U.S. National Institutes of Health Recognizes **Post-Finasteride Syndrome** as a health disorder

- Finasteride may alter CNS, peripheral nerves or androgen signalling pathways
- Anxiety, Depression, Sexual dysfunction, a psychic aspect
- Finasteride alters *neuro-steroid levels* in CSF & plasma which remain altered despite stopping the drug
- Activate Epigenetic switch, irreversible permanent side effects
- Studies not double blind, short term, *inadequate* design
HOW SOMETHING APPEARS IS ALWAYS A MATTER OF PERSPECTIVE.
Finasteride not always effective

- Improved in hair growth in 48% after 1 year
- Hair counts in 17% patients were lower than base counts
- Overall effectiveness of Finasteride reported 59%
- The quest for more than 59% effective option continues.
Causes for Hair loss

Degradation of Extra Cellular Matrix
Cytokines & Micro Inflammation

Dysregulation of Hair Growth Cycles

HAIR LOSS

Trying to Treat all Kinds of Hair loss
with Minoxidil & Finasteride
Hair loss is Multifactorial

1. **Genetic** – with family history or epigenetic changes
2. **Androgenic** – from increased sensitivity despite normal androgen levels
3. **Inflammatory** – Micro inflammation from continued exposure to environmental & lifestyle factors
4. **Dysregulation** – Hair Growth Cycles, imbalance between hair growth promoting & inhibiting factors
5. **Nutritional** – Iron, Vitamin B12, Vitamin D, Zinc, Selenium, Amino acid, cause hair loss
Micro inflammation

- Limited success with modulators of androgen metabolism due to sustained micro inflammation,
- Trenam CW, Blake DR, Morris CJ. Skin Inflammation: reactive oxygen species and the role of iron. J Invest Dermatol 1992
Dysregulation of Hair Growth

Aetiology pathology is unclear

- **Dawber** RP. Aetiology and pathophysiology of hair loss. Dermatologica. 1987;175 Suppl 2:23-8 - *pathophysiology of baldness is strictly a misnomer*


Hair is a Dynamic Organ

➢ High Metabolism, equivalent to Bone Marrow & Intestinal epithelium
➢ Rapid cell division for Anagen & sustained growth req. – Nutrients
Role of Nutrition

- Harrison and Bergfeld 2009, documented diffuse hair loss in calorie restriction, low fatty acids, crash dieting, starvation, zinc and iron deficiency
- Zn, Cu, Se, are required for synthesis of thyroid hormones. Hair loss will not improve with thyroxin unless supplements are added.
Nutrition alters Immunity

- Confirmed by Trüeb RM. Molecular mechanisms of androgenetic alopecia. Exp Gerontol. 2002
- Nutritional correction maintains natural immune response
Micronutrients & gene Interaction


Nutrition Research

- Indian National Science Academy (INSA) 2009 Diet Qualitatively deficient in micronutrients – Hidden Hunger
- Global Health Action. 2012 Biometry & Nutrition Group, Adolescent Micronutrient Quality Index (AMQI)
- Tupe R, Chiplonkar SA, Lactovegetarian Diet. Income-elastic protective foods leading to inadequate intake of calcium, zinc, Vit. D & B12
- 70% people are deficient in Zn, Cu, Mg, Fe, Folic acid and Iodine, consuming less than 50% of RDA
Loss of Nutritive value of foods

Various Factors causing Hair loss apart from Androgenic Alopecia

- **Internal factors** -
  - Iron, calcium deficiency
  - Vit.A,C,E,D deficiency
  - Hormonal imbalance
  - Metabolic changes
  - Stress, Anxiety, Depression
  - Siborrhoeic scalp
  - Prolonged illness
  - Certain Medications

- **External factors** -
  - Smoking
  - Lack of sleep
  - Excess heat or cold
  - Dryness, poor fluid intake
  - Poor Scalp hygiene
  - Dust, pollution, fumes
  - Endocrine disrupting chemicals
Indicators of Oxidative Stress

- Lipid peroxidation, glutathione derivatives and nitric oxide are indicators of cellular destruction by Oxidative Stress – ROS
- Significantly raised in Hair loss patients
Androgens DHT >> TGFβ1 << ROS

- **Hee CE.** The involvement of ROS on androgen inducible TGF beta 1 regulation derived from dermal papilla cells; a suggestive implication of **ROS on androgenetic alopecia**. Journal of the American Academy of Dermatology. 2008
- **Shin H¹, Yoo HG, Inui S, Itami S, et.al.** Induction of TGFβ1 transforming growth factor-beta 1 by androgen is mediated by ROS, reactive oxygen species in hair follicle dermal papilla cells. BMB Rep. 2013 Sep.
- Proves Antioxidants can prevent release of TGFβ1
- Genetic Sensitivity cannot be corrected but external factors influencing the outcome can be understood and corrected
ROS Binds Intracellular Proteins

