

Prevention of UVB radiation-induced cell death: “in vitro” studies

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The ultraviolet component of sun light consists of UVA, UVB and UVC rays. UVB radiation represents an environmental hazard because of its role in skin aging, cancer and infection exacerbation. UVB stimulate the production of reactive oxygen species (ROS) in epidermal cells, resulting in skin lesions, accelerating aging and eliciting malignancies. At least 50% of UVB-induced damage is attributable to the formation of reactive ROS which cause cellular lesions if antioxidant defence mechanisms are down-regulated. Thus, exogenous supplementation of antioxidants may be an effective strategy to reduce or prevent skin damage.

In the last years, we demonstrated the antioxidant effects of melatonin (Mel) (Luchetti et al., 2006) and, more recently of hydroxytyrosol (HyT) and its derivatives (Burattini et al., 2013) in hemopoietic human cells exposed to pro-oxidants. Therefore, in this project we propose to evaluate the antioxidant and/or anti-apoptotic effect of Mel and HyT in HaCaT human keratinocytes exposed to UVB. Keratinocytes in the non-irradiated condition are morphologically similar in Mel- and HyT-treated and untreated group. TUNEL reaction appears negative in both conditions, as well as in control.

UVB radiation induces a significant decrease in cell confluence, with a diffuse cell detachment and the appearance of rounding and blebbed cells. TUNEL reaction evidences several nuclei with DNA fragmentation in UVB treated keratinocytes. In addition, cell viability evaluated by means of supravital propidium iodide (PI) evidences a diffuse staining positivity.

Pre-treatment with Mel or HyT before UVB exposure is able to reduce cell death. In conclusion, HyT and Mel evidence an intriguing capability to prevent cell death in keratinocytes too. They could so represent a potential tool in skin protection from UVB radiation.

References

- [1] Luchetti et al. (2006) Melatonin prevents apoptosis induced by UV-B treatment in U937 cell line. *J Pin Res* 40: 158-6.
- [2] Burattini et al. (2013) Anti-apoptotic activity of hydroxytyrosol and hydroxytyrosyl laurate. *Food Chem Toxicol* 55: 248-56.

Key words

Keratinocyte, UVB, Hydroxytyrosol, Melatonin, Cell death.