

Adriana Agnese Amaro

IRCCS Ospedale Policlinico San Martino
Italy



Molecular evidence for blue light as an etiological factor for uveal melanoma

Abstract:

Uveal melanoma (UM) is more prevalent in individuals with pale skin and light eyes, with welding being a significant risk factor. UV-light, which is filtered by the eye, is not a risk factor for UM, but blue light has been suggested as a potential cause based on mutational signatures in cutaneous melanoma (CM). Blue light, the most energetic part of visible light, has been proposed as an etiological factor. We report here on molecular evidence for mutagenic activity of blue light and the corresponding mutational signature. Spontaneously immortalized murine embryonic melanocytes, Melan-A, were exposed to blue light (66.5W/m²) for 72 hours, then analyzed for effects on cell behavior and gene expression. Surviving cells were cultivated and analyzed by whole genome sequencing. Mutational signatures were derived from sequences as analyzed using Sigprofler and compared to signatures present in uveal melanoma. Melan-A cells exposed to blue light for 72 hours exhibited a mutational signature similar to human uveal melanoma (UM) but not cutaneous melanoma (CM). Surviving cells showed resistance to further blue light exposure, suggesting a selection for apoptosis-resistant, potentially tumor-initiating cells. Functional assays and transcriptomic studies revealed a statistically significant pro-apoptotic and anti-proliferative effects of blue light, along with DNA damage and oxidative stress. Re-exposed cells show apoptosis-resistant features like potentially tumor-initiating cells. The blue light exposure molecular effects on melanocytes are consistent with a mutagenic, potentially tumor-initiating effect of blue light. The mutational signature prevalent in UM is induced by blue light exposure. Blue light likely contributes to UM tumorigenesis.

Biography

Adriana Agnese Amaro Education 2022: Health-based Specialisation Schools Clinical Pathology and Biochemistry, University of Eastern Piedmont, UPO, Novara, Italy. 2010: PhD in Biophysics Roma, University La Sapienza, Italy. 2008. Agnese Amaro has completed his PhD at the age of 27 years from University La Sapienza, Italy and postdoctoral studies from IRCCS Ospedale Policlinico San Martino, Genoa, Italy with a researcher fellowship. She is PI and Coordinator of a project on uveal melanoma molecular carcinogenesis at IRCCS Ospedale Policlinico San Martino, Genoa, Italy. She has published more than 35 papers in reputed journals.