

## MAM2-4

### **Blue light at 450nm wavelength modulates proliferation and differentiation of human skin cells.**

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Sun-light influences the physiology of the human skin in beneficial as well as harmful ways as has been extensively shown for UV-light. However, little is known about the effects of other wavelengths of solar irradiation. We here irradiated human keratinocytes and skin derived endothelial cells with LED-devices of distinct wavelengths to study the effects on cell physiology. Whereas irradiation with blue light at 412-426nm exerts toxic effects and light at 632nm, 648nm, 850nm and 940nm wavelength has no effect at all, we find that light at 450nm wavelength is non-toxic up to intensities of 100J/cm<sup>2</sup>, but reduces proliferation dose dependently up to 50%. This reduced proliferation is caused by differentiation induction as further results demonstrate: Real-time PCR analysis reveals an increase of the differentiation marker involucrin and concomitantly an increase in whole-genome DNA-methylation can be measured. Furthermore, experiments with a model protein demonstrate that the blue light irradiation photolytically generates NO from nitrosated proteins. This small molecule is known to initiate differentiation in skin cells. Experiments using the NO-scavenger cPTIO further support the role of NO in the observed differentiation process. We here define for the first time a therapeutic window in the sun light spectrum at approximately 450nm wavelength. It is non-toxic for skin cells even at high doses but influences cell physiology by reducing proliferation due to the induction of differentiation. We find a photolytical release of NO from nitrosated proteins involved in driving the cells toward differentiation.