California Science Center

CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)
Annie Li

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)
The Application of a Retroviral Vector to Transduce Genes within Cells

Science Fair Use Only

S0318

Division
_ Junior (6-8) _X_ Senior (9-12)

Preferred Category (See page 5 for descriptions.)
12 - Microbiology

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)
Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

The application of a retroviral vector can be useful in gene therapy and the study of certain components of viruses, such as the Hepatitis C virus (HCV). Gene therapy has revolutionized the treatment of genetic diseases by replacing the function of a defective gene with a correct function of another gene. This eliminates the need for repeated drug administration, risks of protein administration, and immunogenicity. The application of the Murine leukemia virus (MLV) based retroviral vector has become the primary tool for gene delivery into hematopoietic cells because of its high efficiency of gene transduction. In this study, the efficiency of gene transduction with this retroviral system was tested with the use of two reporter genes: enhanced green fluorescence protein (EGFP) and then a bacterial gene (lacZ). Next, the reporter genes were replaced by core protein from HCV and then the viral oncongene v-myc to test its transformation ability in NIH3T3 cells, a non-transformed mouse fibroblast cell line. As a result, this system successfully transduced the lacZ gene within 5,720 cells in a 60-mm.2 cell culture, but it did not transform the NIH3T3 cells with v-myc. Currently, I am using the MLV-VSVg (EGFP) to validate the efficiency of this retroviral gene transduction system. Meanwhile, I am constructing MLV-VSVg(core) to infect peripheral blood cells to test if HCV core protein alone is able to transform normal blood cells.

Summary Statement (In one sentence, state what your project is about.)
In this project, a retroviral vector is being constructed to efficiently transduce genes within cells for the study of different parts of viruses and the use in gene therapy.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.
Used lab equipment at U.S.C. Med. Ctr. under the supervision of Dr. Michael Lai; Participant in Howard Hughes Program; Father helped wire board