



# hair fact

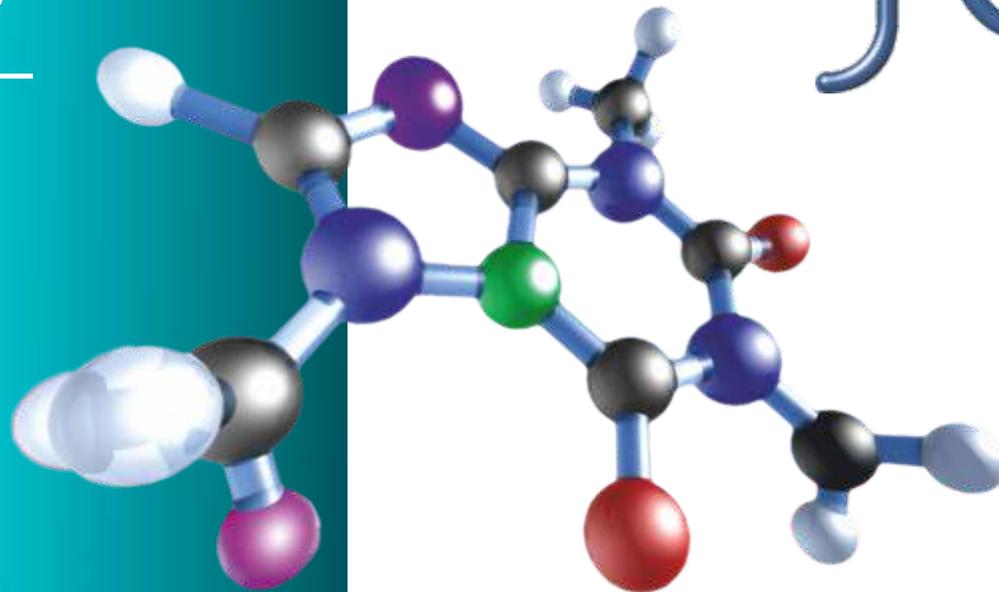
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Men & Women at all ages  
up to grade V of hair loss

Fluence  
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Therapy



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SUFFER FROM BALDNESS

**ENJOY**  
**MORE PATIENT**  
**SATISFACTION**

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Fluence Advanced Cyclical Therapy

Effective | Affordable | Proven

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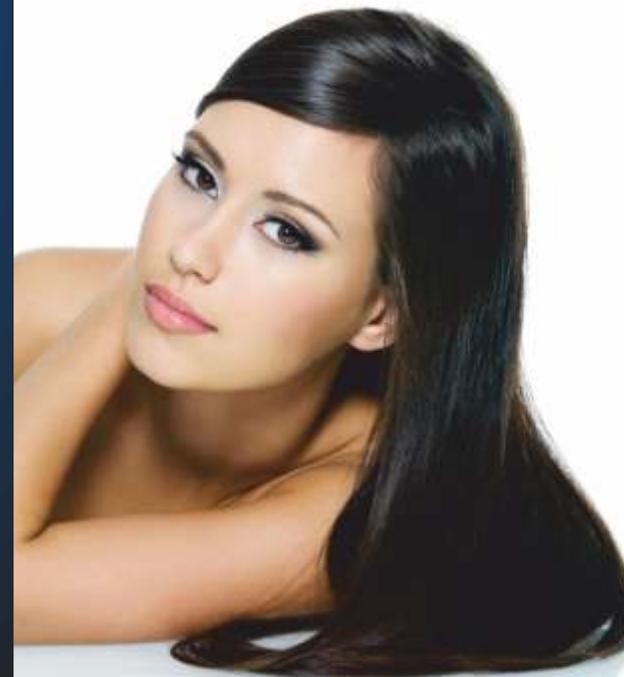


**THE FLUENT WAY TO**  
**GENERATE**  
**HAIR REGROWTH**

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Fluence Advanced Cyclical Therapy

**30%**  
**Hair Re-Growth**  
**In Just**  
**2 Months**

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## SUPPORTING HAIR WITH NUTRIENTS

**Dr Rajesh Rajput**

*This booklet is published in interest of medical profession by:*

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**Pioneers of: CYCLICAL THERAPY FOR HAIR RESTORATION**

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Surgery, ISHRS – Global Council / Fellowship  
Training Committee / Special Task Force

Pioneer, Cyclical Therapy – Hair Restoration

## CYCLICAL THERAPY

THE BACKBONE FOR HAIR  
RESTORATION

Sharing 5 Years of Experience

Welcome to the World of Medicated Aesthetic Solutions. We are committed to provide you the best remedies that work more effectively than ever before. We take care that our formulations and treatment protocols will not only produce better results but also be free from side effects. We are changing the common perception that all hair loss treatments must use hormonal medicines and have undesirable side effects. Our objective is to provide utmost satisfaction to patients and make our remedies the best choice for doctors who aspire for the wellness of their patients.



Fluence has commenced its journey with an unmatched hair regrowth regime, without finasteride. The treatment is extensively tested and clinically proven, acclaimed and published, ISHRS - USA. This cyclical hair treatment activates hair follicles, stimulates growth, strengthens the roots and protects them from damage. The treatment approach leads to hair regrowth irrespective of the cause. Patients divided by the causes of hair problems will unite by the satisfactory results from Fluence Advance Cyclical Therapy (FACT for Hair).

At any point during the treatment you can always get the support from our team of experts for handling difficult cases. Our software will capture every detail of patient conditions along with photographs. The evaluation of the patient results will be done by our expert team along with the consultant physician. Therefore every patient will be virtually under the treatment of an expert medical board.

