

RESEARCH SPOTLIGHT

TRANSLATING SCIENCE TO PRACTICE

Dr. Dana Graves Honored for Periodontal Research

This year, the research of Dr. Dana Graves, Professor in the Department of Periodontics and Vice Dean for Scholarship and Research at Penn Dental Medicine, was recognized by the International Association for Dental Research (IADR) with its 2014 Distinguished Scientist Award in Basic Research in Periodontal Disease. The prize, supported by the Colgate-Palmolive Company, honors and encourages “outstanding achievements” in periodontal disease research.

With more than 150 published papers in peer-reviewed, high-level journals, Dr. Graves’ research has focused on inflammation, wound repair, and diabetes and their relationship to periodontal disease. Since 1984, his work has been continuously funded by the National Institutes of Health, and he is currently principal investigator on three R01 grants — Mechanisms for Impaired Diabetic Oral Wound Healing, Dendritic Cells and Periodontal Disease, and Diabetic Fracture Healing. Presently, Dr. Graves is also an associate editor of the IADR/AADR *Journal of Dental Research*.

Each year, the IADR presents 16 Distinguished Scientist Awards. One of the highest honors bestowed by IADR, each of the awards recognizes a career of distinguished accomplishments in research and development. This year’s awards were presented at the 92nd IADR General Session & Exhibition, held in Cape Town, South Africa, in June.

The IADR is a nonprofit organization with nearly 11,500 members dedicated to advancing knowledge to improve oral health, supporting oral health researchers, and facilitating the communication and application of research findings.



PAST RECIPIENTS

Along with Dr. Graves, the research activities of eight other current members of the Penn Dental Medicine faculty have been recognized with an IADR Distinguished Scientist Award at some point in their careers. Those past awards and recipients include the following:

2013 PULP BIOLOGY RESEARCH AWARD

Dr. Songtao Shi, Professor, Department of Anatomy & Cell Biology (see related story, page 2)

Dr. Shi’s research program focuses on the characterization of human mesenchymal stem cells and the relationship between mesenchymal stem cells and orofacial diseases at the molecule and cellular levels. Along with his collaborators, his lab has isolated and identified several new populations of mesenchymal stem cells, including dental pulp stem cells, stem cells from human exfoliated deciduous teeth, periodontal ligament stem cells, stem cells from apical papilla, and tendon stem/progenitor cells. These discoveries are enabling further investigations of these oral-tissue-derived stem cells and their use in tissue engineering, disease modeling, and clinical treatment. Dr. Shi has published more than 150 peer-reviewed articles in a variety of high-impact scientific journals, of which he served as the corresponding author in *Nature Medicine*, *Cell Stem Cell*, *Lancet*, *Journal of Clinical Investigation*, *Nature Biotechnology*, *Proceedings of the National Academy of Sciences in the U.S.A*, *Cell Research*, *Blood*, *Journal of Bone and Mineral Research*, *Stem Cells*, and *Journal of Dental Research*.

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2012 BASIC RESEARCH IN PERIODONTAL DISEASE AWARD

Dr. Denis Kinane, Morton Amsterdam Dean, Professor, Departments of Periodontics and Pathology

Dr. Kinane's research focuses on periodontal immune and inflammatory processes, mainly addressing the causes, development, and susceptibility markers of periodontal disease. His work also examines the relationship between periodontal/other oral diseases and systemic health and diseases such as diabetes and cardiovascular disease, involving research into inflammation, immunity, microbial pathogenesis, genetics, and systemic disease markers. Dr. Kinane has more than 200 peer-reviewed papers, active and new NIH grants, and is a sought after international speaker.

2012 RESEARCH IN ORAL BIOLOGY AWARD

Dr. George Hajishengallis, Professor, Department of Microbiology

Dr. Hajishengallis' research interests lie at the interface of microbial pathogenesis and immunity, and his work has illuminated novel mechanisms of microbial dysbiosis and inflammation. His work combines basic scientific and translational research, leading to novel approaches to clinical problems, such as exemplified by periodontal disease. Dr. Hajishengallis has more than 100 peer-reviewed papers, active and new NIH grants, and is a sought after international speaker.

2007 PHARMACOLOGY/THERAPEUTICS/TOXICOLOGY RESEARCH AWARD

Dr. Elliot Hersh, Professor, Department of Oral & Maxillofacial Surgery/Pharmacology

Dr. Hersh runs an active clinical research program that plays a key role in developing and carrying out clinical protocols for FDA pivotal studies. His analgesic research team was instrumental in the granting of FDA approval to a number of analgesic and anesthetic agents, such as ibuprofen liquigels (Advil Liquigels), OTC ketoprofen (Orudis KT), extended-release etodolac (Lodine XL), 4% articaine with

1:200,000 epinephrine (Septocaine 1:200,000), the transoral lidocaine patch (Dentipatch), and phentolamine mesylate (OraVerse). His most recent research has focused on the development of the novel opioid combination drug CL-108, which produces significantly less nausea than currently marketed opioids and a nasal spray delivery system of local anesthesia which "numbs" the maxillary teeth without the use of needles.

2006 YOUNG INVESTIGATOR AWARD

Dr. Hyun (Michel) Koo, Professor, Department of Orthodontics

Dr. Koo's research focuses on understanding the assembly principles and the virulence determinants of oral biofilms, as well as developing novel therapeutic approaches to prevent biofilm-dependent oral infectious diseases, such as dental caries. He is particularly interested in three major questions around the biofilm matrix — how the extracellular matrix assembles dynamically in 3D, how the matrix modulates the microenvironmental heterogeneity within biofilms, and how to disrupt the matrix-delineated microenvironments and/or target the pathogens embedded in the matrix.

2004 RESEARCH IN ORAL BIOLOGY AWARD

Dr. Carolyn Gibson, Professor, Department of Anatomy & Cell Biology

Dr. Gibson's research has examined the regulation of dental enamel formation, by studying the in vivo function of proteins that are secreted by ameloblasts and direct the mineralization of dental enamel. She has cloned and characterized human, murine, and bovine amelogenin genes, and has analyzed expression and alternative splicing of amelogenin RNA. (While Dr. Gibson retired in December 2013, she continues to be active in research and teaching at Penn Dental Medicine.)

1992 PULP BIOLOGY RESEARCH AWARD

Dr. Syngcuk Kim, Interim Chair, Louis I. Grossman Professor, Department of Endodontics

Dr. Kim's research interests have focused on pulpal inflammation by studying sensory physiology and microcirculation. Using neuropeptides released from the sensory nerve endings as the mediators, he was able to elucidate pulpal inflammation as the neurogenic inflammation. His investigations have also included the evaluation of various dental materials, especially MTA and Bioceramic using stem-cell lines. With a focus on clinical research, he has changed apical surgery fundamentally to microsurgery in endodontics, making it a more predictable surgical procedure to save the teeth.

1986 YOUNG INVESTIGATOR AWARD

Dr. Marjorie Jeffcoat, Professor, Department of Periodontics and Former Dean

With a common focus on the relationship between oral health and systemic health, Dr. Jeffcoat's research interests have examined the relationship between periodontal disease and preterm birth, diabetes, and cardiovascular disease. Other recent studies have also addressed the impact of cost effectiveness of dental treatment in relation to overall medical costs. In order to answer these clinical questions, she focuses on periodontal disease, implants, caries, diabetes, coronary artery disease, and cerebral vascular disease, having also developed new radiographic methods and computer programs. Dr. Jeffcoat was elected to the Institute of Medicine for her research accomplishments and also served as president of both the IADR and AADR. ■