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The Involvement of Smed Protein during Central Nervous System Regeneration in Planaria after Exposure to Ultraviolet Radiation

Genus *Planaria* is one of the most common model organisms utilized in neurological research due to its high rates of regeneration from pluripotent stem cells. In planaria, the cerebral ganglia can be regenerated after amputation, like any other organ in its body. Planaria commonly reside in freshwater and can be found in all parts of the world, including Alberta. Due to environmental causes, such as climate change, acid deposition, and other anthropogenic stressors, most aquatic organisms are exposed to higher levels of ultraviolet radiation (UV) which affects the development and regeneration of these organisms. Various common genes and proteins, including the Smed protein, are shared among planaria and humans that play important roles during regeneration. However, the function of the Smed's role in humans is yet unknown. The objective of this research is to determine the patterns of Smed protein involvement during the regeneration of the planaria's central nervous system (CNS) after

exposure to Ultraviolet B radiation. The planaria were immunostained with anti-Smed and DAPI and observed by immunofluorescence. As Smed is present at the start of the regenerative process, it was hypothesized that it'd be present in high concentrations at the cerebral ganglia and progressively continue toward the ventral nerve cords to regenerate the planarian CNS until the regeneration process is complete. In comparison to the control group, the experimental groups exposed to UV-B radiation resulted in slower regeneration of the CNS.

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