The Effect of Varying Concentrations of Artemisinin, Berberine, and Sulforaphane Upon Ocular Tumor Formation in Drosophila melanogaster

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Cancer is the second leading cause of death worldwide causing 10 million deaths in 2020. Many patients do not have access to quality treatment and diagnosis which is unfortunate since the survival rates from cancers are better when detected early and given quality treatment. Many elect to attempt to supplement their treatment with natural substances. This project hopes to determine whether artemisinin, berberine, or sulforaphane have greater effects against tumor formation in Drosophila melanogaster induced with ocular cancer. If exposed to slightly higher than recommended doses, then drosophila exposed to sulforaphane will have less flies exhibit tumor formation in their eyes than with berberine or artemisinin. A cross of Yki drosophila with Gal4 flies was performed to induce ocular tumor formation. Flies were then exposed to 0, 1, 2, 4, mM concentrations of berberine and artemisinin and 0, .02, .01, and .005 ug/uL of sulforaphane. Three weeks were allowed to transpire, and flies were analyzed for tumor formation. It was found that at all concentrations of artemisinin there was a significant difference between them and the controls ($p<.05$) and there was a significant difference between artemisinin of the same concentration and that of berberine ($p<.05$). There was a negative correlation in the amount of artemisinin given and percent of tumor formation ($r=.94$, $p<.001$). Both berberine and sulforaphane showed statistically significant difference between controls and highest concentration ($p<.05$) and have negative correlations ($r=-.73$ and $-.61$ respectively). Artemisinin was found to have best anticancer properties.