Even patients undergoing hair transplants will have enhanced results when combined with our cyclical hair treatment. The use of FACT should be 2-4 months prior to the surgery will nourish the follicles to ensure better hair yielding capacity; prevent shock loss after hair transplant. FACT prescribed after transplantation will generate early growth, better hair quality and help to maintain the overall health and wellness of hair for a long time after the hair transplant, reducing the requirement for repeated hair transplants.

Our research team is dedicated tirelessly to constantly innovate, develop and introduce new products on hair and skin treatments. Fluence Pharma promises you the best products, protocols and ubiquitous support to provide you results and experience that you have always aspired.

Fluence Pharma has been formed with the philosophy of inclusive happiness for all. We are committed to incessantly research, innovate and develop medicines, products and protocols that are first of its kind in the market, absolutely safe and better than all existing solutions, yet affordable.

### Vision

We aspire to be one of the most admired pharmaceutical companies in the field of aesthetic medicine and general wellness across the globe.

### Mission

To continuously research Therapies, Products, Protocols and to provide safe & effective remedies for problems where safe & effective solutions are non-existent, all this with a view to improve quality of Life and bring Happiness to people.

*Dear Doctors,*

*Hair loss is apparent when a minimum of 100 is approximately lost in a day varies. The first sign of hair thinning that is noticeable is more hairs than usual left in the hairbrush after brushing, or in the basin after shampooing. If the normal volume is to be maintained, hairs must be replaced at the same rate at which it is lost.*

*In otherwise healthy individuals, nutritional factors play a role in subjects with persistent increased hair shedding. Vitamins, minerals, amino acids, essential fatty acids are prime nutrients required for hair nourishing and any deficiency implies its questionable availability. These nutrients create an environment to support hair growth and sustenance, but when co-administered could adversely interact. This is the basis of CYCLICAL THERAPY which has been pioneered since nearly 5 years ago.*

*The Frequently Asked Questions (FAQs) in this booklet are intended to unveil the importance of nutrition in human hair growth and sustenance.*

**Dr Rajesh Rajput**

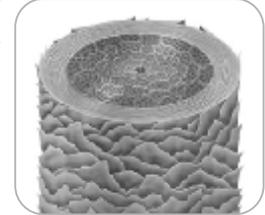
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## HAIR BASICS

### Q1. With what is hair constituted?

Hair is cylindrical, keratinous filaments skin outgrowth. Keratin, a scleroprotein or albuminoid substance, is found in dead outer skin layer, in hair cuticle and nails. There are two types of hair keratin: acidic type I (keratin 1, 2, 3A, 3B, 4, 5, 6, 7, 8) and basic type II (keratin 1, 2, 3, 4, 5, 6).<sup>1</sup>



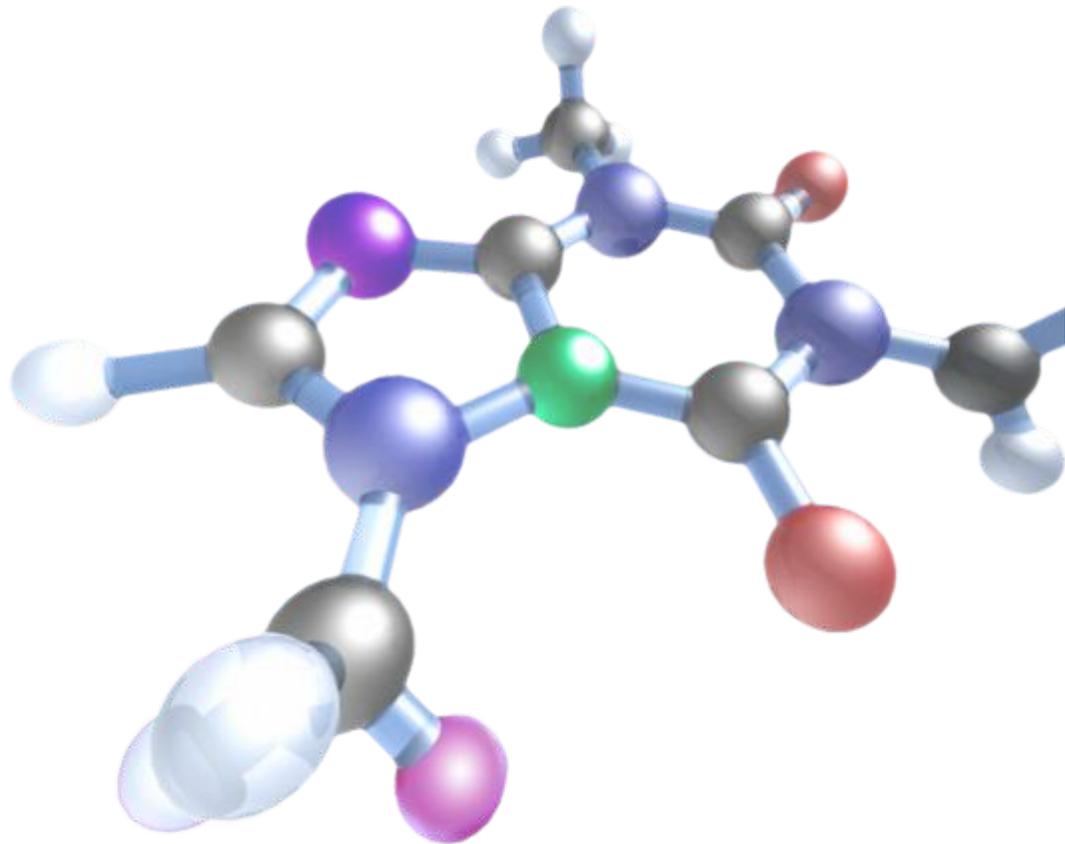
The hair follicles grow in groups all over the scalp – called 'Follicular Units'. These Follicular Units consist between 1 and 5 hairs, the average number being 2 to 3.<sup>2</sup>

### Q2. What are the growth stages for hairs?

Human hair does not grow evenly and constantly. They grow in phases, in always returning cycles.<sup>2,3</sup>

(a) ANAGEN: 1000 days or more (b) CATAGEN: 10 days (c) TELOGEN: 100 days

There is also a shedding phase, or exogen, that is independent of anagen and telogen in which one of several hairs that might arise from a single follicle exits.



