MPC Corporation

Annual Progress Report: 2005 Formula Grant

Reporting Period

July 1, 2009 – December 31, 2009

Formula Grant Overview

The MPC Corporation received $160,481 in formula funds for the grant award period January 1, 2006, through December 31, 2009. Accomplishments for the reporting period are described below.

Research Project 1: Project Title and Purpose

Long-term Adjustment Among Young Breast Cancer Survivors - With previous NCI-funding, younger women with breast cancer were enrolled in a treatment project that was designed to enhance their psychological response to their diagnosis and treatment. The women who participated in the active intervention programs reported better physical functioning and less depression, compared to the standard care group. The purpose of this project, which reflects an outgrowth of activities of the Pittsburgh Mind-Body Center (an NHLBI-funded center jointly operated by the University of Pittsburgh and Carnegie Mellon University), is to collect data that will assess the feasibility of conducting a follow-up study of this same group of young breast cancer survivors, five to nine years after their treatment program ended.

Duration of Project

1/1/2006 - 12/31/2006

Summary of Research Completed

This project ended during a prior state fiscal year. For additional information, please refer to the Commonwealth Universal Research Enhancement C.U.R.E. Annual Reports on the Department's Tobacco Settlement/Act 77 web page at http://www.health.state.pa.us/cure.

Research Project 2: Project Title and Purpose

NMR Research Initiative - This research initiative will seek to advance the state-of-the-art in applications of *in vivo* magnetic resonance imaging (MRI) and spectroscopy (MRS) in order to understand tissue and organ function and to optimize these new research methods for application by others. Scientists working at the Pittsburgh NMR Center for Biomedical Research (NMR Center) will be conducting the research.

Duration of Project

1/1/2006 - 6/30/2008

Summary of Research Completed

This project ended during a prior state fiscal year. For additional information, please refer to the Commonwealth Universal Research Enhancement C.U.R.E. Annual Reports on the Department's Tobacco Settlement/Act 77 web page at http://www.health.state.pa.us/cure.

Research Project 3: Project Title and Purpose

Chronic Stress, Glucocorticoid Resistance and the Inflammatory Response - This project is an outgrowth of activities of the Pittsburgh Mind-Body Center (an NIH funded center jointly operated by the University of Pittsburgh and Carnegie Mellon University) and represents a supplemental protocol added to a recently NCI-funded study, which is designed to examine the efficacy of a multi-modal psychosocial intervention for children newly diagnosed with cancer and their families. The parent grant does not explore any biological factors but presents an exceptional opportunity to begin to investigate whether a stress-management intervention known to reduce levels of psychological distress among a highly stressed population also benefits the hormonal and immune responses that typically accompany chronic stress and are postulated to result in adverse physical health outcomes.

Duration of Project

1/1/2006 - 12/31/2009

Project Overview

The scientific literature provides initial evidence that chronic stress influences the responsivity of a person's immune system to stress hormones and that tangible social support can buffer these effects. However, it remains unclear whether this observation represents a causal phenomenon. One way to more directly examine the causal nature of the relationship between immune responses and stress hormones is to intervene to reduce levels of stress and determine whether this intervention alleviates the associated changes in the responsivity of the immune system. The primary goal of this project is to provide preliminary data needed to examine more formally whether a stress-management intervention known to reduce levels of distress and designed to increase tangible support among mothers of children with cancer can also result in a decrease in stimulated levels of certain immune parameters and in the responsivity of those parameters to stress hormones. In other words, the project can improve upon the existing intervention literature by collecting the preliminary data needed to examine whether an effective stress management intervention alleviates the immune dysregulation that accompanies stress and, as a consequence, may be of both mental and physical health benefit.

The project will randomly assign participants to an intervention group or a standard level of care control group. The intervention group will participate in a multi-modal stress management

intervention. Data will be collected from all participants at two timepoints, corresponding to pre- and post-intervention. Psychosocial information relevant to the treatment intervention will be obtained (e.g, ratings of perceived stress), as well as measures of immune functioning and neuroendocrine responsivity to stress. Information gained from this project will be vital in the preparation of a National Institutes of Health (NIH) proposal examining these same processes in a more definitive manner.

Principal Investigator

Anna Marsland, PhD, RN
University of Pittsburgh
Department of Psychology
Langley Hall, Room 434C
Fifth and Ruskin Avenues
Pittsburgh PA 15260

Other Participating Researchers

Karen A. Matthews, PhD, Lori Arnold, MS, Cindy Kravetz - employed by University of Pittsburgh

Expected Research Outcomes and Benefits

This project will leverage a parent project already funded by the National Cancer Institute (NCI). The parent project is designed to evaluate the effectiveness of a psychosocial intervention targeted to reduce stress and enhance psychological adjustment among families with children with cancer. This project will add several biological markers of stress and immune functioning to that study in order to gain preliminary data that will allow a more definitive determination of whether the intervention enacted as part of the parent study can also influence these biologic markers. This knowledge is important because the project will directly determine whether it is possible to enhance biologic functioning, and by implication, physical health through a psychological intervention program designed to reduce stress. The preliminary findings generated from this project will provide the necessary statistical justification to prepare a more formal proposal for NIH funding. The preliminary data gathered from this project will also allow a more precise determination of the exact nature and scope that the more formal project should take. To the extent that the findings ultimately show a benefit for health, the intervention could be exported more widely for general use among this group of persons — i.e., families with children with cancer.

Summary of Research Completed

The study was conducted to gather preliminary evidence regarding the possible health benefits of an intervention designed to reduce stress and enhance coping among a sample of mothers of children newly diagnosed with cancer. A primary aim of the pilot work was to provide the statistical justification in support of an application for external grant funding. Data collection was completed at the end of 2008 and an initial R01 proposal for NIH funding was submitted to NCI

in December, 2008. We received feedback from NCI in July 2009 and revised and resubmitted this application in March 2010. We also used our findings to support a grant application to the American Cancer Society. This grant was submitted in March 2009, resubmitted in October 2009, and awarded in May 2010. The value of that grant ($951,000) represents an over 20-fold amplification of the seed funding provided by the CURE grant.

Research Project 4: Project Title and Purpose

Flavoprotein Autofluorescence Imaging for Functional Brain Mapping - Flavoprotein autofluorescence imaging (FAI) is a method that allows investigators to view the activity of cortical neurons *in vivo* by measuring cellular metabolic rate. This technique can measure both spatial and temporal changes in brain activity and has the potential to analyze an individual neuron. The technique also has advantages because it measures natural changes in cellular metabolic rate rather than introducing a dye or other chemical for visualization, thus avoiding possible cellular toxicity. Furthermore, the FAI may be utilized in research models of development, aging, stroke, and cancer because tissue metabolic activity is a critical indicator of various physiological and pathological conditions. The purpose of this study is to examine the feasibility of FAI for functional brain mapping in advanced research models.

Duration of Project

1/1/2006 - 6/30/2008

Summary of Research Completed

This project ended during a prior state fiscal year. For additional information, please refer to the Commonwealth Universal Research Enhancement C.U.R.E. Annual Reports on the Department's Tobacco Settlement/Act 77 web page at http://www.health.state.pa.us/cure.