh chemicals can trigger hair loss for some individuals.

Chemotherapy and hair loss: Chemotherapy is an exclusive treatment for cancer patients but it affects normal cells and HFs too. This causes hair loss and known as anagen effluvium type of alopecia.

Other causes of hair loss: Crash dieting, high-grade fever, anemia, blood loss, hormonal imbalance, and pregnancy etc., can cause hair loss.

HAIR DISORDER TREATMENT

The alterations in HF density, dimension or changes to the hair development cycle are the fundamental motives of hair disorders. Androgen additionally a one in every of the main motive of hair loss. A different rationale of hair loss is the use of chemotherapeutic sellers [25]. The therapy of any hair disorder entails altering or modulating one or more of those causes of issues. The healing is relying on the nature of hair disease. If the causes of the changes to hair growth density, dimension and growth cycle is famous then probably the most mighty process of remedy is to target the preliminary sickness mechanism. The cure allows the broken HFs to get better by means of their inherent regenerative capability, they don't affect instantly on the broken HFs. Quite often hair issues contain alterations to HF distribution, dimension and growth cycle. By using modulating a number off of those parameters the disorder can be treated potentially [24]. Patents are on hand that declare the consequences are as a result of the stimulation of HF and scalp metabolism by way of bettering blood circulation, activation of dermal papilla, anti-testosterone motion, and improved diet to the HF through accelerated blood go with the flow, however, the mechanism are still not clear [25,26].

MANAGEMENT AND TREATMENTS OF HAIR GROWTH DISORDERS

An overriding consideration in the administration of AA is that even though the disease could have a serious psychological influence, it has no direct have an impact on normal wellbeing that justifies the usage of hazardous therapies, notably of unproven efficacy. In addition, many sufferers, even though by no means all, expertise spontaneous re-growth of hair.

Traditional healing for AA involves the use of corticosteroids, topical ointments, minoxidil (rogaine), anthralin (psoriatec), sulfasalazine, topical sensitizers, oral cyclosporine, photochemotherapy, and other alternative treatment plans with herbs and herbal creams or oils formulations. None of the work ordinarily as none of those acts to reverse the clause of the autoimmune ailment. Many of those cures can cause dangerous facet effects which can be worse than the localized lack of hair.

Probably the most long-established types of hair development issues are caused via aberrant HF cycling. One such ailment is AGA, characterized by way of a shortening of the anagen phase and a prolongation of telogen, mixed with miniaturization of HF. Hirsutism, alternatively, is defined because of the presence of excess terminal hairs in females in an adult male normal sample. To manipulate the quantity of hair produced for scientific functions, the primary process is to change anagen length both by way of shortening it in circumstances of hirsutism or by means of growing it to correct alopecia.

COUNSELING

A proof of AA, including dialogue of the nature and direction of the disorder and to be had treatments, is predominant. Some sufferers are profoundly upset with the aid of their alopecia and may just require psychological help. Contact with different sufferers and patient help

organizations may just help patients modify to their incapacity. The selection to deal with AA actively will have to now not be taken flippantly. Therapy can be uncomfortable for the sufferer, time-consuming and possibly toxic. It may additionally alter the patient's perspective to their hair loss. Some patients to find it elaborate to cope with relapse following or in the course of initially victorious medication and they must be forewarned of this likelihood. These issues are chiefly foremost in youngsters where the social disruption and focusing of the youngster's awareness on their hair loss, which may influence from lively treatment, have to be weighed carefully in opposition to the talents advantages. However, some patients are appreciative that whatever has been tried, even if it does now not work.

CURRENT TREATMENTS

Hair transplantation

Early hair-grafting techniques were rather crude, more commonly leaving a "patchwork" look. More modern tactics, together with micrografting, involve transplanting productive HFs from a donor discipline on the scalp to a balding subject. HFs are on the whole taken in plugs of one or two hairs (micrografts) from the perimeters or again of the pinnacle and moved to the entrance and/or prime, slowly reconstructing a hairline. Donor websites with full hair produce extra triumphant transplants. Transplanted follicles will also be everlasting or temporary which can final only a few years.

