L-Leucine: a Novel Growth Factor of Adult Stem Cell Differentiation in Dugesia tigrina

Lu, David

Medical researchers anticipate that stem cells will soon be able to treat many diseases such as cancer, Parkinson's disease, Huntington's disease, and Celiac disease. Nevertheless, before stem cell therapeutics can be applied in the clinical setting, more research is necessary to understand stem cell behavior and mechanisms of stem cell interaction. Planaria are well known to have the capability of regeneration and offer a great model to investigate the properties of adult stem cells. The purpose of this experiment was to identify a compound that could accelerate Dugesia tigrina adult stem cell differentiation. It was hypothesized that if brown planaria (Dugesia tigrinas) are exposed to l-leucine, then they will have a decreased regeneration time. Planaria were exposed to the independent variable of l-leucine or no leucine (control). The planaria receiving no l-leucine acted as the control. During the eleven days, the worms that fully regenerated were recorded on which day they regenerated. After experimentation, the mode for each of the levels of independent variable was determined. L-leucine had a mode of 6 days, while no l-leucine had a mode of 8 days. A chi-square test was performed on the data, and the data of l-leucine having an effect on planarian regeneration was statistically significant. The results support the research hypothesis since the planaria exposed to leucine had the shortest mode for full regeneration time. L-Leucine significantly accelerates planaria adult stem cell differentiation. For further studies, the effect of other amino acids, lysine and glutamine, on planarian regeneration should be investigated.

Awards Won: