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Comparison of optical techniques to measure melanin absorption

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Abstract content
   (Max 300 words)

Introduction: Absorption of light in the skin is important for diagnostic and therapeutic applications of lasers and other light sources. Human skin consists of four different layers, stratum corneum, epidermis, dermis and hypodermis. The epidermis, which is about 100 μm thick or approximately 10 cells layers, consists of keratinocytes, Langerhans cells, and melanocytes. Most of the skin pigmentation, melanin, is produced by the melanocytes. Melanin in the epidermal layer is responsible for the skin colour or skin phototype of an individual and has a substantial effect on the light that penetrates through the epidermis. Numerous research groups have reported on the "melanin index" which is a measure of the melanin concentration. The translation from this data to the optical properties of absorption and scattering is not straight forward. Darker skin phototypes do not necessary have more melanocytes, but the melanocytes are more melanogenically active.
Material & Methods: Melanocytes can be cultured in cell culture dishes. Cells are transferred aseptically in vitro on a glass coverslip/tissue culture dish. These cells, once in the growth phase of the cell cycle, are exposed to different concentrations of non-toxic agents that increase melanogenesis. This resulted in differences in the melanin concentration comparable to different skin phototypes. Different optical techniques (integrating sphere (IS) and diffuse reflectance spectroscopy (DRS)) are used to measure the absorption coefficient and reduced scattering coefficient of the melanocyte samples. These two parameters are important in the propagation of light through tissue. The results of these two techniques will be compared.
Results: The DRS gave more consistent results than the IS system and should be used to refine the technique and build up a database of the optical properties for different "melanin" concentrations.

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