

**Final Report**  
**Grant # NNG04GG87G**  
**P. I. – P.J. Duke, Ph.D.**

I. The objective of the grant NNG04GG87G was to support a symposium entitled “Dentists on Mars” to be held as one of the special symposia approved as part of the meeting of the International Association for Dental Research March 10-13 in Honolulu Hawaii. Originally, there were to have been four speakers in addition to Dr. Duke, the organizer, but one of the speakers (Dr. Lewis) had to have hip surgery, and Dr. Duke was not able to find a replacement, and so gave the talk herself. (See attached brochure.)

The money that was to have supported that speaker, however, had to be used to support the international speaker required for approval of the symposium by IADR.

The symposium was held 8-10 AM, Thursday, March 11, 2004 in the ball room of the convention center in Honolulu. Due to the location of the symposium (upstairs from the main floor) and the location of the meeting (Honolulu), the symposium was not well attended. We were also in competition with an excellent tissue engineering symposium. The 30 or so attendees, however, stayed throughout the 2 hour period, and asked questions of each speaker.

II. Deliverables:

The enclosed brochure, designed and printed by the Dental Branch Orthodontic Department, was distributed at the meeting. Handouts provided by The National Biomedical Research Institute were made available at the symposium door, as well in the general handout area of the convention center.

Also, the organizing committee liked the idea of Dentists on Mars so much that Dr. Duke was asked to speak to the breakfast held by the IADR for minority high school students in the Honolulu area.

The symposium has an abstract and outline online

[http://iadr.confex.com/iadr/2004Hawaii/techprogram/session\\_8836.htm](http://iadr.confex.com/iadr/2004Hawaii/techprogram/session_8836.htm)

This is reproduced below, along with the information sent to the IADR in order to get approval of the symposium. The entire list of approved symposia is also below so that one can see that excellence of the presentations that are allowed.

Because of having to pay the expenses of the international speaker, there was only about \$350 left in the account after paying the speakers. This was not enough to support the proceedings in the Journal for Dental Research as originally planned. I was exploring the options for producing a proceedings when I was informed that the grant had been closed and the money sent back. *In previous years, and for all my previous grants, I have been notified by contracts and Grants that my due dates are coming up. They decided to stop doing this, and whoever at the Dental Branch that was supposed to pick this up did not do it.*

### III. Information send to IADR for approval of the symposium:

- a. The oral health of astronauts, studied last in the mid-1970s on Skylab, has not been a priority area of study for NASA due to the short length of stays on shuttle. But with longer stays on the International Space Station, and planning for a trip to Mars, investigations into how spaceflight affects oral health are needed. The objective of this symposium is to introduce the dental research community to changes occurring in humans who go into space, and how these changes might impact oral health.
- b. This symposium is directed at both junior and senior investigators. Speakers will begin with general comments on the topic, and move on to their specialized research. Each of the speakers is an established spaceflight investigator, having experience doing research in space using animals, cells, and humans, and on Earth, using ground based models of spaceflight. In addition, Dr. Millie Hughes Fulford is an astronaut, who flew in space in 1991, and she will draw on her personal experiences in discussing effects of spaceflight on humans.
- c. We hope first of all to educate the dental community as to the types of research that are being carried out by NASA investigators, and to increase their appreciation for the joys and difficulties of doing this particular type of research. It is also hoped that some of the excellent dental researchers present at this meeting can be persuaded to increase their participation in spaceflight research, and that they, in turn, can persuade NASA that oral health in space should be studied, and measures taken to preserve the oral health of astronauts and cosmonauts on long term missions.
- d. What happens to humans who go into space, and the difficulties of living in space will be covered by Dr. Hughes-Fulford, an astronaut-scientist. Dr. Hughes-Fulford will then discuss her research on cell cultures of osteoblasts in space, and in hypergravity. Dr. Laurence Vico will review what is known about bone loss in humans and rats who go into space, and review ground based models (head down bedrest, and tail suspension) that simulate the unloading of spaceflight. Dr. Gerald Sonnenfeld will review immunological changes that occur in spaceflight, and relate the decreases in various types of immunological responses known to occur to possible effects on oral immunological factors. Dr. Marian Lewis will discuss the effects of spaceflight on gene expression using results from her spaceflight experiments on various cell types.

