



MASSACHUSETTS GENERAL HOSPITAL

Blood Vessels Hold Key to Thicker Hair Growth

BOSTON - February 2001, Harvard Medical School affiliate Massachusetts General Hospital - Researchers at Massachusetts General Hospital (MGH) have been able to grow hair faster and thicker on mice thanks to a protein that promotes blood vessel growth in their skin. The mouse hair follicles – while no greater in number than those of normal mice – are individually bigger. Collectively, they increase the total volume of hair by 70 percent the MGH research team reports in the Feb. 19 *Journal of Clinical Investigation*.

If the protein has the same powers in humans, it could lead to the first angiogenic therapy for male pattern baldness. "In male pattern hair loss, it's not that the follicles are gone. They're just miniature follicles," says Michael Detmar, MD, associate professor of dermatology at MGH and lead author on the study. "If anyone could find a way to make the follicles bigger, men might grow hair again."

The discovery that increasing blood flow to the scalp helps stave off baldness may be old news to many barbers. For years, they have been advising clients to massage their scalps as way of stimulating circulation and hair growth.

A few scientific studies have suggested that people with hair loss may have fewer blood vessels. But no one had actually measured how closely blood vessel growth is correlated with hair growth, or what might cause scalp vessels to grow in the first place.

To explore these questions, Kiichiro Yano, a research associate in dermatology at MGH, and his colleagues compared two groups of mice, one normal and one genetically programmed to produce an abundance of a protein known to trigger blood vessel growth, VEGF. The VEGF-enhanced mice grew hair faster and thicker in the first two weeks of life than did the control mice.

The VEGF-enhanced mice also regrew hair faster. Shaved 8 week-old VEGF-mice not only grew hair back sooner, they exhibited a 30 percent increase in hair follicle diameter 12 days after depilation. "By overall volume, the hair was about 70 percent thicker than in wild-type mice," says Detmar.

Blood vessels located in the skin surrounding the pumped-up hair follicles were 40% larger in diameter than those found in normal mice, suggesting that the VEGF-mediated angiogenesis was causing the hair to grow faster and thicker.

When normal mice were treated with an antibody that blocks VEGF activity and then shaved, their hair grew back slower and was thinner than their untreated littermates. Twelve days after depilation, the VEGF-deprived mice still displayed bald spots and overall reduced hair growth. "So by modulating VEGF, we can directly influence the size of the hair," says Detmar.

As for how the VEGF-inspired blood vessels are plumping up the hair shafts, the researchers believe they may be delivering an extra supply of growth factors, in addition to oxygen and nutrients.