#### Anagen

- ♦ Growing phase since hair can only grow in anagen.
- ♦ Hair grows for 3 to 7 years.
- ♦ Hair grows at 0.5 inch per month / 10 cms per year / upto 1 meter long possible.
- ♦ Blood supply provides nutrients and minerals to hair.
- ♦ Hairs look thick and nourished.
- ♦ 85% of hairs in this phase.

#### Catagen

- ♦ Transitional phase and lasts for 1-2 weeks.
- ♦ Production of hairs stop and hair follicles shrink to 1/6 the size.
- ♦ 2-3% of hairs in this phase.

#### Telogen

- ♦ Aged hair fall out, and new ones push themselves out of the skin.
- ♦ This final phase lasts for 3 months.
- ♦ 50-100 hairs shed daily.
- ♦ 10-15% hairs in this phase.



The cells in the hair bulb divide every 23-72 hours, faster than any other cell of the body.<sup>4</sup> The duration of each of the three phases in hair growth mentioned is specific for scalp hair; for different regions the hair cycle time stages-wise will differ.<sup>5</sup>

### Q3. How long can hair grow?

The maximum hair length that is possible to reach is about 15 cms (6 in) for infants (below the age of 1), about 60 cms (24 in) for children, and generally 100 cms (40 in) for adults.<sup>6</sup> Xie Qiuping (China) had the longest documented hair in the world, measuring 5.627 m (18 ft 5.54 in) in May 2004.<sup>6,7</sup>

On an average, hair grows at a rate of about one-half inch (1.25 cms) per month; in males, typically the hair should be trimmed every 8 weeks. This means, between cuts, the hair should have grown about an inch (2.5 cms).<sup>8</sup>

Each hair grows from the hair follicle situated within the dermis, and the number of hair follicles is fixed at birth.<sup>9</sup>



### Q4. How is hair growth facilitated?

The whole body has approximately 5 million hair follicles, and of these one million are present in the hairy scalp.<sup>10</sup> Testosterone is the main regulator of normal human hair growth. The androgens coming via blood bind to receptors in dermal papilla and influence hair growth.<sup>11</sup>

Besides testosterone, studies have demonstrated association between poor nutrition, limited food intake, and deficiencies in certain nutrients and hair thinning.<sup>12</sup>

**A disruption of the growing phase causes abnormal loss of anagen hairs.**<sup>12</sup> Thus, androgen excess and poor availability of nutrients are prime dictators of hair growth or concerns pertaining to the same – hair thinning and hair loss.

## HAIR - NUTRITION

### Q1. Why does hair loss occur?

Hair density decreases mildly as aging progresses.<sup>10</sup> At the age of 25 years the number of hair follicles decline from 1,000 per cm<sup>2</sup> to 500 per cm<sup>2</sup>.<sup>10</sup> Between the ages of 30 to 50 years, the hair density further decreases to about 300 follicles per cm<sup>2</sup>.



Hair thinning is apparent when 50% hair loss occurs;<sup>13</sup> 25% of population has hair thinning.<sup>14</sup>

Hair shedding due to emotional turmoil, medications, skin conditions, poor nutrition, infections, toxic agents, systemic diseases and illnesses can cause temporary diffuse hair thinning.<sup>15,16</sup>

### Q2. Is it to be usually expected that hair loss should occur in those genetically predisposed?

In those with familial balding, hair loss in younger age should never be taken as 'expected'. The probability of men developing pattern baldness before reaching the age of 45 is one in three. Hence, the hair loss could be due to various other reasons including medications, stress, hereditary, underlying disease, malnutrition, and so on.<sup>17</sup>

Also genes are responsible for balding in 80% and hence remaining population with hair loss and thinning have other factors which could be modifiable.<sup>17</sup> Interestingly, the human genome in deoxyribonucleic acid (DNA) was decoded in balding young man who died on Greenland's frozen west coast 4000 years ago; the DNA is nicknamed as 'INUK' by scientists responsible for the discovery.<sup>18</sup>



### Q3. Is there a relationship with 'scalp type' and hair loss?

Sensitive scalp syndrome has been described and hair loss is significantly associated with scalp sensitivity. In this syndrome, with associated hair loss, the scalp is dry in 24%, normal in 58%, greasy in 16% and mixed in 1%. The main triggering factors for sensitive scalp syndrome are considered to be pollution, heat, emotions and shampoos.<sup>19</sup>

### Q4. What is the status of hair in hair thinning and loss?

As long as the anagen phase persists, the hair stays on the scalp. Scalp hair stays in this active growth phase for 2–7 years and this is genetically determined.<sup>12</sup>

Anagen is followed by catagen and the later phase onset signals the end of active hair growth. During catagen club hair is formed over 2-week period and process entails cutting of the blood supply from the hair follicle and the cells that produce new hair.<sup>12</sup> The club hair is a dead fully keratinized hair<sup>12,20</sup> and normally 40 such club hairs per day fall off.<sup>12,21</sup>

The transition of anagen to catagen is on account of an unknown signal.<sup>12</sup> Thus, factors responsible for stretching anagen facilitate hair growth and those which shorten anagen cause loss of hair.<sup>12</sup> In hair loss or thinning, the ratio of time spent in anagen compared to telogen reduces from 12:1 to 5:1.<sup>22</sup>