- Kalkan, Seçkin et.al. *Int J Clin Exp Med*, 2015,
- ROS forms **covalent bond with proteins** in the cells,
- changing their **immune signature** to be recognised as new hair follicle **antigens**
- making them **targets of immunity, inflammation and autoimmune reactions**.
- rationale, for **benefit of antioxidants** in hair loss and **alopecia areata**
- Antioxidants can help in preventing micro inflammation and autoimmune reactions.
Dr. Yoshinori Ohsumi, Japanese scientist who defined and studied the role of – AUTOPHAGY –

Autophagy is partial self destruction or regulated break down of intracellular organelles to recover nutrients, minerals, amino acids in conditions of deficiencies to compensate and provide requirements for vital cellular functions.

Low nutrient levels are compensated by Autophagy and by arresting the growth of new hair.

Thus you do not find clinically low levels in hair loss patients.
Autophagy in energy, nutrition & mineral deficiencies

- Nutritional correction can prevent cellular destruction, restore cellular structure and function back to normal
Evaluation of Minerals in Hair loss

- P. Ozturk et al. BMI and levels of Zn, Cu, in hair, serum and urine of male patients with androgenetic alopecia. Journal of Trace Elements in Medicine and Biology 28 (2014) 266–270
- Zn prevents oxidative destruction by free radicals
- Zn, Cu, are required for enzymatic functions of Carbonic anhydrase, Superoxide dismutase, Polymerase, Collagenase, Cell division, Nucleic acid metabolism, coenzymes and antioxidant activity
- Skalnaya et al. showed a lower copper and zinc content in the hair of frontal area in comparison to the occipital area in women with AGA
Vitamin A, Vitamin D, Vitamin E


- Beoy LA, Woei WJ, Hay YK. Effects of Tocotrienol Supplementation on Hair Growth in Human Volunteers. Tropical Life Sciences Research. 2010;21(2):91-99. Tocotrienol and Alpha Tocopherol resulting into 34% improvement in hair counts attributed to potent inhibition of lipid peroxidation and reduction of oxidative stress

- Excess Vit. A, D, E, Omega 3 interfere with keratinization leading to hair loss instead of hair growth
Cyclical Vitamin Therapy

- Multiple Nutrients together interfere with the absorption & efficiency
- Mon & Thu: **Antioxidants**, Calcium, Omega-3
- Tue & Fri: Iron, **Folic acid** & Vit. C
- Wed & Sat: **Aminoacids**, B-Complex & **Biotin**

Iron & Calcium on different days - chelate, reduce efficiency 40%
- Low dose, once in 3 days, safe, lower cost, meets all body req.
- Therapeutic or **Treatment** dose & Prophylactic or **Preventive**
- 2% Ketoconazole shampoo every 3 – days – helps in hair growth
- **Minoxidil or Peptide** local application - everyday
- **Diet** & Lifestyle modification.
- Combined with **LLLT**, PRP, Growth factors, Hair Transplant
Mucosal blocks from daily Iron

- Viteri FE, Xunian L, Tolomei K, et al. True absorption and retention of supplementation iron is more efficient when iron is administered every three days rather than daily to iron-normal and iron-deficient rats. J Nutr 1995;125:82-91.
Daily Calcium reduces Iron


Reduced uptake – Prooxidant


Hair loss from regular multivitamins

- Reported Hair loss from Commercial Multivitamins
- Formulation of 16 vitamins, 12 minerals and trace elements, 18 amino acids, 3 essential fatty acids, Spirulina, coenzyme Q₁₀, and anti-oxidants
- Leading to Selenium toxicity and hair loss
Hereditary Hair loss can be treated

- Hereditary **Diabetes, Asthma, Hypertension, Cardiac disease**, can be treated - Why not Hair loss?
- Hereditary hair loss is Androgenic Alopecia and can be definitely treated.
- Hereditary comes in 40s – why at a younger age?
- Genome – not one gene – multifactoral – genetic & environmental influence
Peer Reviewed Publications

- **Cyclical Medicine for Hair loss Management and Improving Results in Hair Transplant.** Published in the Hair Transplant Forum International, Nov 2008.

- **Controversy: Is there a Role for Adjuvants in the Management of Male pattern hair loss?** Published in Journal of Cutaneous and Aesthetic Surgery, May 2010.

- **Understanding Hair Loss due to Air Pollution & the Approach to Management.** Hair Therapy & Transplant. March 2015.

Peer Reviewed Publications

Cyclical Vitamin Therapy can deliver Hair Growth in 2-4 months without any Anti Androgens and without any Side effects in Men & women.