Scalp reduction

Balding scalp areas may also be surgically removed to shrink an appearance of baldness. Scalp reduction is most of the time used at the side of grafts or flaps. Previous to discount, the scalp may be stretched to develop areas where hair is growing. The effectiveness of scalp reduction is dependent on the degree of hair loss and scalp elasticity. This technique is now relatively dated and is not often utilized.

SYNTHETIC DRUG USED FOR HAIR DISORDER

Anti-androgens

DHT (the male hormone DHT) is associated with premature hair loss. A wide variety of anti-androgens are used to prevent or reverse premature hair loss: Progesterone, spironolactone (Aldactone[®]), flutamide (Eulexin[®]), finasteride (Proscar[®]), cimetidine (Tagamet[®]), *Serenoa repens* (Permixon[®] and cyproterone acetate (Androcur/Diane[®]). The most effective anti-androgens are oral finasteride (Propecia[®], Proscar[®]). Some patients prefer not to use these products due to potential side-effects associated with the hormones. In hair-loss, an immune reaction caused by male hormones (e.g., DHT) has perhaps the most significant role. Stimulated by androgens, the immune system targets HFs in genetically susceptible areas and causes premature hair loss characteristic of male-pattern baldness.

Growth stimulators

Topical oxygen free-radical scavengers (e.g., superoxide dismutases [SODs], enzymes that counter excessive free-radical activity) are potent hair growth stimulators. SODs inhibit oxygen radicals and may inhibit a localized immune response implicated in hair loss and offset damage and inflammation. Unless immunologic factors involved in hair loss process are effectively treated, the potential for significant hair re-growth may be very limited. Available agents (e.g., Rogaine[®]) stimulate some degree of hair growth in some individuals, but cannot by themselves produce healthy hair and cosmetic benefits. A multi-modal approach is required that combines anti-androgens, autoimmune system protective agents, oxygen free-radical inhibitors, and other hair growth stimulators halt hair loss and generate hair re-growth (Table 1) [27-34].

DISADVANTAGES OF SYNTHETIC DRUG USED FOR HAIR DISORDER

- Synthetic based product may cause human health hazard with several side effects
- The main adverse effect of diphenic prone is severe eczema and disseminated contact eczema

- Oral prednisolone documented potential adverse effects including acne, hypertension, cataracts, diabetes mellitus and bodyweight gain.

NUTRITIONAL SUPPORT

Minerals reminiscent of calcium, iron, copper, chromium, iodine, zinc, selenium and magnesium are integral to keep healthful hair development. Mineral deficiency will lessen the chance to keep watch over the blood circulation that promotes healthful hair progress and thyroid hormones that avoid dry hair and hair loss as well as defects in hair color. Too much iron is toxic to your body. Be definite to speak to your health care provider earlier than taking any mineral supplement. Vitamins B (above all B6, B3, B5 and folic acid), biotin (anti-oxidant, sources of biotin are: Whole grains, egg yolks, liver, rice, and milk. Vitamin A is fundamental for overall just right wellness. It's additionally important to HFs because it continues the hair root lubricated. Vitamin E acts as an antioxidant that aids potent circulation within the scalp as a result of accelerated oxygen uptake in blood, therefore it plays a most important role in promoting hair progress and stopping hair loss. Coenzyme Q10 is a fundamental vitamin that presents our body with the vitamins wanted to grow healthful hair. In addition, they promote total vitality and make contributions to lovely skin and strong nails (Table 2).

Yogurt and soy, darkish green vegetable, entire grain products, principal fatty acid, nuts and seed are fatty meals which are commonly the first-class sources of vitamin E, an immune bettering antioxidant and nerve protector. Carrots include excessive quantities of vitamin A. It's an antioxidant that helps produce healthy sebum in the scalp. Having too much vitamin A can lead to hair loss. There are numerous other foods that support promote hair development and hinder hair loss, akin to fruits, egg, spinach, and broccoli.

