

Effect of Dual Wavelength Light Exposure on Regeneration of *Dugesia dorotocephala*

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Abstract : Increasingly now more than ever, UV damage brings with it a litany of minor deformities that can range from mild lesions and discoloring to cataracts and blindness. Pluripotent stem cells in planaria and human skin can be used to treat wounds and skin damage, with the primary limitations being inadequate growth factors. Photobiomodulation therapy in the form of low-intensity red light therapy has been proven to provide helpful benefits in the healing of skin that displays some of the symptoms of UV damage, such as burns and lesions, along with stimulating the proliferation of stem cells in recellularizing tissue. This paper puts forth an alternate means by which to treat the effects of UV damage using the freshwater planarian model system, *Dugesia dorotocephala*, known for its regenerative abilities and abundance of pluripotent stem cells, which allow for the rapid growth and repair of missing or damaged structures. Our work consisted of exposing planaria to different types of light: red light, blue light, white light, darkness, red and blue light together, UV light, and finally, red and UV light together. The primary focus of this research was on the red and UV lights, with six controls acting as metrics to compare our findings. Through computer-assisted morphological analysis, the results show that there is no significant difference in the rates of regeneration of planaria treated with simultaneous exposure to red and UV light versus planaria in darkness ($p > .05$), a representation of their preferred natural habitat. Our research suggests the viability of red-light therapy in actively combating UV damage and expediting the growth of epidermal stem cells by acting as another growth factor.

Keywords : regenerative medicine, stem cells, planaria, photobiomodulation

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