



Elderberry Juice Prevents Prostate Cancer *In Vitro* and in an *In Vivo* Mouse Model

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Anti-cancer botanical compounds are proposed to suppress tumor growth by disrupting signaling pathways which are involved with cancer cell growth. Here we investigate the potential for elderberry juice (*Sambucus nigra* L. subsp. *canadensis* (L) Bolli) to inhibit Gli/hedgehog (Gli/Hh) signaling, a pathway previously found to be important for the growth of many cancers, including prostate cancer...

In vitro, measuring the Gli/Hh pathway activity, we observe comparable dose-dependent inhibition of the Gli-reporter activity in Shh light II cells treated with dilutions of either elderberry juice or elderberry pulp extract. Importantly, 100 to 250 fold dilutions of elderberry juice or pulp/pomace extracts are effective at suppressing Gli/Hh signaling by 50%. In vivo, diets containing freeze-dried elderberry juice solids at 3 concentrations (low=0.09%, middle=0.45%, high=2%) were fed to TRAMP mice to determine if elderberry could delay or inhibit prostate cancer progression. [The Middle elderberry diet in mice is the equivalent dose of a 60 kg (132 lb.) human drinking 2 tablespoons of elderberry juice per day.]

In comparison with the control group...these 3 concentrations of elderberry in the AIN-93G diet exhibited potent dose dependent inhibition of cancer formation with the Middle and High dose elderberry diets being statistically significant at the $p = 0.03$ and $p = 0.006$ level, respectively. These results support our hypothesis that elderberry juice is capable of preventing prostate cancer. Additional research is warranted on elderberry's mechanism(s) of action in prostate and other cancers that are potentially dependent upon Gli/Hh signaling.

The elderberry juice used in these research experiments was provided by River Hills Harvest Elderberry Producers, LLC. This research supports the practice of consuming

A Symposium Note by Christopher J. Patton, MA, MBA

small amounts (1-2 tablespoons/day) of elderberry juice on a daily basis as a preventative care immune boost. The indications are positive but not conclusive for human biology. Gli/Hh pathway inhibition is not related to elderberry's dark colored antioxidants.