#### IV. Program information

[http://iadr.confex.com/iadr/2004Hawaii/techprogram/session\\_8836.htm](http://iadr.confex.com/iadr/2004Hawaii/techprogram/session_8836.htm)

Seq #60

Thursday, 11 March 2004

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8:00 AM-10:00 AM Hawaii Convention Center Ballroom, Symposium -  
Group/Division Sponsored

### ***Dentists on Mars***

\* Poster files available online

**Sponsored by:** Dental Materials, Mineralized Tissue

**Description:** The oral health of astronauts, last studied in the mid-1970s on Skylab, has not been a priority area of study for NASA due to the short length of shuttle stays. But with longer stays on the International Space Station, and planning for a trip to Mars, investigations into how spaceflight affects oral health are needed. The objective of this symposium is to introduce the dental research community to changes occurring in humans who go into space, and how these changes might impact oral health. Dr. Millie Hughes-Fulford, an astronaut-scientist, will review what happens to humans who go into space, and the difficulties of living, and carrying out experiments in space. She will then discuss her research on cell cultures of osteoblasts in space, and in hypergravity. Dr. Gerald Sonnenfeld will review immunological changes that occur in spaceflight, and relate the observed decreases in various types of immunological responses to possible effects on oral immunological factors. Dr. Marian Lewis will discuss the effects of spaceflight on gene expression using results from her spaceflight experiments on various cell types. Dr. Jack van Loon, from the Dutch Experiment Support Center, will review what is known about bone loss in humans and rats and metatarsal cultures which go into space, and review ground based models (head down bedrest, and tail suspension) that simulate the unloading of spaceflight. Attendees will gain a knowledge of spaceflight research, and information on getting their own experiments in space. The symposium is supported by the NASA Office of Bioastronautics

- 0356** 8:00 AM **Losing Bone in Space: How and Why**  
**M. HUGHES-FULFORD**, San Francisco VA Medical  
Center, CA, USA
- 8:25 AM **Immunological Changes in Spaceflight**  
**G. SONNENFELD**, Morehouse School of Medicine, Atlanta,  
GA, USA

- 8:50 Spaceflight Induced Changes in Gene Expression  
AM M.L. LEWIS, University of Alabama at Birmingham, AL,  
USA
- 9:15 Flight and Ground Models to Study Mineralized Tissues  
AM P. VELDHUIJZEN, Vrije Universiteit, Amsterdam,  
Netherlands

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## 2004 IADR Accepted Symposia

Honolulu, Hawaii  
March 10-13, 2004

### *Achieving Healthy People 2010 Objectives: Oral Cancer*

Group Organizer: Alice Horowitz (NIDCR/NIH, Bethesda, MD, USA)  
Sponsors: IADR *ad hoc* Committee on Tobacco and Behavioral  
Sciences/Health  
Services Research Group

### *Ensuring Ethnic Minority Participation in Clinical Research: Practical Applications for the Pacific Rim*

Group Organizer: Ruth Nowjack-Raymer (NIDCR/NIH, Bethesda, MD, USA)  
Sponsors: NIDCR and Behavioral Sciences/Health Services Research  
and  
Geriatric Oral Research Groups

### *Challenges and Opportunities for Bioengineering Oral Tissues*

Group Organizer: Rena D'Souza (University of Texas HSC, Houston, USA)  
Group Sponsors: Periodontal Research, Pulp Biology, and Craniofacial  
Biology

### **Dentists on Mars**

**Group Organizer: Jackie Duke (University of Texas Dental Branch,  
Houston, USA)**  
**Group Sponsors: Dental Materials and Mineralized Tissue**

### *Enhancing Opportunities for Oral Health Clinical Research*

Organizer: Bruce Pihlstrom (NIDCR/NIH, Bethesda, MD, USA)  
Sponsor: National Institute of Dental and Craniofacial Research

### *Gene Expression and the Genomics of Pain and Analgesic Drug Actions*

Group Organizer: Raymond Dionne (NIDCR/NIH, Bethesda, MD, USA)  
Group Sponsors: Pharmacology, Therapeutics, and Toxicology &  
Neuroscience/TMJ

### *Healthy Mouth-Healthy Life: Critical Connections between Oral Health and Systemic Well-being*

Group Organizer: Dominick DePaola (Forsyth Institute, Boston, MA, USA)  
Sponsors: ILSI of North America; Geriatric Oral Research, Nutrition,  
and  
Periodontal Research Groups; and Association of State and  
Territorial  
Dental Directors

