

BOARD MEETING DATE: March 1, 2019

AGENDA NO. 10

PROPOSAL: Annual Meeting of the Health Effects of Air Pollution Foundation

SYNOPSIS: This item is to conduct the annual meeting of the Health Effects of Air Pollution Foundation. The Foundation staff will present an annual report detailing the research supported by the Foundation over the past year, the Foundation's plans for the future, and a financial report.

COMMITTEE: No Committee Review

RECOMMENDED ACTION:

Receive and file the annual report and ratify the Foundation's disbursements described in the annual report.

Wayne Nastri
Executive Officer

BTG:ML

2018 Annual Report

1. Background

In February 2003, the SCAQMD Board directed staff to establish the Brain Tumor and Air Pollution Foundation to implement an initiative by the Board Chairman to fund research into the potential connections between air pollution and brain cancer. After years of supporting research related to the impacts of air pollution on brain tumors, in March 2017 the Board changed the Foundation's name to the Health Effects of Air Pollution Foundation and expanded the Foundation's mission to support research on the incidence, detection, and causes and cures of various health conditions that may be caused or aggravated by air pollution. To date, the Foundation has received contributions of almost \$9 million and has funded studies with leading medical and public health researchers in Southern California.

2. Directors and Officers

The Directors of the Foundation are: Ben Benoit, Chairman
Dr. William A. Burke, Vice Chairman
Dr. Clark E. Parker, Sr.
Judith Mitchell

The Foundation's staff is: Wayne Nastri, Chief Executive Officer
Denise Whitcher, Secretary
Sujata Jain, Treasurer
Susanna Leung, Assistant Treasurer

3. Report on the Foundation's Activities

Current Research Projects

The following are four research projects in progress that are currently being funded by the Foundation:

“A Cohort Study of Air Pollution, Malignant and Benign Brain Tumors in Los Angeles County” (BTAP010)

Principal Investigator: Dr. Anna Wu (University of Southern California)

Approved Funding: \$758,978

Summary: The proposed study will leverage the Multiethnic Cohort (MEC) study to examine whether air pollution is associated with primary malignant and benign brain tumors. The investigators leverage previous air pollution exposure work and propose adding new components (e.g. ultra-fine particle exposure, air toxics) to comprehensively assess air pollution exposures in the MEC cohort. The study proposes to examine associations between traffic air pollution and malignant primary brain cancer and meningiomas (non-cancerous brain tumors). Key milestones that have been accomplished so far include obtaining administrative approvals to conduct the research, calculating estimates of participants' exposures to criteria pollutants and ultrafine particles, conducting data management activities, and completing data linkages to cancer registries and Medicare and hospital discharge administrative files to identify brain tumor cases. As of January 2019, the project is still in progress, and the contract term has been extended to January 2020.

“Role of Particle-Induced Inflammation in Progression of Brain Tumors” (BTAP011)

Principal Investigator: Dr. Keith Black (Cedars-Sinai Medical Center)

Approved Funding: \$733,461

Summary: The investigators propose to study whether exposure to ambient air pollution-derived particulate matter (PM) alters the progression of brain tumors in

mice. The mice proposed to be used in the experiments have brain tumors initiated from human glioblastoma cell lines. The PM will be concentrated for experimental use from Irvine, California ambient air. As part of this study, changes in tumor progression and inflammatory markers (measured by changes in gene expression) and stem cell activation will also be evaluated. Key milestones that have been accomplished so far include the completion of the first experimental stages on tumor-bearing and non-tumor bearing mice. The mice were separated into four groups, which were exposed to filtered air, coarse PM, fine PM, and ultrafine PM for one month. The exposure period was originally planned to be 2 months, but had to be reduced to one month due to the tumor-bearing animals showing signs of distress and malaise. Molecular analyses (RNAseq and proteomics) were performed on the brain tissues of the non-tumor bearing mice, and preliminary findings show indications of changes in gene expression in certain pathways that play a fundamental role in cancer development, neurological disorders, inflammation and immune response, metabolic disorders, cardiovascular system function and disease, and other functions and diseases. In December 2018, the contract term was extended to June 2019.

