



# Effects of Ginseng Supplements on Human Cervical Cancer Cells (HeLa)

Amber Intanavong & Courtney Mensah  
Faculty advisor: Dr. Rachel Bergerson



## ABSTRACT

Ginseng is a herbal supplement that helps support the body's immune system, which can be promoted to help improve physical performance and in combination with anticancer drugs (1). Ginseng contains many different active components including ginsenosides and ginseng polysaccharides which have contributed to anticancer effects (2). It was hypothesized that more concentration added to HeLa cells, will result in a decrease of cell viability and proliferation showing that Ginseng is effective against cancer. Three trials of CellTiter cytotoxicity screening assays were conducted to discover the cell viability for each of the four concentrations. Our results after the experiment supported that Ginseng contains anti-cancerous properties and reduces cell viability in HeLa cells when treated with higher amounts of concentration.

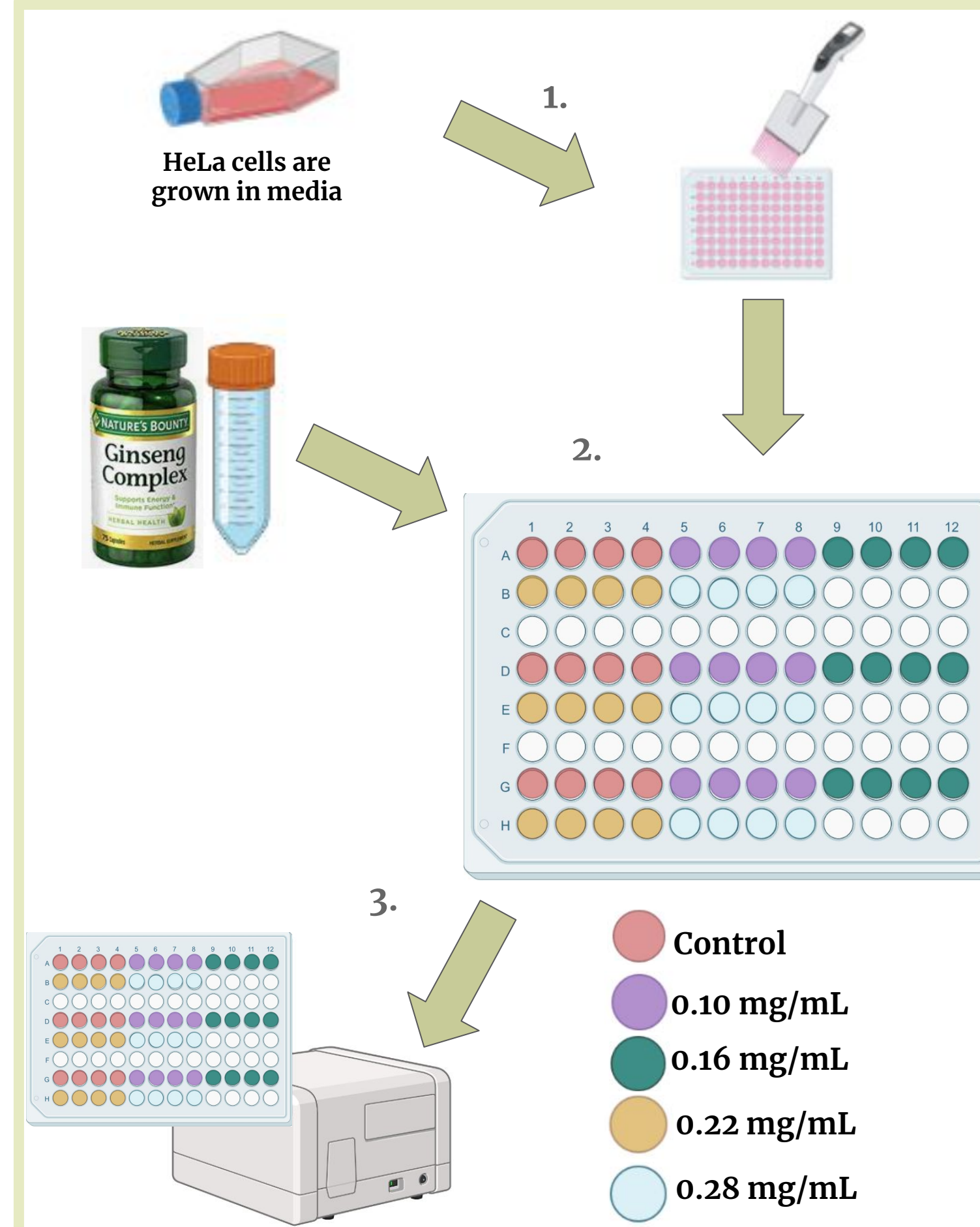
## BACKGROUND

- Ginseng is an herb known for its many health benefits such as boosting the immune system, reducing the risk of certain cancers, blood sugar reduction, it improves brain functioning, and contains antioxidants and anti-inflammatory properties (4).
- Cancer patients who have taken Ginseng had a 50% lower risk of cancer recurrence compared to those who have not taken Ginseng (2).
- Previous research used concentrations of 0.1~100 ug/mL (2).
- HeLa cells are apart of a remarkable cell line derived from Henrietta Lacks who had cervical cancer (3)

This information encourages our hypothesis that Ginseng is effective against cancerous cells.

## METHODS

- 200mg of Ginseng was dissolved in 50mL of dH<sub>2</sub>O to create a stock solution of 4 mg/mL.
- In each trial, HeLa cells were coated onto a 96-well plate containing 20 wells and incubated for 24 hours.
- The HeLa cells were then treated in quadruplicates with varying concentrations of the Ginseng reagent (0.10 mg/mL, 0.16mg/mL, 0.22mg/mL, 0.28mg/mL).
- After another 24 hour incubation period, data was then gathered by performing a CellTiter cytotoxicity assay to determine the viable number of cells.
- There was a completion of 3 trials to determine cell viability and/or proliferation.



