

Towards the Fountain of Youth: Recovery of Elasticity of Aged Epithelial Cells

Igor Sokolov (isokolov@clarkson.edu)
Swaminathan Iyer
Craig Woodworth
Clarkson University, Potsdam, NY 13699, USA

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Skin is a thin but effective layer that serves as a vital protective barrier against the outside environment. Skin integrity protects the body from dehydration, heat loss, and invasion of microorganisms. Elasticity of epithelial tissues is important not only for the cosmetic reasons, but it also helps to maintain the skin's integrity, and facilitate healing after injury. Recently we have found a considerable increase in rigidity of human epithelial cells during ageing [Physics in Medicine and Biology, 2005. 50, p.81]. We also found that the increase in rigidity was correlated with an increase in the density of cytoskeletal fibres. Here we use Atomic Force Microscopy (AFM) in combination with immunofluorescence microscopy to examine the chemical nature of fibres associated with increased rigidity. Having identified the fibres, we chose special cytotoxic chemicals, which are known to be able to decrease the amount of the fibers in cells. It was possible to find the concentration of the chemicals that decreased rigidity of old cells back to the level present in young cells, while keeping cells alive and active. These results are in press and will be published in the May issue of "Nanomedicine: Nanotechnology, Biology, and Medicine".

To understand how these results can be applied to living organisms, we used laboratory hairless laboratory mice. After initial toxicity tests, we developed a formula for a topical cream. The cream was applied to the back of mice once a day for five months. The results clearly showed that the treated skin was softer than untreated skin.

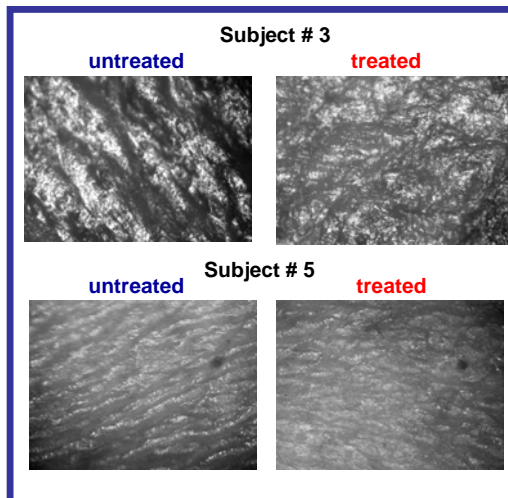


Fig.1. Optical images demonstrating a visual difference in skin smoothness between treated and untreated portions of skin

No negative side effects have been found to date. In contrast, one unexpected positive side effect has been discovered: the disappearance of micro wrinkles, Fig.1. An additional study performed on human epithelial cells in-vitro revealed the mechanism responsible for this smoothing skin.

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