CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
S0428

Project Title
SNP Detection of a 410bp Region of MTRR Promoter in Colorectal Adenoma Patients

Abstract

Objectives/Goals
Studies have shown low folate is associated with colorectal cancer precursor lesion (adenoma) development. The one-carbon cycle is a folate-dependent biochemical process important for DNA synthesis and methylation. Methionine synthase reductase (MTRR) is an enzyme responsible for restoring cobalamin activity, an important process in the one-carbon cycle. Defects in the MTRR gene are hypothesized to lower folate availability because of potential unwanted effects on MTRR enzyme efficiency. The purpose of this project is to analyze a 410bp region of the promoter for single nucleotide polymorphisms (SNPs), a single base pair change not yet considered a mutation, in samples with colorectal adenomas.

Methods/Materials
Denaturing High-Performance Liquid Chromatography (DHPLC) was used. Computer screening and direct sequencing protocols of 28 randomly-selected samples specialized for SNP detection were used.

Results
Results show a heterozygous 2479T##C/T SNP in the targeted region in the positive controls. In actual cases, 27% of the case showed similar peak formation as that of the positive control.

Conclusions/Discussion
Results suggesting that problems may occur on a transcriptional level, but the effect of the SNP will be studied in future research.

Summary Statement
Detecting single nucleotide polymorphisms in the promoter region of patients with colorectal adenomas, precursor cancer lesions, to elucidate possible genetic factors to be studied for affect on colorectal cancer.

Help Received
Dr. Robert Haile's Laboratory & Staff for equipment and guidance (USC/Norris); Dr. Yong Liu & Joan Levine, mentors; Daan Ren, DNA sequencing technician