Hair Aging and Anti-Aging
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The appearance of hair plays an important role in people's overall physical appearance and self-perception. With today's increasing life-expectations, the desire to look youthful plays a bigger role than ever. The hair care industry has become aware of this and is delivering active products directed towards meeting this consumer demand. Besides the aesthetic problem of aging hair and its management, the study of hair aging focuses on the biological problem of hair aging, in terms of microscopic, biochemical and molecular changes. The discovery of pharmacological targets and the development of safe and effective drugs indicate strategies also of the drug industry. Hair aging comprises weathering of the hair shaft, decrease of melanocyte function, and decrease in hair production. The scalp is subject to intrinsic and extrinsic aging. Intrinsic factors are related to individual genetic and epigenetic mechanisms with interindividual variations: prototypes are familial premature graying, and androgenetic alopecia. Extrinsic factors include UV-R and smoking. Experimental evidence supports the hypothesis that oxidative stress plays a role in hair aging. Reactive oxygen species are highly reactive molecules that can directly damage cellular structural membranes, lipids, proteins, and DNA. Currently available pharmacologic treatment modalities with proven efficacy for treatment of androgenetic alopecia are minoxidil and finasteride. Topical anti-aging compounds include photoprotectors and antioxidants. New insights into the role and prevention of oxidative stress could open new strategies for intervention and reversal of the hair graying process and age-dependent hair loss. Finally, topical liposome targeting for melanins, genes, and proteins selectively to hair follicles, the role of hair follicle stem cell types, and biogenineering the hair follicle are currently under investigation for maintenance of healthy and beautiful hair in the young and old.