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The Skin Redoxome and the effects of visible light on the skin

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Redoxome is the network of redox reactions and redox active species that affect the homeostasis of cells and tissues. Due to the intense and constant interaction with external agents, the human skin evolved to host a robust redox signaling framework. The lack of redox regulation causes the accumulation of oxidation end-products being correlated with several skin disorders, including photoaging and skin cancer.(Schalka, Silva et al. 2021) Protection of human skin against sun exposition is a complex issue that involves ambivalent aspects of the interaction of light with tissues. One misconception that has persisted in our society is that visible light is safe to the skin, even though recent data indicate that at least part of the visible spectrum decreases the epidermal barrier function, induces pigmentation in individuals with type IV and V skins and induces inflammatory response.(de Assis, Tonolli et al. 2021) Endogenous molecules absorb UVA and visible light inducing several photosensitized oxidation reactions, which end-up deregulating the redox homeostasis and causing oxidative distress in skin cells and tissues, inducing the accumulation of glycation and lipid peroxidation end products, which are usually more effective photosensitizers than their respective their precursor molecules.(Chiarelli-Neto, Pavani et al. 2011, Chiarelli-Neto, Ferreira et al. 2014, Tonolli, Chiarelli-Neto et al. 2017, Tonolli, Martins et al. 2020, Tonolli, Baptista et al. 2021) In this lecture, I will analyze the main molecular networks of redox regulation present on the human skin, explain the mechanisms by which endogenous molecules (absorbing either UVA radiation or visible light) cause a dysregulation of the skin redoxome and analyze the consequences to human skin, aiming to propose more comprehensive mechanisms of sun care.

Biography

Maurício S. Baptista is professor of Biochemistry at the University of São Paulo (USP, Brazil). He earned Bachelor (1990) and Master (1992) degrees in Biochemistry from USP and holds a doctoral degree (1996) in Chemistry from Marquette University (USA). He did his post-doctoral training at UW-Madison (1997) and was visiting professor (2006) at the Université Joseph Fourier (Grenoble France). His main interests are photochemistry/photobiology, skin damage and protection, regulated mechanisms of cell death.