Director's Report to the National Advisory Dental and Craniofacial Research Council

September 2017

ACTIVITIES OF THE NIDCR DIRECTOR

Since the last meeting of the National Advisory Dental and Craniofacial Research Council on May 23, 2017, NIDCR Director Martha J. Somerman, DDS, PhD, and Acting Deputy Director John Kusiak, PhD, have maintained an active schedule of attending research symposia, delivering presentations to stakeholders, and meeting with working groups and other organizations.

During the last four months, Drs. Somerman and Kusiak engaged in many notable activities:

Drs. Somerman and Kusiak attended the 2017 NIH Pain Consortium Symposium held on the NIH campus in Bethesda, MD, on May 31. Dr. Somerman presented the Mitchell Max Award.

Dr. Somerman presented "NIDCR: Guiding the Future of Oral Health Research and Innovation" at the Eastman University of Rochester Medical Center Centennial Celebration in Rochester, NY on June 8-10. Dr. Somerman also participated in a plenary panel.

Drs. Somerman and Kusiak, Dr. Morgan O'Hayre (special assistant to Drs. Somerman and Kusiak), and members of the NIDCR Division of Extramural Research (DER) (Drs. Lillian Shum and Jason Wan) and Division of Intramural Research (DIR) (Dr. Pamela Robey) on June 12 met with Prof. Glyn Stacey, director of the United Kingdom Stem Cell Bank (UKSCB), a part of the National Institute for Biological Standards and Control, to discuss coordination of NIDCR and UKSCB activities.

Dr. Somerman gave a presentation titled "NIDCR: Guiding Advances in Oral Health Research and Innovation" on June 13 during the Healthy People 2020 Oral Health Midcourse Review at the US Department of Health and Human Services in Washington, DC.

Drs. Somerman, Kusiak, and O'Hayre participated in two conversations on June 16 to discuss public-private partnership opportunities with different organizations. One was with representatives from Johnson & Johnson, including Michael Cohen, who leads global scientific marketing and engagement at the company. Another involved representatives from Dentsply Sirona, Inc., including corporate director of biotechnology Dr. Christopher Damien.

Dr. Somerman and NIDCR staff met with members of the California Institute for Regenerative Medicine on June 21 to discuss regenerative medicine opportunities related to the dental, oral, and craniofacial complex. This meeting was organized by Dr. Amy Paterson as part of the Regenerative Medicine Innovation Project, an initiative of the 21st Century Cures Act.

Dr. Somerman, along with Dr. Shum, director of the NIDCR DER, and Dr. Nadya Lumelsky, chief of the DER's Integrative Biology and Infectious Diseases Branch, gave opening remarks at the Encouraging Novel Amelogenesis Models and Ex vivo cell Lines (ENAMEL) development workshop held on June 23 in Bethesda, MD.

Drs. Somerman and Lumelsky attended the National Academy of Medicine Regenerative Medicine Forum workshop, "Navigating the Manufacturing Process and Assuring the Quality of Regenerative Medicine Therapies," held on June 26 in Washington, DC.

Drs. Somerman and Kusiak participated in a career panel discussion session titled "Future Careers in Research and Dentistry" on July 10 on the NIH campus in Bethesda, MD. This session was held for the NIDCR summer dental students and Medical Research Scholars Program students.

Dr. Somerman provide an update on NIDCR activities on July 11 in a biannual scheduled phone call with the American Dental Association (ADA) Council on Scientific Affairs.

Drs. Somerman, Kusiak, and other NIDCR staff on July 24 attended a virtual presentation of the Knowledge Grid data platform by Dr. Chuck Friedman and colleagues from the University of Michigan. Afterwards, they discussed the potential for using the learning health system model with some aspects of NIDCR research programs. A follow-up meeting was held at NIH on August 31 and attended by Drs. Somerman, Kusiak, and other NIDCR staff, along Dr. Friedman and colleagues. The discussions included how Knowledge Grid could enhance data science and dissemination/implementation research for NIDCR.

