
Subject: Promotive effect of minoxidil combined with retinoic acid on hair growth

Posted by [H_U_82](#) on Mon, 30 Apr 2007 13:36:57 GMT

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Promotive effect of minoxidil combined with retinoic acid on hair growth

Posted on April 30th, 2007 in Hair Loss Studies by admin | 3 Views |

It's been well documented that using minoxidil (Rogaine) in combination with retinoic acid (Retin-A) is more effective than just using minoxidil on its own.

Korean researchers set out to determine why this is. They used human hair follicles that were cultured in a lab to test the growth response to minoxidil and to a combination of both minoxidil and retinoic acid.

Their tests confirmed that the combination of retinoic acid and minoxidil was more effective than minoxidil on its own.

After evaluating the various cells and growth factors before and after the solution was applied they were able to determine that the combination works in two different ways.

1. Promoting the growth of cells more effectively than minoxidil alone.
2. Prolonging the lifespan of the dermal papilla and epithelial cells by preventing premature cell death.

Promotive Effect of Minoxidil Combined with All-trans Retinoic Acid (tretinoin) on Human Hair Growth in Vitro.

J Korean Med Sci. 2007 Apr;22

Kwon OS, Pyo HK, Oh YJ, Han JH, Lee SR, Chung JH, Eun HC, Kim KH.

Department of Dermatology, Seoul National University College of Medicine, Laboratory of Cutaneous Aging and Hair Research, Clinical Research Institute, Seoul National University Hospital, Institute of Dermatological Science, Seoul National University, Seoul, Korea.

Minoxidil induces hair growth in male pattern baldness and prolongs the anagen phase. All-trans retinoic acid (ATRA) has been reported to act synergistically with minoxidil in vivo: they can enhance more dense hair regrowth than either compound alone. We evaluated the effect of minoxidil combined with ATRA on hair growth in vitro. The effect of co-treatment of minoxidil and ATRA on hair growth was studied in hair follicle organ culture.

In cultured human dermal papilla cells (DPCs) and normal human epidermal keratinocytes, the expressions of Erk, Akt, Bcl-2, Bax, P53 and P21 were evaluated by immunoblot analysis.

Minoxidil plus ATRA additively promoted hair growth in vitro, compared with minoxidil alone. In addition, minoxidil plus ATRA elevated phosphorylated Erk, phosphorylated Akt and the ratio of Bcl-2/Bax, but decreased the expressions of P53 and P21 more effectively than by minoxidil alone. Our results suggest that minoxidil plus ATRA would additively enhance hair growth by

mediating dual functions:

1) the prolongation of cell survival by activating the Erk and Akt signaling pathways, and 2) the prevention of apoptosis of DPCs and epithelial cells by increasing the ratio of Bcl-2/Bax and downregulating the expressions of P53 and P21.

Source: PMID 17449938

<http://news.hairlosshelp.com/hair-loss-studies/promotive-effect-of-minoxidil-combined-with-retinoic->
