Introduction

Aging changes of the human face are cumulative effects resulting from intrinsic or exogenous causes, and environmental factors, such as sunlight or smoking. During the last few decades, there has been a proliferation of over-the-counter cosmetic preparations which have been published as anti-aging formulations, but not undergone physiological testing under experimental conditions. Anti-aging products marketed for facial skin care are innumerable, appealing to the consumer and claim to be free of any side effects. However, it is certain that absolutely no product is capable of exerting a rejuvenating effect on the aging skin. The present study is aimed to pinpoint the potentiality of various anti-aging agents which are available in the market and their applicability towards a more youthful facial skin.

Materials & Methods

Animals & Procedure: Female retired breeders (10-12 months) of hairless mice (SHK-1) were used as an experimental animal. The animals were kept under experimental conditions. Anti-wrinkle agents, vitamin C (ascorbic acid), soy cream, and estrogen cream, in the hairless mouse skin with reference to the control group. The epidermal response to topical application of anti-aging compounds was determined by histologic testing under experimental conditions. The epidermal layers were measured using the mean micrometer scale, and the outcome calculated using the Student’s t-test for each group of animals. The experiments were performed on intact animals in the same age group in the absence of any animal or histologic effects on the control or treated animals.

Results

Histological evaluation showed increased epidermal thickness, exaggerated differentiation of the three cellular layers, and more conspicuous nucleus profile and cell size, and coarse protein granules (Fig. 5). Table 1 summarizes quantitative data regarding effects of five anti-aging agents on the epidermis. An anti-aging prophylactic on skin with width measurement (in micrometers), TVU is the labeling index (PCNA-I), and the number of positive nuclei divided by the total number of nuclei. Values were obtained using a Nikon Microphot-FX A (Nikon, Tokyo, Japan) equipped with a digital camera.

The present study indicates that all five commercial cosmetic products were hyperpigmented, and resulted in augmented PCNA expression in the skin of these animals. These agents affected only the epidermal layers. The effects of retinoic acid derivatives or glycolic acid are popular rejuvenating compounds, but their stimulation of the epidermis is not uniform. Augmented epidermal effects of estrogens on the aging skin reported in the literature include synthesis of collagen and keratin, and collagen products. In recent years considerable interest has been expressed in the beneficial effects of soy milk products in improvement of aging skin in addition to calcium testing of estrogen, soy, and ascorbic acid preparations on intact rodent skin. The study may be helpful to pinpoint therapeutic advantages of various anti-aging products. This research was supported by the 2007 Leslie Bern-Stein Grant from the AAFPRS Foundation.

Abstract

Problem:

A therapeutic measure for reversal of aging changes of the facial skin induced by solar radiation is non-invasive topical application of anti aging compounds. This study was aimed to compare topically significant effects of five anti-aging agents on epidermal histology in the non-irradiated hairless mice.

Methods & Measures

Female retired breeders (SHK-1 hairless mice) were treated topically on the dorsal skin with five commercially available agents as a daily treatment for two weeks. The following agents were used: retinoic acid, acidic glycolic acid, estrogen, soy, and vitamin C. Skin sections were analyzed in the light microscope to gather morphometric data of keratinocyte to proliferation (Index of Profliferting Collagen Antigens), epidermal thickness, and nuclear volume of cells from three epidermal layers. Quantitative data were analyzed with SPSS 14.0 statistical software to detect significant difference between the means of the control and experiment groups.

Results

Epidermal stimulation was observed with all cosmeceutical but most pronounced effects resulted from the application of glycolic acid and estrogens, retinoic acid and vitamin C produced significant effects of lesser magnitude.

Conclusions

Reported studies of many of these agents were conducted usually in the irradiated mice, and their effects on the intact skin have been rarely reported. The present study is useful for our contemplated studies on photo aging in the same animals. Agents like retinoic acid and glycolic acid are popular rejuvenating compounds, but have been reported to produce annoying side effects. Mild compounds like vitamin C or soy may cause reversal of detrimental photo aging changes without cutaneous side effects.

Clinical Significance

The study may be helpful to pinpoint therapeutic advantages of popular anti-wrinkle compounds, and to devise clinical strategies to combat photo aging.

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