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The use of alpha-hydroxy acids(AHAs) containing cosmetics has aroused the public interest with their supposed ability to reduce wrinkles, roughness, age spots of skin and other signs of sunburn damages. The excessive and chronic use of AHA containing cosmetics could cause skin irritation, swelling and sunburn, and may increase photo-toxicity and photo-carcinogenesis. However, exact dose-response relationship, photo-toxic effects and skin toxic mechanisms have not been known. In the present study, dose and time effects of glycolic acid, one of the most commonly used AHAs, alone or combination with UVB on skin irritation and inflammatory response were examined. Skin irritation by glycolic acid and UVB alone was increased in dose and time-dependent manners. Higher dose of glycolic acid and UVB (3 J/cm²) treatment for 2 weeks caused severe skin irritation. Lower dose of glycolic acid and UVB (0.4 J/cm²) caused slight or mild irritation. However, lower glycolic acid enhanced UVB-induced skin irritation resulting in severe irritation. Histological examination showed that glycolic acid dose dependently reduced integrity of stratum corneum and increased skin thickness, and higher dose of glycolic acid destroyed epidermal layer without inflammatory response. UVB increased skin thickness, and caused condensed inner stratum corneum and reduced its integrity of outer layer. Glycolic acid enhanced UVB-induced the reduction of stratum corneum integrity. Completely lost of organization of stratum corneum was seen in UVB and glycolic acid combination treated skin. Glycolic acid did not change basal or UVB-induced PGE₂ production and COX-2 protein expression. UVB, whereas, increased PGE₂ (50% over control by higher dose of UVB) and COX-2 expression(2 and 3 fold). These results show that glycolic acid cause skin irritation in a dose and time dependent manners and enhance UVB-induced skin irritation, however glycolic acid-induced skin irritation may not be associated with inflammatory response.

[PA4-12] [10/19/2000 (Thr) 10:00 – 11:00 / [Hall B]]

Co-carcinogenic potential of glycolic acid in hairless mouse skin

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Alpha-hydroxy acids (AHAs) are organic acids present in natural sources such as fruits, wine and milk. Such sources of AHAs have been used as cosmetic material for several years in the public with their supposed ability to reduce wrinkles, roughness, age spots of skin and other signs of sunburn damages. However, it is also true that the excessive and chronic use of AHAs containing cosmetics could cause skin irritation, swelling, sunburn, photo-toxicity, and that increase of photo-carcinogenesis has been suspected. Previous our study showed that glycolic acid, one of the most commonly used AHAs increased skin irritation dose dependently after treatment for 14 consecutive days. In the present study, we examined the tumor (anti)promoting ability of glycolic acid on two-stage carcinogenesis test using inbred hairless female mice (15/group) skin tumors either induced by 7,12-dimethylbenz[a]anthracene (DMBA) as an initiator and glycolic acid (twice a week) as a promoter, or induced by UVB followed glycolic acid (12.5 mg/cm²). Glycolic acid promoted papilloma incidence and multiplicity initiated by DMBA similar to 12-O-tetradecanoyl phorbol-13-acetate (TPA), however, inhibited UVB-induced papilloma formation. The expressions of PCNA, cyclins, cyclin dependent kinase and cyclooxygenase-2, and the activation of transcription factor NF- κ B and AP-1 were concomitantly decreased in glycolic acid treated skin compared to UVB treated skin. Change of these factors by glycolic acid may collectively contribute to during the skin carcinogenesis.

[PA4-13] [10/19/2000 (Thr) 10:00 – 11:00 / [Hall B]]

The Roles of ATP and Calcium in Morphology Changes and Cytotoxicity Induced by Benzoquinone in Platelets