## RESULTS

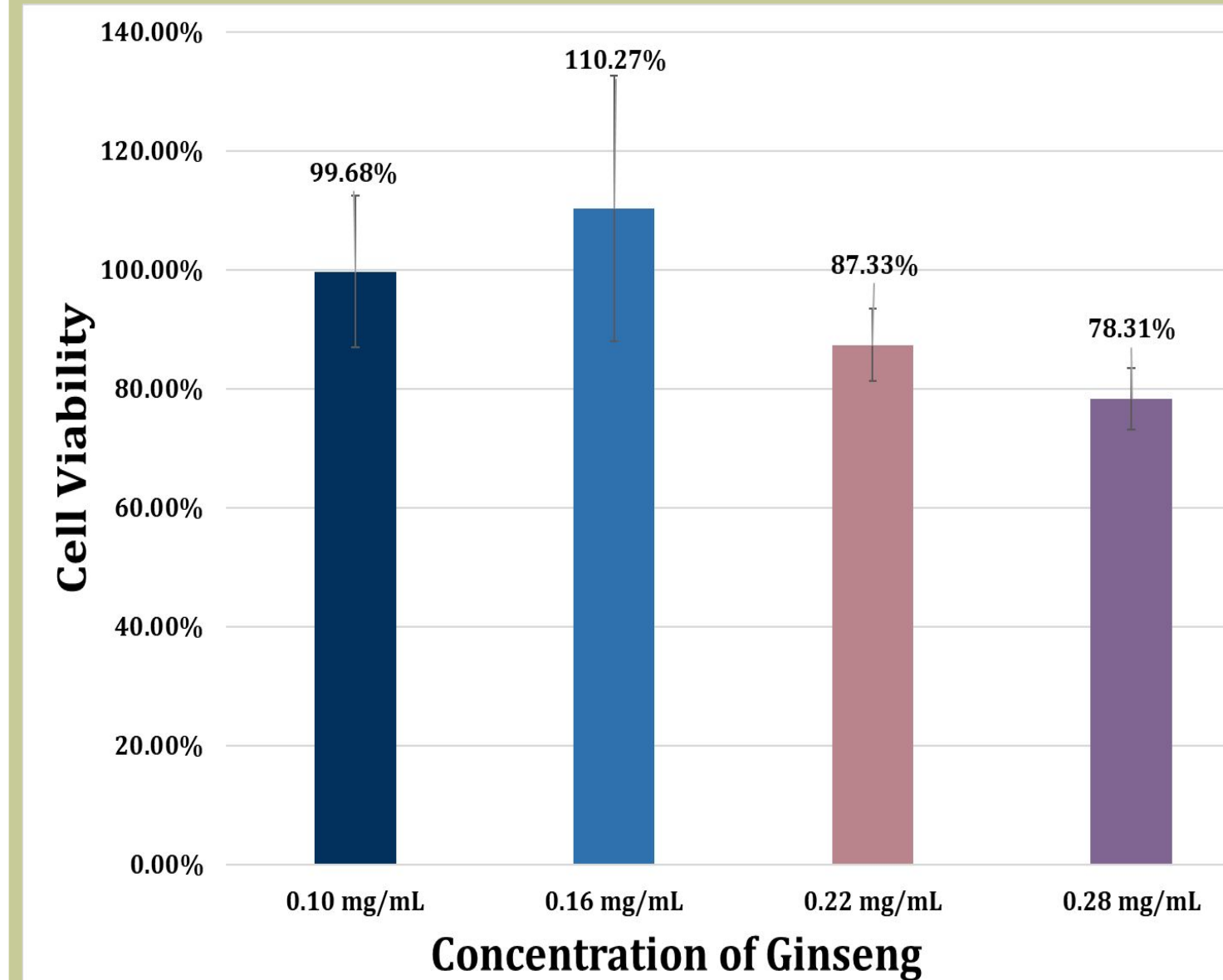


Figure 1: HeLa cell viability after 24 hours of Ginseng supplement treatment of varied concentrations.

Ginseng supplement concentrations at 0.10 mg/mL, 0.16 mg/mL, 0.22 mg/mL, and 0.28 mg/mL were added to HeLa cells. Their cell viability of the different four concentrations was determined by a CellTiter cytotoxicity assay as stated in methods. The values of the Cell Titer assay are read as percentages with the control being 100%. The graph's error bars are depicted through standard deviation per concentration of Ginseng in all trials. This graph illustrates the average results within each concentration of three cytotoxicity trials.

## Outcome:

- Control (non-treated): continued to stay at a consistent rate of cell viability
- Our results signify a direct relationship in treating HeLa cells with Ginseng, it shows a reduction in overall cell viability contingent upon the higher the concentration used.
- Concentrations higher than 0.16 mg/mL resulted in a lower percent cell viability in Ginseng. 0.16 mg/mL of Ginseng resulted in a percent viability of 110%, while 0.22 mg/mL resulted in 87% and 0.28 mg/mL resulted in percent viability of 78%.

## DISCUSSION

- Our research supports our hypothesis that Ginseng does have anti-cancer properties that can reduce cell viability in cancer cells.
- The 0.16 mg/mL well contains a higher concentration average in comparison to the other ones most likely due to lack of proper mixing of Ginseng resulting in the HeLa Cells not being evenly distributed, which may have caused average to fluctuate.
- The concentrations used were too low to show significant decrease in cell viability.
- We ran a fourth trial to rule/verify any problems made in previous trials
  - Results were found to be inconclusive due to mishaps occurring during distribution of Ginseng concentration properly into the wells.

## FUTURE RESEARCH

- Usage of higher concentrations to observe if it poses an effect on HeLa cells**  
We wanted to further research in this area of this experiment due to observations noted on the increase of apoptosis within the HeLa cells at higher concentrations. We propose that at higher concentration the viability of the HeLa will drastically decline.
- Test a different form of Ginseng on HeLa cells to see if it will promote apoptosis**  
Further research showed that there were two forms of Ginseng available to use, we were curious if the other form of Ginseng would pose a different effect on the HeLa cells.
- Usage of Ginseng on other cancer cell lines**  
We wanted to see if Ginseng would have similar effects on other cancer cell lines as it did with HeLa cells or if it would have a differing result.

## REFERENCES

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