The Effect of St. John’s Wort (Hypericum perforatum) on the Development and Reproduction of Hydra (Hydra littoralis)

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This experiment demonstrated the reproductive and developmental effects of St. John's Wort (SJW) (Hypericum perforatum) on Hydra littoralis. An LC50 of 1 mg/ml of SJW was determined. Two separate trials took place, with 40 hydra each. Experiment #1 lasted 7 days with the hydra being fed 1 daphnia pulex on the first and fourth days. Experiment #2 was of 12 days duration with hydra being fed 1 daphnia pulex on days 1-2 and 2 daphnia days 3-10. The results proved the hypothesis partially correct. Groups given 0-0.01mg of SJW developed better than the other groups but died from microorganism blossoms due to the low concentration of SJW. Groups given 0.075-0.25 mg of SJW died very soon following the start of experimentation. The proposed mechanism for these results suggests that hypericin yielded reactive oxygen species, which may initiate the protein kinase C to phosphorylate the Bcl-2 gene. This Bcl-2 gene can now no longer regulate BAX (Bcl-2 associated X protein). The BAX allows cytochrome C to permeate the mitochondrial membrane. This releases caspase 9 (which cleaves the DNA at aspartyl residues). This means that the hypericin increases the risk for apoptosis, and limits the reproductive and developmental abilities of the hydra. The group with 0.05 mg of SJW demonstrated a balance with microbial protection but with a low risk for apoptosis. This should be investigated in humans to see if St. John’s Wort may pose a risk of reproductive and developmental toxicity.

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