CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
S1435

Project Title
Contortrostatin: Evaluation of Its Effect on Ovarian Tumor Growth

Abstract

Objectives/Goals
Evaluate the effectiveness of using a reporter gene (SEAP) to monitor ovarian tumor progression and to determine the efficacy of contortrostatin (CN) treatment on the progression of ovarian tumors.

Methods/Materials
Twelve immunodeficient mice were each injected with A2780 human ovarian cancer cells. The A2780 cell line is a metastatic ovarian carcinoma cell line transfected with a gene for secreted alkaline phosphatase (SEAP). Following 11 days of tumor growth the mice were divided into two groups of six (control and treated). The treated group received 20micro grams of CN (a protein from the venom of the southern copperhead) injected intraperitoneally twice a day, with the control receiving saline injections of the same volume. Mice from each group were randomly selected and weighed approximately once a week. After being weighed, the mice were anesthetized with Nembutal and blood was drawn in accordance with USC animal resource guidelines. Blood samples were then analyzed for the presence of SEAP using a commercially available assay for alkaline phosphatase based on the fluorescence of 4-methylumbelliferyl phosphate (MUP).

Results
Following 11 days of tumor growth, all animals exhibited similar plasma levels of SEAP. Over the course of the subsequent treatment period, mice administered CN showed a slowed growth in plasma SEAP, while control mice SEAP levels rose to the maximum detectable amounts. The weight of the two groups did not show a significant difference. Gross examination of control and treated animals by collaborators from the USC Department of Pathology showed a greater degree of tumor dissemination in the control compared to the treatment group.

Conclusions/Discussion
Ovarian tumors, the 5th leading type of cancer to cause death, are not solid tumors and in experimental models, there is no reliable method for determining tumor burden. The expression of a marker gene in the blood, as observed in this study, is a novel and valid method to quantitate the degree of tumor growth and ultimately tumor burden. This experiment shows that the administration of the disintegrin CN slows tumor growth. Future experiments will focus on both microscopic spread of tumors and vascularization of the tumors in the presence of CN. The SEAP assay provides a novel method to evaluate the growth and dissemination of ovarian tumors and a method to evaluate in vivo the growth of ovarian tumors.

Summary Statement
The purpose of these studies is to develop and evaluate a novel method for measuring the growth and dissemination of ovarian tumors both in the absence and presence of the investigational drug contortrostatin.

Help Received
The Norris Cancer Research Center laboratory of Dr. Francis S. Markland provided the laboratory space and supplies. Supervision of the project and biological samples were collected by Dr. Swenson and Dr. Golubkov. Participant in the Bravo/USC Biomed Program.