

Abstracts

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Preparation Technique for Size-Controlled Emulsions and Their Application for Cosmetics

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In this article, new preparation techniques for size-controlled emulsions and their functions are described. Two preparation methods for nanoemulsions are discussed. The condensation method involves cooling single-phase microemulsions to a temperature below the solubilization phase boundary. The key process of the the second dispersion method is the homogenization of coarse emulsions with water phases containing large amounts of water-soluble solvents by a high-pressure homogenizer. An aqueous wax nano-dispersion was prepared through a cooling procedure of microemulsions. O/W cream containing surfactant and fatty alcohol also became transparent with a low viscosity through the reduction of emulsion droplet size. This technology could give lotion type cosmetics an excellent function that can be found in O/W cream. On the other hand, an extra large size emulsion (visible size emulsion) consisting of amphiphilic solid oil and liquid oil was developed. This formulation could provide a freshening feel in the early stages of application and an emollient feel after rubbing into the skin due to the

extra large size of the emulsion. Although retinyl acetate was unstable against hydrolysis, the reduction of the oil/water interface area achieved by enlarging oil droplet size was also effective against hydrolysis.

The Dyeing Mechanism of Oxidative Hair Color in White and Black Human Hair

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The staining mechanism of oxidation hair color on white hair and black hair in the same person was studied. The quantitative analysis using ICP MS showed that the content of metals in the white hair was much less than that of the black one. This was due to low level of melanin granules in the white hair, one of the predominant structures containing metals, that was observed with TEM and EDS-TEM. The results of this study also showed that the penetrating speed of oxidation dyestuff monomers and of direct dyes into

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both the black hair and the white hair was the same under the condition without hydrogen peroxide, and the speed of direct dyes under the condition with or without hydrogen peroxide was also the same, and using oxidative dyestuffs the black hair had much higher staining efficacy in the presence of hydrogen peroxide than white hair. The fact that transition metals catalyze the oxidation reaction of hydrogen peroxide has been known. Therefore, the difference in staining efficacy of oxidative dyestuffs in white hair and black hair in the presence of hydrogen peroxide in the staining solutions might be due to the difference of metal content that results from the difference in the number of melanin granules in the hair.

Relationship between Opened Facial Pores and Carbonylated Protein/Catalase Activity in Stratum Corneum

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Recently, consumers have been paying a lot of attention to improvement of enlarged facial pores. Investigation of the basic mechanism underlying enlarged pores and development of methods of improvement are big issues for cosmetic scientists. The purpose of this study is to define an image parameter which well expresses a visual impression of the situation of facial pores and to investigate whether oxidative stress is involved in the mechanism of the enlargement of pores. As a first step, we determined that the threshold of size which is recognized as an enlarged pore was 0.04 mm². In addition, we found that image parameters in a determinate area, a total area of pores, mean area of pores and number of enlarged pores well expressed the visual impression, and also a correlation with the image parameter between total area of pores and age was shown. As a second step, we assessed the relationship between image parameters on total area of pores and parameters from stratum corneum (SC) including nucleated cells, thick abrasion, catalase activity and protein carbonylation (SCCP) in order to investigate mechanisms of the enlargement of pores. In analysis on parameters which were extracted from the entire face, there was no correlation with the total area of pores and SC derived parameters except catalase activity. In the study, we found

that enlarged pores were concentrated more in the upper cheek than the lower cheek. In addition, the SC histological study pointed out that parakeratotic cells and SCCP-positive cells were localized at the peripheral area of open ducts in pores. We attempted further analysis using parameter ratios in which parameters in the upper cheek were internally normalized by those in the lower cheek. As a result, it was found that SCCP ratio and catalase ratio showed significant correlations with total area of facial pores. In the study, we proposed the possibility that epidermal oxidative stress was one of factors behind the enlargement of facial pores.

Chemical Mapping of Sulfur-Containing Molecules in Human Hair Using Soft X-Ray Microscopy

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The effectiveness of XANES (X-ray absorption near edge structure) profile for mapping of a specific chemical bond or molecules containing the bond has been demonstrated for biological specimens. In the present study, we have applied the XANES measurement system to human hair. The fine chemical maps of cystine and cysteic acid were obtained in combination with a high resolution soft X-ray microscopy system. The results showed that oxidation treatments, such as permanent waving and bleaching, to hair reflected the increase of cysteic acid. The spectromicroscopy system, which consists of X-ray microscopy coupled with XANES measurement, seems to be useful for hair care research to identify the area of oxidative damage.

Effect of Hydrophobic D-Glucosamine Analogues on Production of Hyaluronan in Human Keratinocyte and Structural Activity

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D-Glucosamine (GlcN) (1), N-acetyl-D-glucosamine (GlcNAc) (2), and alkyl N-acetyl- β -D-glu-cosaminide are known to stimulate the production of hyaluronan production in human keratinocyte. Novel hydrophobic derivatives 1 and 2 were synthesized, and the effect of these derivatives on the production of hyaluronan in human keratinocyte was investigated. While GlcN had no effect on the production of hyaluronan in the keratinocyte, N-butyl- β -D-glucosamine (4) stimulated production. To investigate the mechanism of this stimulation, four subgroups of derivatives of N-acetyl- β -D-glu-cosaminide were synthesized that contained alkyl alcohols, fluoro alcohols, silyl alcohols, and aromatic alcohols, respectively (10–15). Correlation of Log P (o/w) of the alcohol moieties and hyaluronan production was investigated. The production ratio of hyaluronan to the control experiments increased with an increase of Log P values within each subgroup. However, no correlation was observed between these four subgroups, suggesting that other factors are related to the stimulation of hyaluronan production.

