



PHOTOBIOLOGY AND PHOTOPROTECTION

ONE YEAR IN VIVO MULTIPHOTON EVALUATION OF DAILY SOLAR EXPOSURE EFFECTS IN REAL LIFE AND DEMONSTRATION OF BROAD SPECTRUM DAILY PHOTO-PROTECTION BENEFITS ON THE FACES OF CAUCASIAN WOMEN

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Introduction: Chronic daily sun exposure is known to induce premature skin aging. In vivo multiphoton microscopy allows noninvasive 3D characterization of human skin structure with sub- μ m resolution.

Objective: To study, for the first time with in vivo multiphoton microscopy, the effects of seasonal changes in epidermis and superficial dermis (50 μ m under dermal-epidermal junction) occurring on human face along 1 year. Moreover, the benefits of a broad-spectrum daily photo-protection product were evaluated.

Materials and Methods: 60 Caucasian women living in Paris, aged 55-65y, phototypes II to III, were recruited and randomized in double blind into 2 groups: 30 subjects applying once a day the daily photo-protection product (low, unbalanced UVB/UVA filtration ratio) versus 30 subjects applying the vehicle. The study was conducted, on real life exposure conditions (October 2016 to November 2017). An evaluation of multiphoton and skin color parameters on face were performed at months M0, M4, M8 and M12.

Results: The evolutions of melanin density (multiphoton) in stratum basale and skin pigmentation (colorimetry) are in coherence with season in the vehicle group; whereas these parameters remain stable during the year in daily photo-protection group. The SAAID index (dermis aging marker calculated using collagen and elastic fibers densities, known to decrease with aging) significantly decreased in subjects using the vehicle alone during summer and returned to normal in autumn. In subjects using the daily photo-protection product, the aging marker remained stable.





Conclusions: Multiphoton microscopy enabled, for the first time, to non-invasively follow melanin density and superficial dermis aging marker along a full year, and confirmed the efficacy of daily photo-protection broad spectrum filtering technology, in real life conditions. The daily usage of adapted filtering formula, would be beneficial in the prevention of cumulative detrimental effects of daily solar exposures that lead, year after year, to most of photo-aging visible signs.

