# CALIFORNIA STATE SCIENCE FAIR
# 2011 PROJECT SUMMARY

**Name(s)**

Vishwaesh Rajiv

**Project Number**

**S0525**

**Project Title**

## A Novel Approach to Fighting Cancer: Silencing hif-1 in C. elegans to Study the Resulting Effects of Hypoxic Survival

**Abstract**

**Objectives/Goals**

Simulate a model of a cancer cell in a tumor by using C. elegans mutants which had abnormal cellular growth in their germ cell area of their bodies. Then, kill/damage this clump of cells under an induced state of hypoxia (which is ever-present in a tumor) using RNAi gene silencing.

**Methods/Materials**

I grew C. elegans mutant strains on feeder bacteria plates. Creating the RNAi feeding strain involved genomic DNA lysis, Polymerase Chain Reaction, Gel Extraction, ligation, sub-cloning, plasmid miniprep, and E. coli transformation into final RNAi feeding strain.

Materials included: NGM medium, all necessary PCR reagents (including primer mixes)/equipment, all necessary gel electrophoresis supplies, micropipettors, L4440 feeding vector, Ligase mix, E. coli HT115(DE3) strain, LB plates, ampicillin, centrifuges, and other standard lab supplies (for example, tubes).

**Results**

None of the worms were dead, although many subjected to the RNAi treatment had severely restricted movement in the germ cell area line in their body cells and extensive damage to the same abnormal clump of germ cells (shown by lysing). Because all other variables were controlled in the experiment, this can be assumed that the RNAi treatment was mostly successful as it damaged the tumor-like clump of cells.

**Conclusions/Discussion**

My experiment overall supported my hypothesis: silencing the gene hif-1 in the mutant C. elegans under hypoxic stress did in fact damage the abnormal tumor-like germ cells. In order to further quantify this tumor-like cells' damage, given more time, I would have examined the proteins or chemicals released by the impaired cells and analyzed the full extent of the damage of the RNAi treatment.

**Summary Statement**

My project is simulating a tumor by using C. elegans mutants with abnormal clumps of germ cells and critically damaging these cells under naturally induced hypoxic stress by RNAi gene silencing to show a potential treatment for cancer.

**Help Received**

Used lab equipment at A Schmahl Science Workshop under supervision of mentor Dr. Ronald Birrell