The effect of visible blue light on the differentiation of dendritic cells in vitro (Article)

Monfrecola, G.[a], Lembo, S.[a], Cantelli, M.[a], Ciaglia, E.[b], Scarpato, L.[a], Fabbrocini, G.[a], Balato, A.[a]

[a] Department of Clinical Medicine and Surgery, Section of Dermatology, University of Naples Federico II, Via S. Pansini n. 5, 80131 Napoli, Italy
[b] Department of Pharmaceutical and Biomedical Sciences, University of Salerno, Italy

View references (20)

Abstract

Visible blue light (BL) spectrum ranges from 400 nm to 475 nm, peaking at 420 nm. Various biological effects have been shown to be exerted by visible light (VIS) (wavelengths (λ): 400-700 nm), including erythema, pigmentation and generation of reactive oxygen species. Due to the sequential position along the electromagnetic radiation (EMR) spectrum, BL biological effects could be theoretically compared to the UVA ones (λ: 320-400 nm). In the present study we investigated the effects of BL on differentiation, maturation and cytokine production of monocytes derived dendritic cells (MDDCs), through the irradiation of their precursors. MDDC precursors ($CD14^+$cells) were isolated from the blood of healthy donors and subsequently irradiated with increasing doses of BL. Differentiation as well as maturation process was assessed by flow cytometry, analyzing CD1a, CD83 and CD86 positive cells. Moreover, intracytoplasmatic immunofluorescence, in irradiated vs unirradiated derived cells, was performed to evaluate IL-6 and TNF-α production. Our findings have shown that BL treatment of MDDCp: i) did not affect the generation of iDCs, ii) did not interfere with terminal differentiation of MDDCs (from iDCs to mDCs) and iii) decreased IL-6 and TNF-α production by MDDCs in a dose-dependent manner. We concluded that BL is unable to interfere with MDDC differentiation and maturation, whereas it is effective in reducing the production of IL-6 and TNF-α.