



# CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

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| <b>Name(s)</b><br>Nikhil A. Madan  | <b>Project Number</b><br><b>J0510</b> |
| <b>Project Title</b><br><b>Is the Reishi Mushroom Mutagenic?</b>   |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>The objective of this experiment was to determine if Reishi Mushroom preparations mutate bacterial DNA.</p> <p><b>Methods/Materials</b><br/>Dilution 1 (1x) of Reishi Mushroom, Capsules, Tea Leaves, and Tea Extract were mixed in DMSO (water for the tea extract). Dilution 1 was serially diluted to make Dilutions 2, 3, and 4. The bacteria were incubated the day before the experiment. The reaction mixture containing Davis Mingioli salts, D-glucose, bromocresol purple, D-biotin, and L-histidine was made. Negative controls (DMSO or Water), positive control mutagens, and each Reishi preparation were added to the reaction mixture with or without metabolic activation system (S-9) mix. Each sample was mixed with TA98 or TA100. The sample were added to 96 well plates and incubated at 37°C for 5-6 days. If bromocresol purple turned yellow, it meant the bacteria had been mutated.</p> <p><b>Results</b><br/>Without metabolic activation in TA100, the Reishi Tea Extract Dilutions 1, 2 and 3 showed a significant increase in yellow wells compared to the Background. With metabolic activation in TA100, the Dilution 1 and 2 showed a significant amount of wells compared to the Background. These changes were concentration-dependent. However, Tea Extract did not show an increase in yellow wells for TA98. The Reishi Capsules Dilutions 1 and 4 showed an increase in yellow wells in TA98 with metabolic activation (compared with DMSO). However, these changes were not concentration-dependent. Reishi Capsules did not show an increase in yellow wells in TA100 or in TA98 without metabolic activation. The Reishi Mushroom and Tea Leaves did not show a significant amount of positive wells compared to the DMSO control.</p> <p><b>Conclusions/Discussion</b><br/>Reishi Tea Extract had chemicals that were mutagenic to TA100 in a concentration-dependent manner. Reishi Capsules are possibly mutagenic to TA98, but this effect was not concentration-dependent. The hypothesis of this experiment was that at least one out of four of the Reishi preparations would be mutagenic. According to the results of this experiment, two of the four Reishi preparations (Reishi Tea Extract and the Reishi Capsules) were mutagenic. Therefore, the hypothesis was correct. However, one cannot conclude that Reishi Mushroom can cause cancer because this test only detects mutations, which may have no effect (silent mutation), harmful effect (causes cancer or loss of function), or a beneficial effect (improvement in a function).</p> |                                       |
| <b>Summary Statement</b><br>The Reishi Tea Extract with and without metabolic activation was mutagenic to TA100 and the Reishi Capsules with metabolic activation was mutagenic to TA98.   |                                       |
| <b>Help Received</b><br>Used lab equipment in Neurocrine Biosciences, dad provided training with experimental methods, EBPI supplied reagents for this experiment.   |                                       |