



Hair Growth Enhancement Through Hair Follicle Stem Cells Stimulation

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DESCRIPTION

To prevent the PGE2 molecules from degrading quickly *in vivo*, PGE2 is conjugated with collagen using crosslinkers to create a PGE2 matrix. The architecture of hair follicles, the dynamic expression of hair follicle stem cell markers, and important regulators in the hair growth cycle were investigated under various PGE2 matrix treatments. Our findings indicated that enhancements in hair follicle stem cells, including Sox9+ and Lgr5+ cells, have also been validated as therapeutic benefits. From basic to clinical research, scientists have been focusing on hair regeneration for hair homeostasis. With the use of delivery methods like microneedles, liposomes, and nanoparticles, hair transplant technologies, stem cell therapy, and medication therapy have all advanced significantly to date. In more detail, hair follicle cloning or hair follicle stem cell activation are the main components of stem cell treatment. However, the Food and Drug Administration (FDA) has only authorised minoxidil and finasteride as drugs. The ideal therapeutic approaches typically produce only transient therapeutic effects or a variety of negative side effects

Molecular prostaglandin is involved in the control of hair development and differentiation, according to evidence from prior studies. The influence of prostaglandin D2 and prostaglandin F2 on hair development is completely opposite. Another prostaglandin, PGE2, has also been discovered to shield animals against radiation-induced alopecia, albeit no studies have explicitly shown the mechanisms underlying this shift. The ubiquitous nuclear protein High Mobility Group 1 (HMGB1),

which is liberated from cell nuclei upon tissue damage, promotes hair development by secreting PGE2 from Human Dental Pulp Cells (HDPCs). Additionally, increasing PGE2 levels is one of the ways that minoxidil, castor oil, or omeprazole promote hair growth. Arachidonic Acid (AA) serves as the source of prostaglandins, which are produced by the appropriate prostaglandin synthase. PGE2 is one among them, and its molecular structure mediates a wide range of physiological and pathological functions, including inflammation, fever, and pain. It's interesting that in recent years, it has prompted commendable measures in the regeneration field. As a result, created a specific sort of matrix containing PGE2 and further examined its impact on hair growth, which may one day lead to novel therapeutic suggestions for hair diseases. Given that activated or inhibited signals influence the formation of hair follicles, further investigated the changes in the expression of associated factors.

In this study, found that the PGE2 matrix stimulates Sox9 and Lgr5 expression and promotes hair development with a significant percentage of hair follicles in the early anagen phase. To prevent the PGE2 molecules from degrading quickly *in vivo*, PGE2 is conjugated with collagen using cross linkers to create a PGE2 matrix. The architecture of hair follicles, the dynamic expression of hair follicle stem cell markers, and important regulators in the hair growth cycle were investigated under various PGE2 matrix treatments. Our findings indicated that enhancements in hair follicle stem cells, including Sox9+ and Lgr5+ cells, have also been validated as therapeutic benefits.

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