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## Melatonin and skin

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Skin and particularly its epidermal compartment, when exposed to hostile environments such as radiation, physical injury, chemicals, pollution and microorganisms, requires protective chemical molecules and pathways. Melatonin, one of the evolutionarily oldest and most conserved molecules, with well documented direct radical scavenging activity and indirect antioxidant functions, plays a very important role in skin maintenance. The fact that human skin not only has functional melatonin receptors, but also acts as a complete system capable of producing and regulating melatonin synthesis, makes melatonin a promising candidate for maintaining and protecting skin. It is important to note that recent studies have not only discovered how to better synchronize the skin's circadian clock and to protect skin from external aggressors, but have also provided further evidence that skin barrier functions are predictably time-dependent and that skin chrono-pharmacology also needs to be considered. New metabolic pathways are involved in melatonin's protective functions in dermal cells. The topical use of melatonin for therapeutic purposes and skin protection has considerable advantages. Moreover, endogenous intracutaneous melatonin production, together with topically-applied exogenous melatonin or metabolites, is expected to be one of the most potent antioxidative and anti-inflammatory systems of defence against external damage to the skin. Therefore, melatonin could be used therapeutically in future clinical dermatological treatments and also in preventive medicine strategies.

### Recent Publications

1. Slominski A Fischer TW, Zmijewski MA et al., (2005) On the Role of Melatonin in Skin Physiology and Pathology. *Endocrine* 27: 137–148.
2. Slominsk A, Tobin DJ, Zmijewski MA et al., (2007) Melatonin in the skin: Synthesis, metabolism and functions. *TRENDS in Endocrinology and Metabolism* 74:3913-3925.
3. Shen YQ, Guerra-Librero A, Fernandez-Gil BI et al., (2017) Combination of melatonin and rapamycin for head and neck cancer therapy: Suppression of AKT/mTOR pathway activation and activation of mitophagy and apoptosis via mitochondrial function regulation. *J Pineal Res* doi: 10.1111/jpi.12461
4. Abdel Moneim AE, Guerra-Librero A, Florido J et al., (2017) Oral Mucositis: Melatonin Gel an Effective New Treatment. *Int J Mol Sci*. doi: 10.3390/ijms18051003
5. Fernández-Gil B, Moneim AE, Ortiz F, Shen YQ et al., (2017) Melatonin protects rats from radiotherapy-induced small intestine toxicity. *PLoS One*. doi: 10.1371/journal.pone.0174474.

### Biography

Germaine Escames has broad experience in the studies of the antioxidative role of melatonin and the identification of the mitochondria as the main target of melatonin and its anti-inflammatory activity against the innate immune response, among others. From several years to date, her activity has been focused on the oncostatic activity of melatonin and the adverse effects of radio and chemotherapy. In addition, she studied the effects of melatonin on the skin. She has four international patents on melatonin. One is currently under a multicentric clinical trial (in 10 hospitals of Spain) for the prevention and healing of oral mucositis induced by radio and/or chemotherapy and other two patents consist in an endovenous melatonin formulation for the treatment of sepsis. The fourth patent consists in a regenerative and anti-aging cream of melatonin for its topic application in the skin. A clinical trial with this cream to treat position ulcers is now being carried out in collaboration with other groups.

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