#### Q 5. Which factors shorten anagen?

Deficiency of nutrients<sup>3</sup> and excess dihydrotestosterone (DHT)<sup>23</sup> accumulation in hair follicle definitely shorten anagen. DHT only shrinks the hair follicles – it does not destroy these. Eventually, the hair follicles become so small that they cannot replace lost hair. *The follicles are still alive*, but are no longer able to perform their task of holding and growing hair.<sup>24</sup>

In hair loss, blood circulation with supply of oxygen, vitamins, minerals, amino acids and essential fatty acids is missing to important regulatory structures (pilo-sebaceous bulb-unit, perifollicular connective tissue sheath, and epidermis).<sup>23</sup> It has been documented during starvation, wherein there is nutrition deprivation, and also in alcoholics, whose intake of nutrients is poor, there is noticeable hair loss in six to ten weeks.<sup>3</sup>

#### Q 6. Does dandruff affect hair growth?

Yes. In dandruff, 100-300 hairs are shed every day as compared to 50-100 each day normally.<sup>25,26</sup> Hair shedding in dandruff may be a result of alterations in the exogen phase.<sup>25</sup>

#### Q 7. What is the role of DHT in hair loss?

Usually testosterone is responsible for follicular priming whereas DHT, its metabolite, is responsible for regulating linear growth in activated follicles.<sup>27,28</sup> The normal concentrations of testosterone are 0.5-5 mcg/mL.<sup>23,29</sup>

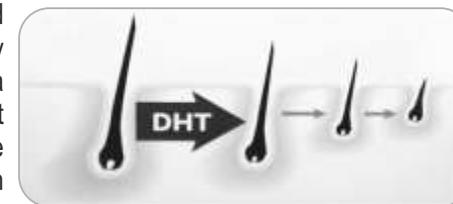
DHT is produced both<sup>23,30</sup> systemically and by intrafollicular conversion from testosterone by 5-alpha reductase (Type II) enzyme present within the hair follicle, sebocytes, follicular keratinocytes and papilla cells<sup>27,31,32</sup> of genetically predisposed men.<sup>23,33,34,35</sup> The type II 5-alpha reductase converts 4-8% of testosterone to DHT.<sup>36</sup> The normal DHT serum level is 0.25-0.75 ng/mL.<sup>32,37</sup> Also the usual DHT production rate is 674 mcg/day (28 mcg/hour) in males and 55 mcg/day (2.3 mcg/hour) in females.<sup>27,38</sup>



Testosterone is a “prerequisite”<sup>39</sup> for pattern baldness and, in males with male pattern baldness, the levels are higher 9 ng/mL.<sup>23,40</sup> Since excess testosterone results in increased conversion to DHT which is 30 times more potent androgen.<sup>41</sup> Excess of DHT causes shortening of anagen in favor of longer telogen phases.<sup>23,33,42,43,44,45</sup>

Additionally, sebaceous glands of bald scalp have greater binding affinity of receptors present with androgens as compared to hair scalp.<sup>46</sup> Thus, DHT binds more with androgen receptors in dermal papilla cells, sebocytes and basal cells.<sup>47,48</sup>

When DHT is excessively produced<sup>27</sup> and concentrations are increased (especially more than 30 ng/mL<sup>49</sup>), hair regresses to a finer, thinner texture and makes it impossible to survive!<sup>41</sup> This is because DHT induces interleukin (IL)-6 which adversely influences hair cycling by early induction of catagen.<sup>50</sup> IL-6 inhibits hair shaft elongation and also inhibits proliferation of matrix cells.<sup>50</sup>



Also DHT stimulates secretion of transforming growth factor – beta (TGF- $\beta$ ) from dermal papilla cells.<sup>51</sup> One of the mechanisms of causing hair loss is inducing oxidative stress by TGF- $\beta$ .<sup>51,52</sup>

#### Q 8. Why DHT can cause hair loss in females?

Estrogen keeps follicles in anagen; during pregnancy there is never hair loss<sup>53</sup> but during the postpartum period since the estrogen levels are relatively lower alopecia is known to occur.<sup>37</sup> Around menopause, the estrogen hormone levels in females decline. Although the quantum of androgens in females is relatively lesser as compared to in males, the declining estrogen concentrations cause an imbalance whereby even the small quantities of DHT is sufficient to cause hair loss.<sup>23</sup>

#### Q 9. Besides DHT are there any markers for assessing hair loss potential and prognosis?

Prostate specific antigen (PSA) is also a marker for androgenization.<sup>37,54,55,56</sup> Hair thinning and excessive loss of hair directly correlates with PSA levels.

For males, depending upon the age, the normal values for PSA range from 0.5-1.2 ng/mL.<sup>57,58</sup> In females the normal PSA levels are: *pre-menopause*, <0.02 ng/mL; *postmenopause*, <0.04 ng/mL.<sup>37</sup>

*menopause*, <0.02 ng/mL; *postmenopause*, <0.04 ng/mL.<sup>37</sup>



### Q 10. Which specific nutrients have been directly demonstrated to influence hair health?

A number of vitamins, minerals, amino acids, essential fatty acids and other nutraceuticals can influence hair growth.<sup>59</sup> In otherwise healthy individuals, nutritional factors appear to play a role in subjects with persistent increased hair shedding.<sup>60</sup>

#### VITAMINS

**WATER-SOLUBLE VITAMINS: B-complex vitamins** (B1, B2, B3, B5, B6, B7, B12), particularly biotin is necessary for stimulating new hair growth and preventing hair loss.<sup>61</sup> B-vitamins make the hair follicles stronger.<sup>62</sup>

