

# A Natural Way to Improve Chemotherapy: Investigating the Effect of Biochanin A on the Efficacy of Thapsigargin in a *C. elegans* Cancer Model

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Multidrug resistance is a major obstacle in the treatment of cancer. One of the major causes of resistance is P-glycoprotein, an ATP binding cassette transporter that binds and removes toxins from cells, enabling cells to eliminate drugs and toxins before damage is incurred. This study aimed to test the effect of a potent P-glycoprotein inhibitor, Biochanin A, on the efficacy of an anticancer drug called Thapsigargin. Interestingly, it has been found that Biochanin A is able to specifically target cells that overexpress P-glycoprotein, enabling it to increase the accumulation of chemotherapeutic drugs in cancer cells without causing further harm to healthy cells. The nematode *Caenorhabditis elegans* has been used as an alternative cancer model for certain drugs such as Thapsigargin because it possesses a homolog for a calcium ion transporter that is targeted by Thapsigargin. In this study, *C. elegans* was used to model cancerous tumors and were treated with Thapsigargin either alone or in combination with Biochanin A. It was found that treating worms with Biochanin A in conjunction with Thapsigargin produced significantly greater reductions in population than Thapsigargin alone, indicating that Biochanin A may be able to improve the effectiveness of chemotherapy and prevent or reverse drug resistance. Additional trials are being conducted to confirm these findings.

## Awards Won:

Third Award of \$1,000