The Effects of Electromagnetic Radiation on Dugesia tigrina Regeneration

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Dugesia tigrina, Brown Planaria, are flatworms that have sensitive chemoreceptors and photoreceptors. Planaria can regenerate themselves from fragments of severed tissues using adult pluripotent stem cells called neoblasts. This characteristic makes them a suitable model for tissue growth, regeneration or embryological studies. This investigation studied how exposure to ultraviolet, infrared and white light affect the regeneration of planaria. White and ultraviolet light are known to induce stress in planaria. Exposure to infrared light has been shown to increase cell proliferation. The anterior ends of 140 planaria were removed, divided into groups of 20, and then allowed to regenerate for 20 days. Three of the groups received light for 50% of the time (12 hours per day) while the other groups received light for 25% of the time (6 hours per day). The control group was not exposed to any light. During the testing period, phototaxis tests were performed daily and a chemotaxis test were performed twice: on day 15 and on day 20. The hypothesis is “If planaria are exposed to ultraviolet radiation or white light while regenerating, then the time period required for regeneration will increase and chemoreseptivity will decrease compared to planaria that were exposed to infrared radiation or those that regenerated without light exposure.” The results found that ultraviolet and white light can impair the regeneration of planaria by increasing the length of the regeneration period, increasing the length of time needed to develop eyespots and chemoreceptors. Regarding the effects of infrared, the results were inconclusive. The results support the hypothesis, that exposure to white and ultraviolet light can be dangerous to aquatic life and affect its development.

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