CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

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Project Number

J1514

Project Title

Do Antioxidants Prevent Chemotherapy Cell Toxicity?

Abstract

Objectives

The purpose of this project is to find the best way to treat cancer without causing harm to healthy cells. After reading more in depth about cancer and chemotherapy, I learned that the medication that cancer patients use (any type) can kill a person by destroying healthy cells. The hypothesis of this project is that imatinib mesylate (an anti-cancer medication) is better with the most effective antioxidants rather than using imatinib mesylate by itself. Based on that hypothesis, the most effect antioxidant would be the garlic extract in the higher concentrations of the medicine.

Methods

To conduct the experiment, I tested 3 antioxidants (green tea, vitamin D, and garlic extracts) in combination with the chemotherapy drug imatinib mesylate. Ten samples of both high (200mg) and low (100mg) concentrations of the drug combined with 0.5 mL and 1 mL of each of the antioxidants were placed on the YPD agar petri dishes and incubated for 24 hours. I also tested the efficacy of the drug on its own without the antioxidants. Yeast colonies were counted and recorded to determine which of the antioxidants had the best effect on healthy cells.

Results

A high concentration of garlic combined with a low concentration of the medicine had the best results and increased the number of yeast colonies by 15.53% as opposed to the higher concentration, which decreased it by 1.5%. The medicine alone, in both concentrations, killed off about 30% of the colonies. Both concentrations of Vitamin D combined with each of the medicine concentrations had the most detrimental effects by reducing the colonies from about 48% to 73% compared to the control group. The remaining antioxidants, green tea in both medicine concentrations and the garlic in the high medicine concentration, all decreased the number of colonies at a lower rate, ranging from 5.26% to 20% compared to the control.

Conclusions

In conclusion, my hypothesis was proven partially correct. Turns out a high concentration of garlic combined with a low concentration of the medicine was the best combination of the antioxidants and concentrations. If I were to improve my project, I would like to test with more different types of antioxidants and chemotherapy medicines.

Summary Statement

I tested if antioxidants will prevent chemotherapy cell toxicity after cancer patients are treated with chemotherapy.

Help Received

I'm thanking Najwan Nasereddin for guiding me throughout my project and being there for me every step of the way. I would also like to thank my school, Bright Horizon Academy, for letting me participate in the science fair competition and our lab mentor who helped me with the medicine