A healthful weight loss program, low in fat and excessive in fiber, fresh fruit, and greens can have a most important function in inhibiting hair loss associated with getting older and genetics. In Asian nations, the place veggies are familiar with regular dietary practices; sample-variety hair loss is hardly ever located. Botanically based nutrients may just prevent HFs from coming into an everlasting dormant state. Nutritional supplements can provide some improvement.

L-Lysine

The United States patent has been issued for L-lysine for the treatment of various types of hair loss, including AGA. L-lysine (an amino acid) inhibits 5-alpha reductase.

L-Arginine

HFs use nitric oxide to maintain and promote new hair growth. L-arginine is required to produce nitric oxide.

Saw palmetto

Saw palmetto (*S. repens*) is a palm-like plant that is native to North America. An extract derived from saw palmetto berries contains fatty acids and sterols. Sawpalmetto is commonly used to treat benign prostatic hyperplasia because it inhibits testosterone's action on the prostate. Extracts of Saw palmetto block 5-alpha reductase, reduce DHT uptake by follicles and block binding of DHT to androgen receptors. The liposterolic extract of saw palmetto combined with beta-sitosterol (a phytosterol common to many plants and grains) produced marked improvement.

Green tea extract

Topical agents such as finasteride inhibit Type II 5-alpha reductase in HFs. Agents from tea (catechins, (-) epigallocatechin-3-gallate and (-) epicatechin-3-gallate) affect Type I 5-alpha reductase activity responsible for converting testosterone to DHT. All tea is derived from the same plant species, but types and varieties differ according to where and how the plants are grown and how the tea is produced. Catechins in green tea leaves are more potent. Black pekoe is allowed to dry and ferment, but green tea is not, thereby preserving catechin integrity.

Table 1: The established therapies and synthetic compounds used for treatment of alopecia areata

S. No.	Treatment	Proposed mechanism	Side effect	Typical application	Reference
1.	Cimetidine	5 α -reductase Type-2 enzyme inhibitor	Loss of libido, impotence and gynecomastia	Extensive disease	[27]
2.	DPCP	Antigen competition	-	Extensive disease	[27]
3.	Dithranol (anthralin)	Immunomodulatory	-	Extensive disease	[28,32]
4.	Dutasteroid	Inhibits both Types I and II 5- α reductase isoenzymes	Hormonal imbalance, significant reduction in sperm motility	Extensive disease	[33]
5.	Finasteroid	Binds irreversibly to the 5 α -reductase Type-2 enzyme and inhibits the conversion of testosterone to DHT	Teratogenic effects in animals on high doses, causing genitourinary abnormalities in male offspring, hormonal disorders in male	Extensive disease	[31]
6.	Flutamide	Converts into 2-hydroxyl flutamide and acts as potent competitive inhibitor of DHT	Miniaturization of hair cycles, hepatic dysfunction and breast tenderness	Extensive disease	[31]
7.	Folligen	Contains copper complex with Saw palmetto, anti-androgen against 5 α -reductase isoenzymes	Not clinically proven in double-blinded clinical test	Extensive disease	
8.	Intralesional triamcinolone	Immunomodulatory	-	Patchy disease	
9.	Minoxidil	Open potassium channels and increase the proliferation and differentiation of epithelial cells in the hair shaft	Hirsutism, local irritation, itching, dryness and erythema	Patchy/moderate disease	[30]
10.	Oral prednisolone (corticosteroids)	Immunomodulatory mechanism	Acne, obesity, mild hypertension and lenticular opacities	Extensive disease	[33]
11.	Photochemotherapy	Immunomodulatory	-	Patchy disease	[34]
12.	Spirolactone	Antiandrogen in blocking the androgen receptor inhibits androgen biosynthesis	Hyperkalemia, digitalis glycosides, the increase in blood pressure	Extensive disease	[29]

