



CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

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Project Title Regeneration Revolution	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this study was to determine whether there was a connection between the stem cell behaviors, as seen through the regenerative processes, of the brown planarian (<i>Dugesia</i>) and the common geranium (<i>Pelargonium hortorum</i>).</p> <p>Methods/Materials 36 specimens of both organisms (taken from geranium plant and culture of brown planarians) were observed; 18 of each served as a "control" group and were not induced into regeneration while the other 18 were. The plants required the supplemental auxin hormone Indole-3 Butyric Acid, while the induced planarians were cut in half at the width of the pharynx. The plants were incubated in clear plastic cups under a constant light source and were misted with water, while the planarians were kept in test tubes filled with equal amounts of spring water for 19 days. During that time, visual observations were taken along with quantitative measurements.</p> <p>Results After testing, the ratios of regenerated growth to the averaged original lengths of each specimen were about 26.28%, while the original lengths themselves showed about 16%. Of the average rates collected for the <i>Dugesia</i>, the average deviation was 0.185783224 cm, while the average rates in the <i>Pelargonium hortorum</i> had an average deviation of 8.383 cm. Considering the naturally high deviation in the geranium results, these percentages show a fairly similar pattern of regeneration. The actual development of meristem/blastema did not appear until 3 days after onset for <i>Dugesia</i> and 7 days after onset for <i>Pelargonium hortorum</i>. The graphs depict an "explosion" of growth (steep increase) at these points for each organism. The control groups for this experiment, exhibited little to no growth. The planarians grew to about 0.3 cm, and all of the untreated plant cuttings died.</p> <p>Conclusions/Discussion Based on data and observations, the hypothesis that the regenerative processes of <i>Pelargonium hortorum</i> and <i>Dugesia</i> show similarities was supported both quantitatively and qualitatively. Patterns of regenerative rates among the two organisms, while not jointly synonymous, show a very similar growth pattern in regards to their original forms. Stem cells can provide the key to curing the most threatening degenerative diseases and solving important problems in society today. Drawing connections can help science to understand and explore these cells and their dynamic abilities.</p>	
Summary Statement This study attempts to compare the stem cell regenerative processes of the brown planarian (<i>Dugesia</i>) and the common geranium (<i>Pelargonium hortorum</i>) with the use of research-backed visual growth markers and quantitative measurements.	
Help Received The research facility answered some of my questions.	