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Coenzyme Q10 has anti-aging effects on human hair

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Ubiquinones are the most widespread and therefore best investigated bioquinones. Due to their hydrophobic isoprenoid side chain, ubiquinones can be solubilized in organic solvents or lipids but are insoluble in water. Using a specific emulsifier system it has been possible to deliver positive effects to biological systems also from aqueous formulations. Ubiquinone-50, also referred to as coenzyme Q10, is well known in cosmetic science and especially in skin care because of its antioxidant activity. It is found in the membranes of peroxisomes, lysosomes, vesicles, the endoplasmic reticulum and notably in the inner membrane of the mitochondrion, where it is an important part of the electron transport chain. Using coenzyme Q10 in the proposed emulsifier system we could show that the molecule not only has relevance as an anti-aging bioactive in skin care but also has positive effects on the human hair follicle. The hair follicle is a complex mini organ and synthesis of hair keratin, the major component of hair fibers, is an essential prerequisite for the growth of strong and healthy hair. But like all biological systems the hair follicle, the biologically active part of the hair, also undergoes an aging process associated among other things with a decline in certain hair keratins. Due to this age-related shift in basic structural proteins of the hair shaft, mature hair often becomes fragile and difficult to manage. Therefore it is a challenge for cos-

metic science to provide bioactives to fight age-related changes and maintain a youthful appearance of hair. Using cultivated hair follicle keratinocytes we identified coenzyme Q10 as a potent bioactive that stimulates the gene expression of different hair keratins, especially those which are reduced during aging processes in hair follicles. These results led us to investigate a shampoo and a tonic formulation enriched with coenzyme Q10 in a placebo-controlled panel study. In a left/right comparison a group of healthy volunteers older than 40 years of age applied the formulations daily for 4 days. Throughout the test period the gene expression of different hair keratins from plucked hair follicles was determined using quantitative polymerase chain reaction techniques. Subsequent statistical analysis revealed an increase in age-relevant hair keratins in human hair roots treated with coenzyme Q10, thus pointing out the striking benefits of coenzyme Q10 in hair care formulations. We conclude that coenzyme Q10 is an ideal ingredient for hair care formulations, providing anti-aging properties through activation of specific keratins aligned with the needs of mature hair. hair follicle, aging, outer root sheath keratinocytes, keratin synthesis

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