DHT: Dihydrotestosterone, DPCP: Diphencyprone

Table 2: Herbs providing nutritional support in treatment of hair disorder

Biological source	Family	Part used	Phyto-constituents	Uses
<i>Aloe barbadensis</i>	Liliaceae	Leaves	Minerals	Nutritional support
<i>Avena sativa</i>	Poaceae	Seeds	Carbohydrates, iron, zinc and Mn and fibers	Nutritional support
<i>Bacopa monniere</i>	Scrophulariaceae	Entire plant	Triterpenoids saponins, bacosides	Nutritional support and nervine tonic
<i>Cajanus cajan</i>	Fabaceae	Seeds	Protein, starch and minerals	Nutritional support
<i>Juglans regia</i> L.	Juglandaceae	Fruit	Fe, Cu, Mn, Zn, K, proteins and fats	Nutritional support
<i>Lactuca sativa</i> L.	Asteraceae	Leaves	Vitamin A and folic acid	Nutritional support
<i>Medicago sativa</i>	Fabaceae	Leaves	Proteins, calcium, minerals and vitamins	Nutritional support
<i>Pelvetia canaliculata</i>	Fucaceae	Brown algae	Isoflavones	Anti-oxidant action
<i>Phyllanthus embelica</i>	Euphorbiaceae	Fruit	Gallic acid, vitamin C, quercetin	Nutritional support

PROSPECTS OF HERBAL HAIR CARE MEDICINE

There is a revival of option for products over the synthesis, in reward scenario because of their much less or no side effects. Magnificence salons and more than a few cosmetics corporations also use herbal soaps, shampoos and beauty merchandise made from more than a few constructed from various vegetation to treat the hair and scalp concern considering that the use of natural products is considered safe and free from allergic reactions/results.

HERBS USED FOR HAIR CARE: AN OVERVIEW

There are various products on hand within the markets that are ready by way of combinations of one and more herbal medications. These merchandise are used as hair tonic, hair growth promoters, hair conditioner, hair cleansing agent, anti-dandruff marketers and for the treatment of alopecia and lice infection. Preparations are to be had in the form of creams, dyes, powders, tablets, tonics, lotions, conditioners, wave units, hair sprays, and detailed rinses.

The following herbal drugs are mainly used as hair growth promoters.

In ayurvedic literature, there are records of herb which promote the growth of hair, keep them soft and silky and do not allow them to turn gray at an early stage herbs like Arnica, Henna, Bringraj, Jatamansi, Shoe flower, Bahera, Ghrit Kumari, Shikakai, Amla, Motha, Bhrami etc. have been widely used by the traditional communities as a hair wash, hair dye, hair growth oil formulation and shampoo.

These are located priceless in treating quite a lot of hair issues equivalent to hair fall, hair development, baldness, lice problems, dandruff, itching besides being priceless as hair tome, hair dye and hair wash. A majority of these vegetation/herbs are used by myself, nevertheless, blending in more than a few varieties can be executed for synergistic action. Such kind of information may give a lead for constructing herbal formulators extra.

Mankind has located it not possible to reside each in the old and cutting-edge time without the usage of medicinal plants regardless of

the overwhelming have an effect on and our dependence on modern treatment and large advances in synthetic drug, herbal treatment continues to be the mainstay of about 70-80% of the world populace in general in the developing nations for primary wellbeing care due to the fact that better cultural acceptability better, compatibility with the human body and lesser medicine or only palliative cure is to be had.

Natural drug treatments are for this reason a priceless as good as a valuable present from nature. They were handled with care and admire in the early days. The future pattern is more in the direction of the whole thing "Natural" and it might be valuable looking into the plant world for ultra-modern medicine. This welcome pattern for the reason that it makes an attempt to marry typical observe with ultra-modern expertise.

Petroleum ether extract of aerial parts of *Tridax procumbens* showed luxurious growth of hair in albino rats. 70% ethanolic extract of leaves of *Ginkgo biloba* was shown to be effective for hair growth activity, Methanolic extract of *Potyporus umbellatus* has excellent hair growth activity in rats [35,36]. Combined extract *Embellica officinalis*, *Lawsonia inermis*, *Nardostachys jatamansi* and *Corchorus* retards the falling of hairs.

Extract of dried flowers of *Madhuca indica* has been effective in alopecia. Extracts of *Swertia japonica*, *Aloe aroberescens*, *Hftrsngia macrophylla*, *Abrus precatorius*, *Clitoria tornalea*, *Cirirullus colocyntis*, liquorice roots and ginseng have also been observed for the management of alopecia.

