Prevention of Oxidative Stress Induced Diseases through the Effects of Curcumin on Planarial Stem Cells and Regeneration

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Curcumin is known for its multifarious effects like its antioxidative, cancer chemo-preventative, and anti-inflammatory properties. This research aimed to explore curcumin's effect on planarial regeneration and stem cells, as well as monitor its impacts on ROS and oxidative stress levels. The goal was to gain insight into how curcumin can be used in the treatment and prevention of oxidative stress-induced diseases in humans. First, to observe curcumin's effects on tissue development, planaria were exposed to light after curcumin pre-incubation with the knowledge that they are extremely photophobic. By testing their response to light in terms of time and locomotion, their regenerative stage could be determined quantitatively. Additionally, stem cell proliferation could be monitored through the MTT assay. Lastly, by inducing oxidative stress in the Antioxidant and Protein ELISA assays, curcumin's ROS balancing and preventative capabilities were tested. Through the MTT assay, it was found that cell proliferation rates were significantly higher in planaria treated with curcumin in contrast to control groups. Additionally, the Photophobia assay made it clear that curcumin improved tissue growth and response times. Lastly, planaria pre-incubated with curcumin before oxidative stress was introduced showed much higher antioxidant activity. These results prove that curcumin is effective in accelerating regeneration and blocking oxidative stress-induced diseases in planaria flatworms. The results hold important clues in regards to curcumin's vast potential to be implemented in conjunction with human stem cell therapies used for the treatment of diseases like Hepatitis C and Breast Cancer, as well as preventing Parkinson's and a wide range of oxidative stress linked disorders.

Awards Won:
Third Award of $1,000