

GRANT APPLICATIONS SOUGHT  
BY THE NATIONAL CARIES PROGRAM,  
NATIONAL INSTITUTE OF DENTAL RESEARCH

A N N O U N C E M E N T

The National Caries Program, National Institute of Dental Research, was created in 1970 to bring about a significant decrease in the incidence of caries. All activities of the National Caries Program are designed to contribute to this goal, and consist of a continuum of efforts from knowledge gathering fundamental research on the subtleties of caries etiology through highly applied testing, field trials, and demonstration of caries preventive agents.

Through research grants, the National Caries Program seeks to develop information on the etiology, pathogenesis, and mechanism of dental caries and to help advance fundamental research findings to the stage of more applied research and development of caries preventive measures. The National Caries Program has announced previously its interest in encouraging the submission of high quality research grant applications proposing investigations which would provide a better understanding of "Mechanisms for Control of Oral Flora" (June 24, 1974, *NIH Guide for Grants and Contracts Supplement*), "Root Surface Caries" (December 12, 1974, *NIH Guide for Grants and Contracts Supplement*), and "Mechanisms of Action of Fluoride" (August 8, 1975, *NIH Guide for Grants and Contracts*).

The purpose of this announcement is to continue to encourage submission of grant applications in these areas and to transmit to the research community information on important areas for investigation which have been identified at recently convened National Caries Program sponsored conferences and workshops ("Identification of Cariogenic Bacteria by Fluorescent Antibody and Other Techniques: An International Symposium", A.S. Bleiweis, Ed., *J. Dent. Research* 55: A1-A206, 1976, American Dental Association, Chicago; "Immunological Aspects of Dental Caries", R.J. Genco, Ed., *J. Dent. Research* 55: C1-C230, 1976, American Dental Association, Chicago; "Immunologic Aspects of Dental Caries: Selection of Immunogens for a Caries Vaccine and Cross Reactivity of Antisera to Oral Microorganisms with Mammalian Tissues", W.H. Bowen, R.J. Genco, T.C. O'Brien, Eds., Special supplement to Immunology Abstracts, Information Retrieval, Inc., Washington, D.C.; "Cariostatic Mechanisms of Fluorides", W.E. Brown, Ed., *Caries Research* 11 (supplement), 1976, S. Karger, A.G. Basel; "Microbial Aspects of Dental Caries", H.M. Stiles, W.J. Loesche, T.C. O'Brien, Eds., Special supplement to Microbiology Abstracts, Information Retrieval, Inc., Washington, D.C.). Specific examples of areas of program interest identified by participants at these conferences include the following:

To determine the influence of surface properties of enamel on the composition of pellicle and colonization by oral microorganisms, studies on the role of fluoride in promoting or inhibiting the absorption of protein films to enamel are needed. Information is needed on the effect(s) of fluoride on the overall porosity and pore size distribution of enamel.

More information is required on the ability of pellicle and plaque to concentrate fluoride and the possible influence of pellicle and plaque fluoride on the uptake of fluoride by enamel. In relation to the availability of fluoride to enamel, studies need to be initiated on mechanisms for uptake and release of fluoride by enamel and apatite. Information is needed on the distribution of fluoride in different areas of the mouth, the form and availability of fluoride in plaque, and the amount of fluoride in plaque fluid.

To allow verification of and extrapolation from in vitro model systems, the effect of fluoride on plaque, pellicle, and enamel characteristics needs to be studied in animal models.

Studies need to be initiated on the uptake of fluoride and certain trace elements by plaque microorganisms, and the specific effects of these trace elements on the growth rate, metabolism, and structural integrity of oral microorganisms grown under a variety of controlled conditions. New research efforts are needed to identify plaque microorganisms capable of binding fluoride, the specific binding site, and the energy dependence of this activity. Efforts should be made to assess the possible interaction of the effects of fluoride with immunological and non-immunological host-protective factors present in saliva.

Concerning research on the role and mechanisms of action of s-IgA in relation to dental caries prevention, studies on both the local and central mechanisms for stimulation of secretory immune responses in the salivary glands are needed. The importance of systemic versus secretory response in the prevention of dental caries needs to be ascertained. The uptake and sequence of antigen processing in peripheral and central secretory immune sites including dose/response relationships of selected antigens needs further investigation.

Methods to quantitatively measure immunoglobulins and antibodies in order that laboratory estimates of response to a caries vaccine can be correlated with levels of protection need to be developed. Approaches to optimize the secretory immune response including route of immunization, schedule of immunization, and use of biologically acceptable adjuvants needs further examination.

Information is needed on the cell surface variability of cariogenic microorganisms under oral environmental and nutritional conditions, the cell surface availability of specific surface components of cariogenic microorganisms which could act as an immunogen(s) in stimulating an immune response resulting in caries reduction, whether the antigens involved in adherence are the same antigens being considered

as immunogens in caries vaccine experiments, how saliva may affect the growth capabilities of oral microorganisms, and how salivary factors may influence the interaction of s-IgA with bacterial cell surface components.

Additional studies are needed on the importance of extracellular bacterial components in the mouth acting as inhibitors of s-IgA - bacterial interaction, the influence of salivary factors which may modify the potential protective effects of s-IgA against caries, and the relationship between IgA subclass in saliva and caries experience.

Receipt dates for grant applications by the Division of Research Grants are March 1, July 1, and November 1. Review and award of such applications will be through the usual NIH procedures.

Preliminary drafts of the proposals and other inquiries regarding this announcement, including earlier program announcements and conference proceedings, may be addressed to Dr. Thomas C. O'Brien, Chief, Caries Grant Programs Branch, National Caries Program, National Institute of Dental Research, National Institutes of Health, Room 522, Westwood Building, Bethesda, Maryland 20014, telephone (301) 496-7884.