**Biotin** (vitamin B7) has, in fact, been called 'hair food'.<sup>63</sup> Biotin is also called vitamin H - the H represents Haar und Haut, German words for "hair and skin".<sup>64</sup>

Biotin is important for hair growth<sup>65,66,67</sup> because it is utilized during growth of hair cells.<sup>68</sup> Marginal biotin deficiency associated with diffuse hair loss is prevalent.<sup>69</sup>

**Vitamin C**, the other water-soluble vitamin, improves blood circulation to scalp, provides antioxidant protection and helps in absorption of iron which is an essential element for hair growth.<sup>62</sup>

**FAT-SOLUBLE VITAMINS: Vitamin A** can stimulate the hair follicles to make the hair grow faster by controlling the synthesis of retinoic acid inside the follicles.<sup>62</sup> Retinoic acid stimulates hair growth via signalling mechanism and is at its peak during mid-anagen.<sup>70</sup>

**Vitamin E** is unique since it provides antioxidant protection and also enhances oxygen uptake by hair follicles.<sup>62</sup>

**Vitamin D** stimulates hair growth especially via activating the hair growth genes.<sup>62,71</sup> The life cycles of hair follicles may be regulated by vitamin D; deficiency of vitamin D promotes diffuse hair loss because of a shorter life span of hair follicles.<sup>71,72,73,74</sup>

#### MINERALS

**IRON:**<sup>37</sup> When iron deficiency develops, the synthesis of ferritin by the liver ceases. Ferritin that was located in growing follicles is released to serum to support other organ function, such as the bone marrow. As a consequence of this loss of ferritin, the follicles go into telogen phase.<sup>75</sup> Ferritin levels less than 30 ng/mL (90 pmol/L) are associated with an increase of telogen phase.<sup>76</sup> When the levels are between 40 ng/mL and 70 ng/mL (90 and 156 pmol/L), an excess of telogen hair loss is also observed.<sup>69,77</sup> Only when serum levels are greater than 70 ng/mL the hair is in normal anagen phase. Hence, iron is required to normalize serum iron as well as ferritin levels. Hemoglobin

(Hb) levels less than 12g is associated with telogen hair loss.<sup>78</sup>

**CALCIUM:** The follicles use calcium in the production of the keratinized protein that makes up the hair. This is one of the reasons why it is recommended that adequate nutrients intake, including calcium, is required for hair growth.<sup>79</sup>

**ZINC:** Amongst minerals, iron and zinc are important factors responsible for hair loss when deficient<sup>72,80,81</sup> and zinc being the most common cause – rapid responses being demonstrated from its supplementation.<sup>69</sup>

Whereas the normal anagen / telogen phase ratio is 80% / 20%, zinc deficiency can result in an abnormal 25% / 75% proportion.<sup>82</sup> Zinc concentrates in hair root and can inhibit 5-alpha reductase, the enzyme responsible for DHT concentration in hair follicles.<sup>83,84</sup> Hence, inadequate zinc availability has direct influence on hair growth.

**AMINO ACIDS:** The amino acid lysine in hair loss also appears to be important. Double-blind data confirmed the findings of an open study in women with increased hair shedding, where a significant proportion responded to **L-lysine** and iron therapy.<sup>60</sup>

**Arginine**, another amino acid, is a potent vasodilator and can increase blood flow to hair, thereby enhancing oxygen and nutrients' supply to the follicles.<sup>85</sup> Besides, arginine stimulates growth hormone<sup>86</sup> and this also plays a role in hair growth.

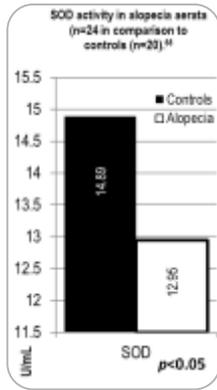
**ESSENTIAL FATTY ACIDS:**<sup>87</sup> These are fatty acids that the body needs but can't produce on its own. Essential fatty acids aid in skin and hair growth. **Omega-3 fatty acids** can help with blood circulation and cell growth, which are important for hair follicles. Essential fatty acids also help to increase nutrient absorption at the hair follicles.

Essential fatty acid deficiency can cause diffuse telogen hair shedding usually 2 to 4 months after inadequate intake.<sup>72,80</sup>

**NUTRACEUTICALS:** Although the length of anagen phase is genetically determined, it can be lengthened with the consumption of methylsulfonylmethane (MSM) which is a sulfur based compound.<sup>88</sup>

**ANTIOXIDANTS:** The body possesses endogenous defense mechanisms, such as antioxidative enzymes (superoxide dismutase, catalase, glutathione peroxidase) and non-enzymatic antioxidative molecules (vitamin E, vitamin C, beta carotene, glutathione, ubiquinone), protecting it from free radicals by reducing and neutralizing them.<sup>89,90</sup>

Lipid peroxides, which can cause free radicals, induce the apoptosis of hair follicle cells,



and this is followed by early onset of the catagen phase.<sup>89</sup> The marked alteration in oxidant-antioxidant system is responsible for alopecia.

In alopecia, there is marked decline in the concentrations of a very important antioxidant enzyme called superoxide dismutase (SOD).<sup>91</sup>

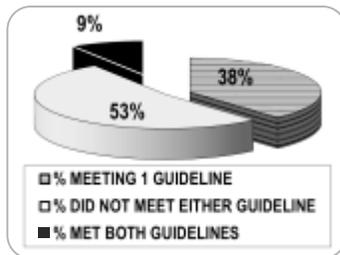
As a result, there is more production of free radicals - particularly superoxide anion. The latter mitigates the effect of DHT causing any hair to miniaturize.<sup>92</sup>

Thus intake of antioxidants is beneficial for hair growth and their sustenance.