***Human Genetics Advances for Periodontal Research and Treatment***

**Group Organizer:** Scott Diehl (New Jersey Dental School, UMDNJ, Newark, USA)

**Group Sponsor:** Periodontal Research

***Human Papilloma Viruses & Oral Cancer: State of the Science and Art***

**Group Organizer:** Newell Johnson (GKT Dental Institute, London, UK)

**Group Sponsor:** Oral Medicine & Pathology

***International Perspectives on Barriers and Opportunities for Women Researchers***

**Group Organizer:** Mark Macek (University of Maryland, Baltimore, USA)

**Sponsor:** Behavioral Sciences/Health Services Research and Oral Medicine &

Pathology Groups and NIDCR

***Local Delivery of Medications for Periodontal Therapy***

**Group Organizer:** Ray Williams (University of North Carolina, Chapel Hill, USA)

**Group Sponsor:** Periodontal Research

***Microbial Genomics and its Aftermath: Transcriptomes and Models***

**Group Organizer:** Robert Quivey, Jr. (University of Rochester, NY, USA)

**Group Sponsor:** Microbiology & Immunology

***Nanotechnology for Bone-Titanium Integration Research***

**Group Organizer:** J. Mark Thomason (University of Newcastle upon Tyne, UK)

**Group Sponsors:** Prosthodontics Research, Implantology, Mineralized Tissue, and Dental Materials

***Neural Control of Mastication***

**Group Organizer:** Jack Turman, Jr. (University of Southern California, Los Angeles, USA)

**Group Sponsor:** Neuroscience

***Nutrition, Oral Health, and Food Choice: Are Their Influences the Same in All Countries?***

**Group Organizer:** Florian Mack (University of Greifswald, Germany)

**Group Sponsor:** Geriatric Oral Research

***The Odontoblast—A Special Cell?***

**Group Organizer:** A.J. Smith (University of Birmingham, UK)

**Group Sponsors:** Pulp Biology and Mineralized Tissue

***Oral Connections to Aspiration Pneumonia***

**Group Organizer:** Barbara Smith (University of Michigan, Ann Arbor, USA)

**Group Sponsors:** Geriatric Oral Research and Oral Medicine & Pathology

***Oral Microbiology 2004: A Tribute to Toshihiko Koga***

**Group Organizer:** Edward Lally (University of Pennsylvania, Philadelphia, USA)

**Group Sponsor:** Microbiology/Immunology

***Outreach Teaching: Does Clinical Teaching of Dental Students Outside the Dental School Improve their Education?***

**Group Organizer:** Ross Hobson (University of Newcastle, UK)

**Sponsors:** Education Research and IFDEA

***Risk Assessment and Risk Management of the Periodontal Diseases***

**Group Organizer:** Rutger Persson (University of Berne, Switzerland)

**Group Sponsor:** Periodontal Research

***Saliva/Oral-fluid-based Diagnostic Markers of Disease***

**Group Organizer:** Laurie Carter (Virginia Commonwealth University, Richmond, USA)

**Group Sponsors:** Diagnostic Systems, Oral Medicine & Pathology, and Salivary

Research

***Salivary Gland Regeneration: Advances Toward Therapeutic Strategies***

**Group Organizer:** Matthew Hoffman (NIDCR/NIH, Bethesda, MD, USA)

**Group Sponsors:** Salivary Research and Oral Medicine & Pathology

***The Scientific and Moral Imperative for a Dental Caries Vaccine***

**Group Organizer:** Lawrence Meskin (University of Colorado, Denver, USA)

**Group Sponsor:** Microbiology/Immunology

***Signaling Pathways Regulating Craniofacial Growth and Morphogenesis***

**Group Organizer:** Mina Mina (University of Connecticut, Farmington, USA)

**Group Sponsors:** Mineralized Tissue and Craniofacial Biology

***Understanding the Fundamentals of Tooth-whitening Technology***

**Group Organizer:** Kenneth Klimpel (Colgate Palmolive, Piscataway, NJ, USA)

**Group Sponsors:** Oral Health Research and Dental Materials (to be confirmed)

***Use and Validity of Oral Health Measures in Public Health and Epidemiology***

**Group Organizers:** Paul Eke (CDC, Atlanta, GA, USA) and Mark Macek (University of

Maryland, Baltimore, USA)

**Group Sponsors:** Behavioral Sciences & Health Services Research and Oral Health Research

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