

Abstracts

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Characterization of Eluted Proteins from Hair Fiber under Permanent Waving or Bleaching*
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Protein is the most abundant component (65-95%) of hair, and has been targeted as an important subject for hair science research. Chemical treatments, such as permanent waving or bleaching, are widely known to be a major cause of hair damage. However, the constituent proteins in the effluent from these treatments have not been characterized in detail. In this study, we performed Tricine-SDS-polyacrylamide gel electrophoresis for detailed analyses of the proteins eluted under various chemical treatment conditions. Effluents from permanent waving or bleaching showed similar electrophoretic profiles, and both types contained a major protein band of approximately 7kDa. Through immunoblot analyses, this protein band was identified as ubiquitin, a ubiquitously distributed protein that mediates non-lysosomal protein degradation in eukaryotic cells. Comparative analyses of the ubiquitin-signal-intensities revealed that natural hair extracts derived from distal parts contained a lower ubiquitin content than those from proximal parts. These results suggested that ubiquitin was released during the course of natural occurring hair damage. Therefore, we speculated that the major components lost from hair were likely to be soluble proteins that were neither keratin intermediate filament proteins nor keratin associated proteins.

The Method of Evaluation for Facial Sag by the Analysis of Topography around Nasolabial Groove*
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Facial sag becomes tangible accompanied with aging. We have previously reported a usefulness of photonic scale for facial sag evaluation. In this paper, we investigated the quantitative method to evaluate facial sag precisely using a moire 3-dimension

camera system. The subjects whose sag scores increase followed by age were photographed by moire 3-dimension camera. When an arbitrary 3-dimensional point (a, b, c) was chosen on the facial skin under a nose, a curve of facial outline was obtained as a 2-dimensional curve on xz-plane ($y=b$) that includes the point (a, b, c). This curve includes a morphological structure of nasolabial groove. Then we determined their differential curves and their maximum peaks around nasolabial groove to analyze changes of facial morphological structure, followed by a confirmation of the high correlation between the maximum peak value of differential curve and age or sag score. Furthermore, we compensated the maximum peak value of differential curve on the basis of its differential value of the central side around nasolabial groove in order to standardize the individual topographic differences. As a result, the strong correlation between these peaks and age or sag score was revealed. These results suggested that the nasolabial groove can represent the facial sag and that evaluation of the nasolabial groove is a very useful way. Moreover, because of its high ability of quantification without any proper experiences, this method is very useful for sag evaluation.

Evaluations of Appearance of the Foundation Applied Skin and Some Ideas for Improvements of Long Lasting Performance*
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'Long lasting performance' is one of the important qualities for make-up cosmetics. The long lasting performance also has been understood as a total quality of the make-up appearances last long, has been evaluated mainly using the sensory analysis. In this report, for some evaluation ways of the make-up appearances and the long lasting performances, on the make-up foundation case, will be introduced to sensory analysis, an optical measurement and some substitute properties. Moreover, it will be introduced to the improvement technologies for aspects of the application techniques and the applied ingredient properties.

* These abstracts appear exactly as they were originally published. They have not been edited by the *Journal of Cosmetic Science*.

Basic Characterization of Poly(MPC-co-BMA) and Its Application to Hair*

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We have synthesized the amphiphilic polymer, poly[2-methacryloyloxyethyl phosphorylcholine(MPC-co-butylmethacrylate(BMA))], and clarified its unique properties in comparison with commercial moisturizing agents. In hair care studies, the treatment of hair with poly(MPC-co-BMA) made it smooth and increased its strength and water content. This compound protects hair and skin from damage rather than having a curing effect.

Controlling Fibroblast Growth Factors for Hair Growth Regulation*

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Although much research on the process of hair growth has been conducted in recent years, there is still no effective remedy for alopecia today. One reason is the lack of complete understanding of the mechanism of hair loss. Recent studies have revealed that the fibroblast growth factor-5 (Fgf-5) gene affects hair growth regulation. Moreover, it has been discovered that a short form of FGF-5 protein known as FGF-5S is produced by the Fgf-5 gene, but its effects on hair growth regulation have not been reported. We previously reported that FGF-5 and FGF-5S are located respectively in the round macrophage-like cells and hair follicles. The FGF-5-positive cells shift from dermis to panniculus adiposus during the catagen phase of the hair growth cycle, and the production of FGF-5S increases during the later half of anagen. In this study, we investigate the effects of FGF-5 and FGF-5S on the hair growth cycle. Through subcutaneous injection of FGF-5 into the dorsal region of mice, we discovered a significant inhibition of hair growth during anagen and promotion of the transition into catagen. Surprisingly, FGF-5S by itself did not affect hair growth; but when combined with FGF-5, it clearly inhibited the catagen-promoting activity of FGF-5. Our experimental results suggest that the FGF-5-positive cells shift to panniculus adiposus during catagen in order to gather around dermal papillae in which the FGF-5 receptor is expressed, and ultimately induce catagen. Clearly, FGF-5S suppresses FGF-5 activity until the onset of catagen, and alopecia is induced when the localization of the FGF-5-positive cells and/or FGF-5S production is disordered. Our results suggest the interesting possibility that by controlling and balancing the ratio of these two growth factors, a more effective preparation for treating alopecia can be developed.

Effect of Aloe arborescens Miller. on Hyaluronic Acid Synthesis by Dermal Fibroblasts*

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It is well known that characteristic changes in facial appearance, wrinkles and sagging, are caused by aging. It has been considered that the structural changes in dermal matrix is responsible for these changes. Hyaluronic acid is one of the components of the dermal matrix, and plays an important role in moisturizing skin. In aging skin, it has been reported that normal hyaluronic acid is decreased by binding to surrounding protein. This decrease of normal hyaluronic acid might be one of the reasons that elderly people experience decreased water contents in the skin. We focused on the regulation of hyaluronic acid synthesis in human dermal fibroblasts in order to improve the skin condition of elderly subjects. We searched for substances that have an activity to stimulate hyaluronic acid synthesis and chose the four plant extracts. Of the four, we found that Aloe arborescens Miller. extract stimulated hyaluronic acid synthesis most potently. Then, to clear active substances in that Aloe arborescens Miller., each fraction was separated by using column chromatography. It was found that the highest polar fraction potently stimulated hyaluronic acid synthesis. Furthermore, the effective fraction showed an increase of hyaluronan synthase (HAS) 2mRNA expression.

Application of Ester Quats as Hair Conditioning Agents*

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Biodegradable quats, such as monoethanol ester diethyl monomethyl ammonium chloride (MEC) and diethanol ester dimethyl ammonium chloride (DEC) are expected as new ingredients for hair conditioners, while monoalkyl trimethyl ammonium chloride (MAC) and dialkyl dimethyl ammonium chloride (DAC) have been widely used as hair conditioning agents. We investigated properties of MEC and DEC (ester quats:EQ) in comparison with MAC and DAC (alkyl quats:AQ) for hair conditioner application. EQ showed good water holding ability and adsorption property on keratin powder compared with corresponding AQ. These results seemed to relate to the ester linkages of EQ. Bending moment of hair treated by AQ was better than that of EQ, however, it was found that DEC is comparable to MAC. The result of sensory evaluation suggested that EQ are possible ingredients for hair conditioners. These findings would promote development of hair conditioners with EQ. Especially, it is considered that DEC is new and unique ingredient for hair conditioner.