### Q 11. Why antioxidants are to be taken when they are available in fruits and vegetables?

The latest dietary guidelines call for five to thirteen servings of fruits and vegetables a day (2½ to 6½ cups per day), depending on one's caloric intake.<sup>93,94</sup>

For a person who needs 2,000 calories a day to maintain weight and health, this translates into nine servings, or 4½ cups per day (2 cups of fruit and 2½ cups of vegetables).<sup>93</sup> Such dictate for intake of fruits and vegetables are never adhered to in real life.



**Graph:** Intake of required quantum of fruits, vegetables or both.

Less than 10% of individuals are taking 2 or more servings of fruits and 3 or more servings of vegetables daily;<sup>95</sup> hence, antioxidants are much needed to be supplemented.

### Q 12. How much is the requirement of nutrients to benefit hair growth?

The nutrients needed are to be given to fulfil the Recommended Dietary Allowances (RDAs) as specified. Intake of nutrients as per dietary needs can reverse changes occurring in hair loss.<sup>96</sup> Excessive intakes of nutritional supplements may actually cause hair loss and are not recommended in the absence of a proven deficiency.<sup>60</sup> For example, excess of vitamin A and E lead to improper keratinization of hair and cause hair loss.<sup>97</sup> Also while low levels of retinoic acid are important for sebaceous gland function, excess retinoic acid synthesis within the sebaceous gland could lead to atrophy of the gland, and reduced sebum production.<sup>98</sup>

## CYCLICAL THERAPY

### Q 1. What is cyclical therapy in hair restoration?

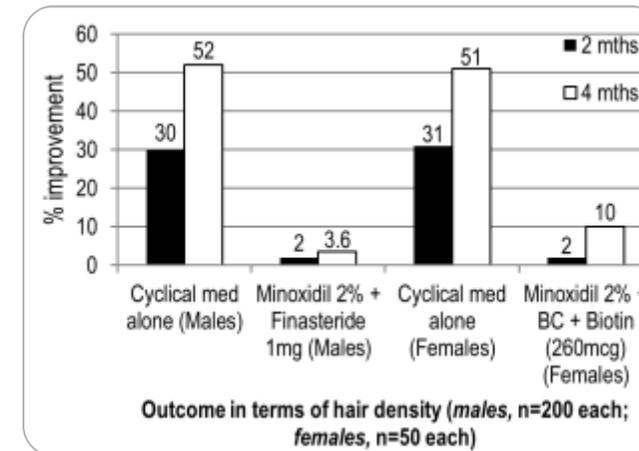
Cyclical therapy entails giving vitamins with calcium supplements on a single day, followed by iron and mineral combination product on one other day of the week and finally amino acid blend; the three regimens are so advocated that these are taken on alternate days as different nutrients such that daily dosing is avoided and so also possibility of nutrient-nutrient interaction.

### Q 2. What is the basis and genesis of cyclical therapy?

Cyclical therapy has been designed after over a decade of extensive research on patients with hair thinning and loss. The basis of cyclical therapy is that hair requires nutritional support during the anagen growth phase and also for its maintenance; without nutrients hair cannot get support and even stimulated hair growth would demonstrate disappointing eventual outcomes.

### Q 3. How effective is cyclical therapy?

Cyclical therapy has been demonstrated to provide very encouraging outcomes in most patients advocated the same.<sup>97</sup>



44% of males and 56% of females **not** on cyclical regimen did not respond at all!<sup>97</sup>

### Q 4. Is the supply of nutrients alone beneficial?

In addition to nutrients' intake, blood flow to skin must be adequate otherwise<sup>99</sup> not only will there be lack of oxygen, even transport of vitamins, minerals, etc. to hair follicles

could be compromised.<sup>100</sup> The scalp has a rich blood supply derived from both the internal and external carotid systems.<sup>22</sup> Massaging loosens the space between the scalp and skull and facilitates blood flow to the hair follicles.<sup>101</sup>

Arginine and niacin can increase blood supply to hair follicles. Vitamin E can facilitate uptake of oxygen by as much as 40% from the circulating blood.<sup>102</sup>

#### Q 5. What is the role of nutrient supplementation in hair transplant surgery?

Hair transplantation entails proper spacing of the punches so as to not compromise blood supply to the remaining scalp.<sup>22</sup> Ensuring blood flow to follicles is vital to facilitate nutrients to reach the hairs. Hence, it is critical that nutrients are supplied even in those undergoing hair transplantation if the support to hair to be provided for good quality growth.

#### Q 6. Is there a role for stem cell therapy for hair loss and baldness?

Hair transplants are still the “gold standard” for hair restoration, Hall says, but their success relies on the skill of the surgeon and a supply of healthy follicles from elsewhere on the scalp.<sup>103</sup>

The RepliCel technique was pioneered by company co-founders Rolf Hoffmann, a German dermatologist, and Vancouver researcher Kevin McElwee. Hair follicles are harvested from the back of a person’s scalp, where hair is typically resistant to the hormone that causes baldness. That tissue is transferred to the lab, where researchers isolate dermal sheath cup cells from the base of the follicle. Those cells are replicated by the millions over a period of three months, later to be injected into bald areas at the top of the scalp.<sup>103</sup>