A combination of *N. jatamansi*, *Aegle marmelos*, *Glycyrrhiza glabra* and *Myristica fragrans* rejuvenates the hair, gives superb condition and adds hair volume. A combination of *Brassica nigra* oil with meha azadirachita

piper longum, *Carthamus tinctorius* oil, *G. glabra*, and *Euphorbia thymifolia* strengthens the hair roots and promotes the hair growth.

Juice extract of leaf of *Lippia nodi* flora and lime fruits in gingly oil and pepper [37] examined methanol extract of 80 herbs for hair growth promoting activity and find 7 of them were highly potent. Ishida et al. (1999b) isolated the active substances Acetosyringone and polyporusterone A and B herb *P. umbellatus* fries and reported to use for hair treatment. Ishida Fraf (1999a) isolated senegose A, seniginisll and lliad senegasaponm b from the herb polygar senega var latifolia and also showed hair growth promoting activity.

Proanthocyanidins from grape seeds promote proliferation of mouse HF cell *in vitro* and convert hair cycle *in vivo* similar to minoxidil, hair growth.

HERBAL THERAPIES

There are many herbal preparations available that have been used to combat hair loss. For example, cantharidin, extracted from *Cantharis vesicatoria*, has been traditionally incorporated into hydro-alcoholic hair lotions. As the agent is highly irritating, it was formulated at strengths of about 0.002% [38]. Another remedy was derived from extracts of jaborandi leaves. The active constituent was pilocarpine which was used in concentrations of up to 0.4%, either alone or in combination with cantharidin or quinine. With nearly all of these preparations, no clinical evidence was supplied to support the claims being made. Greenberg and Katz compared the efficacy of an herbal preparation containing a 7.5% extract of fennel, polygonum, mentha, chamomile, thuja and hibiscus in an aqueous cream base with that of the aqueous cream base alone. A total of 24 balding males were enrolled in the randomized, double-blind study. The volunteers applied either

Table 3: Some important plants/herbs used for hair growth activity [39-50]

S. No.	Biological name	Vernacular Name	Family	Part used
1.	<i>Acacia rogeta</i>	Shikakai	Fabaceae	Fruit
2.	<i>Allium cepa</i>	Onion	Liliaceae	Bulb
3.	<i>Aloe vera</i>	Ghrith Kumari	Liliaceae	Leaves
4.	<i>Arctium lappa</i>	Burdock root	Asteraceae	Leaves
5.	<i>Arnica montana</i>	Arnica	Asteraceae	Flowers
6.	<i>Azadirachita indica</i>	Neem	Meliaceae	Leaves
7.	<i>Bacopa monneri</i>	Brahmi	Scrophulariaceae	Entire plant parts
8.	<i>Barssica</i> spp.	Mustard	Brassicaceae	Seeds
9.	<i>Buxus wallichiana</i>	Papri	Buxaceae	Wood
10.	<i>Capsicum annum</i>	Lal-mircha	Solanaceae	Fruit
11.	<i>Centella asiatica</i>	Gotu kola	Umbelliferae	Entire plant parts
12.	<i>Citrullus colocyntis</i>	Bitter cucumber	Cucurbitaceae	Fruits
13.	<i>Cocculus nucifera</i>	Nariyal	Arecaceae	Kernel
14.	<i>Convolvulus pluricaulis</i>	Shank puspi	Euphorbiaceae	Entire herb
15.	<i>Cuscuta reflexa</i> Roxb	Swarna lata	Convolvulaceae	Stem
16.	<i>Cyperus rotundus</i>	Nagarmotha	Cyperaceae	Rhizome
17.	<i>Eclipta alba</i>	Bhangra/Bringraj	Asteraceae	Entire plant parts
18.	<i>Ginseng radix</i>	Ginseng	Araliaceae	Roots and stem
19.	<i>Hibiscus rosa-sinensis</i>	Shoe flower	Malvaceae	Leaves and flowers
20.	<i>Hydychium spicatum</i>	Kapoor Kachari	Zingiberaceae	Leaves and rhizomes
21.	<i>Lawsonia inermis</i>	Henna	Lytheraceae	Leaves
22.	<i>Nardotachys jatamansi</i>	Jatamansi	Valerianaceae	Rhizome
23.	<i>Nicotiana tabacum</i>	Tobacco	Solanaceae	Leaves
24.	<i>Nyctanthes arbor-tristis</i>	Harsinghar	Oleaceae	Leaves, flower and oil
25.	<i>Ocimum gratissum</i>	Wild basil	Lamiaceae	Leaves
26.	<i>Phyllanthus emblica</i>	Amla	Euphorbiaceae	Fruit
27.	<i>Piper nigrum</i>	Black mirch	Piperaceae	Leaf
28.	<i>Radix Panax ginseng</i>	Ninjin	Araliaceae	Root and stem
29.	<i>Rosmarinus officinalis</i>	Rosemary	Labiatae	Leaves and flowers
30.	<i>Sapindus trifoliatus</i>	Reetha	Sapindaceae	Fruit
31.	<i>Terminalia bellerica</i>	Bahera	Combretaceae	Fruit
32.	<i>Tridax procumbens</i>	Coat button	Asteraceae	Aerial part
33.	<i>Trigonella foenum-graecum</i>	Methi seeds	Fabaceae	Seeds
34.	<i>Valeriana wallichii</i>	Sugandha bala	Valerianaceae	Rhizome
35.	<i>Ziziphus jujuba</i>	Jujube red date	Rhamnaceae	Seed