“Do Changes in Amount and Composition of Ambient PM Influence Induction or Exacerbation of Brain and Lung Tumors?” (HEAPF012)

Principal Investigator: Dr. Arthur Cho (University of California, Los Angeles)

Approved Funding: \$979,182

Summary: This study proposes to use cellular and mouse models to investigate whether exposure to air pollution (PM and vapor phase) increases the expression of biological markers that are associated with the development or progression of lung or brain cancers. The investigators propose to collect ambient air samples at several locations and in different seasons in the Los Angeles Air Basin. The samples will be characterized for their potential biological actions, and then used in studying the potential effects in human lung cancer cells and brain cancer cells. Biological markers relevant to cancer development or progression (oxidative stress, inflammation, tumor cell growth stimulators, and invasive behavior of cells) will be evaluated in these experiments. The air samples will also be used in an exposure study of mice induced with brain cancer cells, to monitor and quantify tumor growth. Additionally, the study will separate the PM from the air samples into “fractions” with different chemical properties, and these PM fractions will be tested for toxicity using human lung and brain cancer cells, the same biological markers for inflammation and tumor cell growth. Key milestones that have been accomplished so far include collection of samples from all five collection sites, and hiring key staff to conduct the study components. The study experienced an administrative delay due to a requirement to inspect and approve the facility where the research will be conducted. The final preliminary cell effects study has been

completed, and was used as a reference sample to normalize differences in protein expression. This project is scheduled to complete in December 2019.

“Role of Particle-Induced Inflammation on Progression of Neurodegenerative Brain Disease” (HEAPF013)

Principal Investigator: Drs. Keith Black and Julia Ljubimova (Cedars-Sinai Medical Center)

Approved Funding: \$750,000

Summary: This study proposes to study whether exposure to ambient air pollution-derived particulate matter (PM) alters the progression of neurodegenerative disorders in mice. The mice proposed to be used in the experiments include ones that are genetically modified so that they will develop Alzheimer’s disease, as well as control wild-type mice. The mice were separated into four groups, which were exposed to filtered air, coarse PM, fine PM, and ultrafine PM for three months or six months. The PM will be concentrated for experimental use from Irvine, California ambient air. As part of this study, changes in disease progression and biomarkers of Alzheimer’s disease will also be evaluated. Key milestones that have been accomplished so far include the initiation of the three and six month PM exposure periods in three cohorts of mice, updates to the experimental timeline and quantifiable hypotheses based on the pathology of the mice used in the experiments, completion of three and six month exposures of filtered air in healthy control mice, and completion of PM experiments in healthy control mice using RNAseq and proteomic analysis, which resulted in the identification of key biomarkers that link PM exposures to Alzheimer’s disease. The researchers have also completed data quality assurance, data analysis, and biostatistical analysis activities. In December 2018, the contract term was extended to June 2019.

4. Financial Report

The Foundation’s fiscal year ended June 30, 2018. Financial statements were prepared by staff and audited by BCA Watson Rice, LLP (Auditor). Total expenses for the fiscal year were \$1,037,788 and included grants (\$1,036,480), audit fees (\$1,203) and other fees/taxes (\$105). The Auditor issued an unmodified opinion, indicating that the financial statements were presented fairly, in all material respects, and in accordance with generally accepted accounting principles.

As of December 31, 2018, the Foundation had a cash balance of \$1,909,628. Following is an accounting of the Foundation’s operations since its inception (7/23/03):

Revenue from Operations	
Contributions	\$8,972,568
Interest Income	43,801
<i>Total Revenue from Operations</i>	\$9,016,369
Operating Expenses	
Grants	
-Cedars-Sinai	\$6,068,110
-UCLA	316,030
-USC	703,402
Corporation Filing Costs	1,714
Bank charges	598
Professional fees-audit	16,887
<i>Total Operating Expenses</i>	\$7,106,741
Cash Balance	\$1,909,628

5. Plans for the Upcoming Year

The Foundation will continue monitoring the progress of the existing research projects and will provide an update to the Board when the projects have final results to report. During the February 2019 meeting, the Foundation Board members discussed reaching out to the existing researchers to conduct additional research stemming from the currently funded projects, as well as interest in funding new research to address community concerns about childhood asthma.

6. Resource Impacts

None.