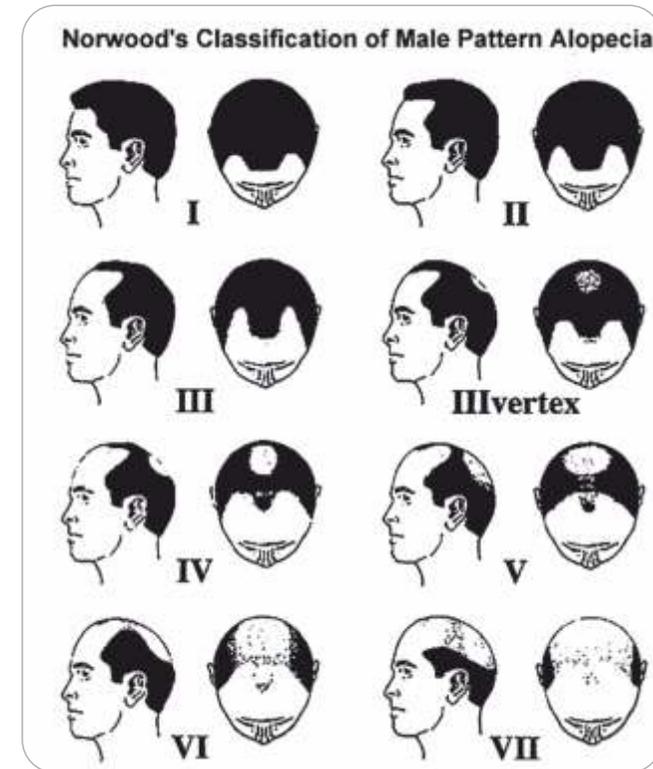
Stem cell therapy is not 100% guarantee and in about five out of seven donors, it was possible to get hairs that were induced and even grow new hair shafts. However, so far this has just been done on human skin transplanted onto mice and clinical trials are at least five years away.<sup>104</sup>

Interestingly, ultra-low-temperature storage of cells for banking purposes is now of common practice. Freezing is an insult to cells where physical disruption leading to chemical changes takes place.<sup>105</sup> One proposed hypothesis of injury during hypothermia and freezing is the formation of oxygen-free radicals.<sup>105,106,107,108,109,110</sup> Hence, antioxidants are typically added to preservation solution, including during stem cell therapy targeted for hair growth.<sup>105,111</sup> This only confirms the need of nutrients for support of follicles functioning and hair growth.

## CROWNING GLORY

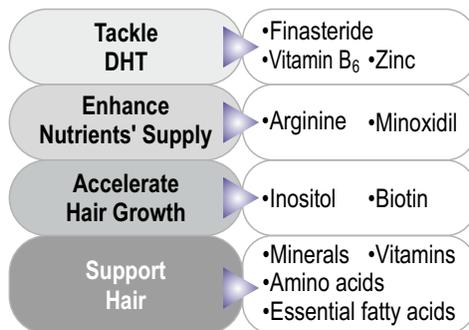
### Q. 1. What are the stages of alopecia?

The Norwood classification, published in 1975 by Dr. O'tar Norwood, is the most widely used classification for hair loss in men. It defines two major patterns and several less common types. In the regular Norwood pattern, two areas of hair loss – a bitemporal recession and thinning crown – gradually enlarge and coalesce until the entire front, top and crown (vertex) of the scalp are bald.



### Q. 2. What are the measures to be adopted to restore hair or prevent its loss?

44% have grades I to III of alopecia androgenetica and require only medical treatment. Hair transplantation is basically required in 13% cases having grades IV to VI.<sup>112</sup> Medical intervention wise there are basically three approaches for ensuring that the crowning glory is maintained, or is restored.



Zinc and vitamin B<sub>6</sub> together (in combination with azelaic acid) can diminish 5-alpha reductase activity by as much as 90%!<sup>113</sup> In addition, caffeine has also been demonstrated to counter the DHT-induced miniaturization of the hair follicle. This is because caffeine is a phosphodiesterase inhibitor which results in increased cyclic adenosine monophosphate (cAMP) levels in cells. cAMP promotes proliferation of hair by stimulating cell metabolism.<sup>23,114</sup>

### Q 3. What about the roles of minoxidil and finasteride?

Minoxidil / finasteride are two approved drugs for managing hair loss. Minoxidil increases blood flow whilst finasteride is 5-alpha reductase inhibitor and thereby blocks DHT production by 60%. However, both agents result in noticeable effects on hair growth after several weeks of use and are needed to be continued if benefits should persist.<sup>22</sup>

However, merely stimulating hair growth with minoxidil alone is not reliable since there will be stunted growth, split ends, and breakage if hair is deprived of appropriate nutrients. No matter how many different products are tried, the health of hair won't actually improve if it is not supplied the needed vitamins, minerals, amino acids, essential fatty acids, etc.<sup>115</sup>

Finasteride is usually advocated in only after class III baldness has occurred. This is the stage referred to as: 'save it' or 'shave it'.<sup>116</sup> Hence, in those with early stages of baldness measures other than finasteride are the answer.

### Q 4. What is senescence baldness and how nutrients could assist in the same?

There is even an entity known as androgen-independent alopecia or senescence alopecia. This refers to physiologic thinning of hair which becomes apparent after the age of 50 years.<sup>117</sup> In this there is a progressive decrease in number of hair follicles and hair diameter with aging.<sup>89,118</sup> Senescence-associated hair loss can be well managed with nutrients which facilitate growth of healthy hair.