active or placebo cream to their scalps every 24 hrs and also washed daily with a supplied shampoo. Hair status was assessed by harvesting, on a bimonthly basis, a selected area of the scalp. After 40 weeks of treatment, the mean total hair count increased by 77% in the actively treated group compared with only 3% in the placebo group ($p=0.003$). Furthermore, the mean terminal hair count for treated men increased by 169% compared with a mere 33% increase for the placebo-treated men. Based on this data, herbal therapy seems to hold great potential as a treatment for alopecia and warrants further study (Table 3).

CONCLUSION

Discovery of novel hair growth promoters is of first-class significance as only two drugs namely minoxidil (topical) and finasteride (oral) have been accredited by way of FDA for the remedy of alopecia. AGA is a DHT-mediated approach, described by using steady miniaturization of androgen reactive HF and accompanied by perifollicular fibrosis of follicular units in histological examination. AGA was caused in rats by way of administration of testosterone. Conversion of testosterone to DHT, which is an extra robust androgen in comparison with testosterone explanations miniaturization of HF and shortening of the anagen segment and markedly prolongs the period of resting segment or telogen resulting in the conversion of thin terminal hairs into fine vellus hairs. It is concluded that petroleum ether extract of *Phyllanthus niruri* acts as a hair development promoting agent in AGA frequently via inhibition of 5 α -reductase enzyme and reduction of the conversion of testosterone to more powerful compound, DHT within the skin. Presently on hand healing choices have specific barriers, both due to terrible efficacies or because of the compliance issues and these medicines are unable to avoid recurrence, which is the most common situation. With all of the choices for treating hair loss, it is not shocking that patients in most cases believe overwhelmed and burdened. Private preferences could play a principal function in identifying the nice remedy choice. Hair loss is an original and ever growing trouble in cosmetics as well as fundamental well-being cared to follow. In a case of artificial medicines, Minoxidil and finasteride remain our pleasant retailers in handling hair loss that is approved by means of FDA. Alopecia is a customary drawback that has affected men and women for years. It is still now not utterly understood and remains to be investigated via many healing are on supplied together with natural or synthetic headquartered products, but average product are continually gaining popularly and using plant extract in the system is on the rise. Since looking on the growing fame of the natural medicines in hair care, it should be useful to soak up systemic investigation on the efficacy of those medicines and their education. 1 day it is viable that many new plants extract of industrial importance will be recognized and claims of many huge spread herbs shall be established.

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