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Progenic hair regrowth treatment- Reversing hair graying by activating melanocyte stem cells of hair follicles with platelet-derived growth factor (PDGF)

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Hair Graying the most obvious sign of human aging and is becoming more and more popular at young population of Age 30. In 1956, Harman et al. first proposed the '*free radical theory of aging*', which is widely accepted to explain hair graying phenomenon. Wook et al. have recently demonstrated that the accumulation of hydrogen peroxide (H₂O₂) in human white scalp hair shaft in millimolar concentration, with the absence of catalase and methionine sulfoxidereductase (MSR) protein expression. The function of key melanogenesis, tyrosinase, is limited which leads to the eventual loss of hair color. While the entire hair follicles are subject to H₂O₂-mediated stress, it becomes natural to assume that other proteins, including antiapoptotic Bcl-2 protein are targets for oxidation. Nishimura et al. (2005) have also demonstrated that hair graying may be caused by defective self-maintenance of melanocyte stem cells, and not of differentiated melanocytes. Such process was dramatically accelerated with Bcl-2-deficiency, which causes selective apoptosis of melanocyte stem cells. Mayumi et al.(2011) have recently identified Wnt signal secreted by EpSCs at the onset of hair regeneration, demonstrated that WpSCWnt activation in McSCs drives their differentiation into pigment-producing melanocytes, while EpSCWnt signaling not only dictates hair follicle formation but also regulates McSc proliferation during hair regeneration. 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 major focus on the activation of bulge Hair Follicle Stem Cells. Thus, we wonder if we can activate EpSC to induce regeneration of new follicles, we maybe also activate McSCs to create new melanocytes and to reverse hair graying. 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 received growth factor treatment since May 2010, while new hair formation has been confirmed in all patients, and to our surprise, many of which show sign of pigment reproducing 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. We noted new pigmented hair with unpigmented tip in all patients at 30 day intra-treatment findings. The continued turnover of gray hairs into black hair has been observed 12 months after the termination of treatment. There is a portion of of white old hairs that may not covert to pigmented hair due to complete loss of McSCs. Progenic Hair Treatment provides promising solution to the reversal of hair graying by activating Melanocyte stem cell and the renewal of old white hairs with new-born black hairs. However, these new-born hairs are sensitive to the attack of oxidative stress that further daily anti-aging hair care treatment is necessary to the long-term success.

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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