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## **Progenic hair regrowth treatment- The use of platelet-released growth factors for treating androgenetic alopecia (AGA) by activating hair follicle stem cells**

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**A**ndrogenetic Alopecia (AGA) is a common disease affecting over 50% male population over 50 years old in the United States. The main molecular pathway has been accepted that 5-alpha reductase in the fast growing cells outside dermal papilla of hair follicle converting testosterone into dihydrotestosterone (DHT). DHT then binds androgen receptor and the complex of which next binds DNA in cell nucleus, resulting in growth arrest of follicle cell and gradual decrease of protein synthesis. Such molecular pathway prevents vellus hair growing into terminal hair in the next shortened anagen phase. Cotsaralis and his team (2011) discovered that hair follicle stem cells resided at bulge area of follicle are the same in number in bald and in normal scalp of human samples. The difference is that due to some kind of abnormality of stem cells, they fail to convert into progenetic cells. Earlier study suggested a common microinflammation and fibrosis in AGA resulted in fibrosis of outer root sheath fiber that activating growth factor signals were unable to trigger hair follicle stem cells that telogen follicle became unable to transform into next anagen phase.

Tomita et al (2006) discovered that PDGF isoforms (AA & BB) induce and maintain anagen phase of murine follicle. Horsley et al (2011) advocates that PDGF is capable of inducing telogen follicles into anagen phase and the concentration of which is dose-dependent.

**Based on the above findings, we designed an advanced hair regrowth course with 3 major focus:**

1. Activation of bulge Hair Follicle Stem Cells
2. Blockage of 5-alpha-reductase pathway
3. Control of chronic micro inflammation and fibrosis

We delivered PDGF (Platelet Derived Growth Factor) and VEGF (Vascular Endothelial Growth Factor) isolated from platelet after lyophilization, gamma radiation and then revitalization with normal saline solution. The delivery method evolved from micro-needling to needle free electroporation. Global images, and tricoscopy of each treatment are recorded for comparison and validation of course effectiveness. A hair growth course of 4 delivery is indicated for each patients on monthly basis subject to the final finding whether hair density reach 120 hairs per square centimeter. If not, additional delivery is indicated. Total new hair gain is calculated by new hair density multiplying affected region during and at the end of the course.

So far, over 400 patients have receive growth factor treatment since May 2010. New hair growth has been confirmed in all patients by tricoscopic examination at the second treatment 21~30 days later. The delivery of the above growth factors has been effective that we noticed prompt growth of new hair as early as 3 weeks in young patients and 4 weeks in mid-aged patients. New hair growth (5~15 hairs per square centimeter) is observed regularly. Total new hair gains of, 6,000~12,000 new hairs have been confirmed at end of the 90~120 days course.

Addressing the need for blocking 5-alpha-reductase pathway and controlling follicle microinflammation, a hair care solution containing azelaic acid, saw palmetto extract, grape seed extract, green tea extract, morinda officinalis extract, is applied topically once daily during and after the entire course. Shall a severe microinflammation is observed, a foam steroid is also prescribed. We are pleased with the treatment result of Progenic Hair Treatment as it provides effective solution to the main molecular pathways that have caused hair loss in AGA progression. The longest treatment follow-up has been 24 months and the patient has been satisfied with his result. Surprisingly, we noticed hair regrowth in bitemporate regions with our designed treatment where existing medications neither Minoxidil nor Finasteride proved effective. We believe that Progenic treatment provide a satisfactory solution to AGA population with promising expectations.

### **Biography**

Jack Sung has graduated from Chinese Culture University in 1982 at the age of 22. He has dedicated to medical device industry for more than years in product study, design, and marketing of biomaterial. He is the hair therapy instructor of Taiwan Society of Trichological and Anti-aging Medicine, and China Cosmetology and Hair Transplant Association.

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