Summer Student Research Program
Project Description

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PROJECT TITLE (200 Characters max):

Inhibition of Growth and Induction of Differentiation in Colon Cancer Cells

HYPOTHESIS:
The hypothesis to be tested is that polyphenolic molecules derived from plants may act synergistically with inhibitors of histone deacetylases to inhibit growth and induce differentiation in colon cancer cells.

PROJECT DESCRIPTION (Include design, methodology, data collection, techniques, data analysis to be employed and evaluation and interpretation methodology)

The objective of the research program is to understand the mechanisms by which growth and differentiation of cancer cells can be regulated. Attention is being focused on mechanisms that involve side-chain modification of histones in the regulation of gene expression. Compounds under investigation include naturally occurring polyphenolic molecules found in fruits and vegetables. Preliminary data indicate that a fraction from Okra seeds that contains polyphenolic molecules can have a biphasic effect on the proliferation of colon cancer cells in which there is a stimulation of proliferation at low concentrations and an inhibition of growth at higher concentrations. One of the questions to be addressed is whether these actions are exerted by a single molecule or represent the action of multiple compounds.

The project will use colon cancer cells maintained in culture as model systems. The parameters to be observed include effects on cell cycle progression and the induction of enzyme activities in colon cancer cells. The enzymes to be examined as markers of colon cancer cell differentiation include alkaline phosphatase, dipeptidyl peptidase and aminopeptidase. The action of agents under investigation will be correlated with effects on histone acetylation and methylation as judged by immunoblotting of histones isolated from the cells under investigation. Several colon cancer cell lines will be examined because our past work has indicated that they can differ considerably in their response to agents that can induce some parameters of colonocyte differentiation.

Evidence will be sought that polyphenolic molecules can influence colon cell growth and differentiation through effects on histone side-chain modification.

Data will be analyzed statistically using the Instat program.

SPONSOR’S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH:


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IS THIS PROJECT SUPPORTED BY EXTRAMURAL FUNDS?

Yes ☑  or  No ☐
(If Yes, please supply the granting agency’s name)

Alma Toorock Memorial for Cancer Research

THIS PROJECT IS:  ☑ Clinical  ☑ Laboratory  ☐ Behavioral  ☐ Other

THIS PROJECT EMPLOYS RADIOISOTOPES  ☐

THIS PROJECT INVOLVES THE USE OF ANIMALS  ☐

Pending ☐  Approved ☑  IACUC Protocol #

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS  ☐

Pending ☐  Approved ☑  IRB Protocol # M

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

The student will become familiar with tissue culture techniques and several techniques used in biochemistry and molecular biology. The student will be exposed to the design of experiments and the evaluation of data including statistical analysis. Evaluation of published research and literature searching will be a part of the project.