

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 04-34

November 18, 2004

Agenda Item No.: 04-10-2

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2555-245, entitled "Effects of Ozone and Nitrogen Dioxide Exposure on Cardiovascular Responses in Healthy and Susceptible Humans," has been submitted by the University of California, San Francisco;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 2555-245, entitled "Effects of Ozone and Nitrogen Dioxide Exposure on Cardiovascular Responses in Healthy and Susceptible Humans," submitted by the University of California, San Francisco, for a total amount not to exceed \$399,032.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 2555-245, entitled "Effects of Ozone and Nitrogen Dioxide Exposure on Cardiovascular Responses in Healthy and Susceptible Humans," submitted by the University of California, San Francisco, for a total amount not to exceed \$399,032.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed \$399,032.

I hereby certify that the above is a true
And correct copy of Resolution 04-34, as
Adopted by the Air Resources Board.

Lori Andreoni, Clerk of the Board

ATTACHMENT A

“Effects of Ozone and Nitrogen Dioxide Exposure on Cardiovascular Responses in Healthy and Susceptible Humans”

Background

Epidemiology studies indicate that both ozone (O₃) and nitrogen dioxide (NO₂) are associated with increased cardiovascular morbidity and mortality, and with decreased heart rate variability (HRV), a risk factor for adverse cardiovascular outcomes. However, epidemiological studies can not establish causality, only statistical association. Biological mechanisms that could explain air pollution induced cardiovascular effects are unknown, and no controlled human exposure studies have investigated the effect of O₃ or NO₂ on HRV.

Objective

The objective of this project is to investigate several possible mechanisms through which O₃ and NO₂ could alter HRV in healthy and asthmatic humans. The investigation will focus on mediators of airway and systemic inflammation, components of the renin-angiotensin (system that regulates blood volume, arterial pressure, and cardiac vascular function), and blood coagulability that could plausibly influence HRV.

Methods

The study will involve 20 healthy and asthmatic subjects (ages 18-55) who will undergo four-hour, intermittent exercise exposures to 0.2 ppm O₃, 0.4 ppm NO₂, and filtered air. Endpoints will include pulmonary function, airways inflammation, biochemical mediators of airway and systemic inflammation, and several mechanisms that could influence HRV (the renin-angiotensin system and blood coagulability).

Expected Results

The results of this project will help fill a critical data gap: the biological basis for epidemiologic findings that O₃ and NO₂ exposure can induce adverse cardiovascular effects. The results will either validate or refute epidemiological reports.

Significance to the Board

The results will provide critical support for future reviews of the ambient air quality standards for O₃ and NO₂.

Contractor:
University of California, San Francisco

Contract Period:
42 months

Principal Investigator (PI):
Karron L. Power, M.D., M.P.H.

Contract Amount:
\$399,032

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
This is Dr. Power's first submission as PI, although she was co-PI on a recently completed, ARB-funded research contract. Her contributions to the previous contract were of high quality, and were key to the projects success. The co-PIs on this project also participated in the previous project, resulting in a strong research team.

Prior Research Division Funding to UCSF:

Year	2003	2002	2001
Funding	\$497,990	\$0	\$0

BUDGET SUMMARY

University of California, San Francisco

“Effects of Ozone and Nitrogen Dioxide Exposure on Cardiovascular Responses in Healthy and Susceptible Humans”

DIRECT COSTS AND BENEFITS

1.	Labor and Employee Fringe Benefits	\$ 299,956
2.	Subcontractors	\$ 0
3.	Equipment	\$ 0
4.	Travel and Subsistence	\$ 1,000
5.	Electronic Data Processing	\$ 0
6.	Reproduction/Publication	\$ 600
7.	Mail and Phone	\$ 900
8.	Supplies	\$ 21,000
9.	Analyses	\$ 0
10.	Miscellaneous	<u>\$ 39,300¹</u>

Total Direct Costs \$362,756

INDIRECT COSTS

1.	Overhead	\$ 36,276
2.	General and Administrative Expenses	\$ 0
3.	Other Indirect Costs	\$ 0
4.	Fee or Profit	<u>\$ 0</u>

5. Total Indirect Costs \$36,276

TOTAL PROJECT COSTS

\$399,032

¹ These costs include human subject payments, and costs for use of the bronchoscopy facilities at San Francisco General Hospital.