### Q. 5. Which hair oil is better, if at all necessary, for hair application?

Coconut oil prevents combing damage of various hair types. Mineral oils are extensively used in hair oil formulations in India, because it is non-greasy in nature. Coconut oil is possibly the only oil found to reduce the protein loss remarkably for both undamaged and damaged hair when used as a pre-wash and post-wash grooming product. This is because coconut oil, being a triglyceride of lauric acid (principal fatty acid), has a high affinity for hair proteins and, because of its low molecular weight and straight linear chain, is able to penetrate inside the hair shaft. Mineral oil, being a hydrocarbon, has no affinity for proteins and therefore is not able to penetrate and yield better results.<sup>119</sup>

The process of swelling and deswelling of hair is one of the causes of hair damage by hygral fatigue; coconut oil, which is a better penetrant than mineral oil, may thus provide better protection from damage.<sup>120</sup>

### Q. 6. What is the advice regarding shampooing of hair?

When hair start thinning it is commonly implied that shampooing is the cause, since hairs are noticed in the tub. To prevent this, shampoo usage is often minimized. The hair that would normally come out in the shower now builds up on the scalp. With the next shampoo, even more hairs end up in the tub only confirming the myth that shampoo is the culprit. Hair loss and baldness is not due to hair falling out, but rather by normal hair gradually being replaced by finer, thinner hairs. The simple solution is to shampoo every day and the excess hair in the tub will go away.<sup>121</sup>

### Q. 7. In managing hair loss, besides hair growth, what else is required to be paid attention to?

Besides, hair growth, it is important to ensure that the quality of hair with respect to its thickness, shine, etc. is also taken care of by supply of suitable nutrient factors.

### Q. 8. Which nutrients ensure good quality hair?

Nutrients can provide excellent qualities to hair which becomes apparent in approximately 6 months of persistent use.<sup>122</sup>

**Strong hair:** pantothenic acid, biotin, inositol, para-amino benzoic acid, calcium, MSM, essential fatty acids

**Thick hair:** coenzyme Q<sub>10</sub>

**Elastic, supple hair:** pantothenic acid, selenium

**Glossy, shining hair:** pantothenic acid, zinc, coenzyme Q<sub>10</sub>, essential fatty acids

**Less dry hair:** vitamin A, calcium

**Smooth hair:** iodine, essential fatty acids

**Dark hair:** pantothenic acid, copper, arginine

**Dandruff-free hair:** riboflavin, essential fatty acids

**Q. 9. How cyclical therapy presents a new lease of life to hair?**

Cyclical therapy provides nutrients to support the hair follicle cell through the stages<sup>123</sup> of division, growth and maturation with resultant formation of keratinized cells (hair shaft) which extrudes from the follicles. Besides the various vitamins, minerals, antioxidants, amino acids and essential fatty acids provided by cyclical therapy aim to ensure superior hair quality in all aspects.

**Q. 10. Can cyclical therapy benefit pattern balding?**

Hair loss in pattern balding maybe genetic, but so also are asthma, hypertension, diabetes and so on. Similar to current management principles for tackling these other diseases, hair loss can be managed with long-term intake of nutrients to support hair and agents such as minoxidil to stimulate hair follicle for maintaining the hair cycles.

**Q. 11. Can cyclical therapy benefit balding – supposedly genetic, even in young age?**

The cycle of hair growth takes the 3-4 years to finish for the scalp.<sup>124</sup> The hair will thus experience about 25 to 30 cycles like this during a lifetime.<sup>125</sup>

The cycles are interrupted in pattern baldness – but this is not compulsory in all at young age. It usually takes 15-25 years for adults to go bald; only some men may go bald in fewer than 5 years. About three in ten 30 year-olds and half of 50 year-olds are experience baldness.<sup>126</sup>

Thus, there could be factors other than DHT which cause hair loss and theoretically there are enough cycles possible, if encouraged and stimulated, to keep a healthy head of hair until death.<sup>125</sup> Remember even in pattern baldness, the follicles are alive but cannot perform the task of producing and holding hair.<sup>127</sup>

A combination of minoxidil – which stimulates hair follicles, and cyclical therapy – which provides vital factors to sustain hair within the follicle, is ideal blend for hair restoration.

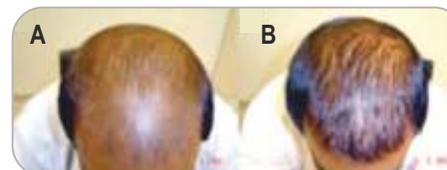
**CYCLICAL THERAPY – DOCUMENTED OUTCOMES**



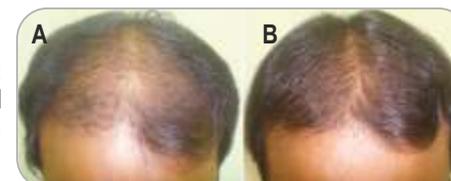
**A:** Miniaturization of hair; **B:** Miniaturization reversed within 4 months of cyclical therapy.



**A:** Polycystic ovarian disease (PCOD) hair loss; **B:** PCOD hair loss response after 4 months of cyclical therapy.



**A:** Miniaturization of hair appearing as Grade VI; **B:** Miniaturization reversed within 4 months of cyclical therapy to Grade II.



**A:** Grade IV hair loss in young patient; **B:** Improvement in 4 months with cyclical therapy.



Reversal of stress-related diffuse hair thinning within 4 months following cyclical therapy.



Reversal of Grade III pattern baldness in young patient within 4 months following cyclical therapy and laser.



Reversal of diffuse thinning in a 33 year old young patient within 4 months following cyclical therapy.

Reversal of male pattern baldness stage V within 4 months following cyclical therapy.



Gradual reversal of male pattern baldness stage VI within 4 months following cyclical therapy & laser.



Gradual reversal of crown thinning within 4 months following cyclical therapy and laser.



Reversal of asymmetric Grade III pattern baldness within 4 months following cyclical therapy & laser.



Reversal of post-pregnancy hair loss within 4 months following cyclical therapy.

Reversal of crash dieting-induced hair loss within 4 months following cyclical therapy and laser.



Reversal of thyroid imbalance-induced hair loss within 4 months following cyclical therapy.

Reversal of Grade III hair loss within 4 months following cyclical therapy.



Reversal of temporal hair thinning and receding within 4 months following cyclical therapy and laser.

Reversal of hair thinning and poor growth within 4 months following cyclical therapy and laser.



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***Notes***

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