

MELATONIN RECEPTOR AS A NEW TARGET FOR ANTI-AGEING STRATEGIES

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The superfamily of G-protein-coupled receptors (GPCRs), also called seven trans membrane receptors, is one of the largest and most studied families of cellular receptors. It is known that in the skin, GPCRs regulate fundamental functions including wound healing, inflammation as well as skin pigmentation and barrier function. Among the GPCR superfamily, melatonin receptor 1 (MT1) represents the main receptor for melatonin, the hormone that regulates the circadian day-night-rhythm and seasonal biorhythms. As we age, we assist to a steady reduction of circulating melatonin, associated to a disrupted cellular rhythmicity and an acceleration of the ageing process. In the skin the melatonin has been described as a potent antioxidant and its function, exerted through MT1, might play an indispensable role in the physiological functions of the skin. Our aim was to further investigate the expression pattern of MT1 in basal and oxidative stress conditions. We demonstrated that MT1 expression is age-dependent and it is strongly affected by oxidative stress and UV irradiation. Melatonin treatment was able to restore the affected expression of MT1 in UV irradiated fibroblasts, whilst strongly inducing antioxidant genes. Interestingly, due to its hormonal origin, melatonin cannot be incorporated in cosmetics formulations. For this reason and given the constant interest towards natural derived extracts, we identified a plant cell culture extract showing melatonin-like activities. We demonstrated that a *Helianthus annuus* callus culture extract was able to trigger MT1 activation in skin cells similarly to the recombinant melatonin. Moreover, results derived from cAMP assays confirmed that *Helianthus annuus* callus culture activates the MT1 pathway. The same extract was also able to protect the cell membrane and mitochondria from oxidative stress. Here we identified a natural agonist of melatonin activities in skin cells, able to attenuate the negative stress conditions occurring with ageing.

Biography

M Bimonte has graduated in Biological Sciences at the University of Naples Federico II. She completed her PhD in Genetics in 2005. Since then, she has been a Research Scientist at Arterra Bioscience, an Italian biotech company focused on the Discovery and Production of Active Compounds for Cosmetics and Agriculture applications. She has been involved in the research and development of innovative cosmetic products derived from plant tissue cultures, microalgae and food by-products. She is the author of 16 scientific publications and 8 patents.

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