Dr. Somerman gave introductory remarks titled "Welcome: Annual U01 Symposium on Dental Restorative Materials" at the annual meeting of Novel Polymer for Composite Restorations U01 Symposium at the National Institute of Standards and Technology in Gaithersburg, MD. Dr. Somerman and Dr. Kusiak participated in the executive committee meeting via conference call on July 27 to gather expert panelist recommendations. In addition, Dr. Somerman attended the U01 pre-IND submission meetings at the Food and Drug Administration on July 28 in White Oak, MD.

ADA Officers, including Dr. Kathleen O'Loughlin, ADA executive director; Dr. Gary Roberts, ADA president; Dr. Joseph Crowley, ADA president-elect; Dr. Marcelo Araujo, vice president of the ADA Science Institute; Mr. Robert J. Burns, manager of Legislative and Regulatory Policy at ADA; and Ms. Jennifer Fisher, congressional lobbyist at ADA, visited NIDCR in Bethesda, MD on July 31. During their visit, Dr. Somerman discussed research supported by NIDCR and provided a handout titled "NIDCR: Guiding the Future of Oral Health through Research and Innovation."

Drs. Somerman and Kusiak, and Dr. Tim Iafolla, chief of NIDCR's Program Analysis and Reports Branch and lead for NIDCR public-private partnerships, along with several other NIDCR staff, met with representatives from Henry Schein, Inc., on August 1 to discuss public-private partnership opportunities. Representatives from Henry Schein included Mr. Steve Kess, vice president of global professional relations; Mr. David Kochman, vice president of corporate affairs; Ms. Allison Neale, director of public policy, Office of the CEO; and Ms. Rachel Nelson, director of sales and marketing, Exan Group. Also attending were Dr. Kathy Atchison, professor at the University of California, Los Angeles School of Dentistry, and Dr. Christopher Fox, executive director of the International Association for Dental Research/American Association for Dental Research.

Drs. Somerman and Kusiak along with NIDCR staff had a follow-up meeting on August 1 related to opportunities for collaborations with representatives from the Uniformed Services University of the Health Sciences (USUHS). Participants included Dr. Tom Schneid, executive dean of the USUHS post-graduate dental college, Dr. Bruce Doll, assistant vice president for technology research and innovation at USUHS, and Dr. Rodney Phoenix, associate dean for dental research at USUHS.

Dr. Somerman provided welcoming remarks at the NIH Common Fund Glycoscience Program all hands meeting held on August 30 at the NIH Campus in Bethesda, MD.

Dr. Somerman, Dr. Margo Adesanya, chief of NIDCR's Science Policy and Planning Branch, and Dr. Bruce Dye, director of NIDCR's Dental Public Health Residency Program, participated in the Indian Health Service Division of Oral Health 2017 Strategic Planning Meeting in Rockville, MD. The purpose of the meeting was to develop a strategic plan that outlines specific strategies and timelines for addressing oral health disparities in American Indians/Alaska Natives children.

BUDGET UPDATE

FY 2017

The FY 2017-enacted budget for NIDCR is $425,751,000. This amount has been reduced by $954,000 for the Secretary's transfer to support the Administration for Children and Families program, yielding an operating level of $424,797,000.

FY 2018

A continuing resolution for FY 2018 signed by the President provides funds through December 8th at the FY 2017 enacted level. The President's Budget Request would provide $320,749,000 for NIDCR. The complete NIDCR FY 2018 Budget Justification (PDF) is available for viewing.

National Institute of Dental and Craniofacial Research FY 2017 Operating Plan		
Research Grants:	**No.**	**Amount**
Research Projects		
Noncompeting	422	203,436,027
Administrative Supplement	*(20)*	4,000,000
Competing	158	60,921,546
Subtotal	**580**	**268,357,573**
SBIR/STTR	21	11,994,837
Research Project Grants	**601**	**280,352,410**
Research Centers	**1**	**3,409,542**
Other Research		
Research Careers	45	7,282,218
Other	19	9,057,509
Subtotal Other Research	**64**	**16,339,727**
Total Research Grants	**666**	**300,101,679**
	FTTPs	
Research Training	**229**	**11,080,677**
Research & Development Contracts	**19**	**19,810,644**
Total Extramural Research		**330,993,000**
Intramural Research	**145**	**66,812,000**
Research Management and Support	**90**	**26,992,000**
Total, NIDCR		**424,797,000**

HHS/NIH UPDATE

Francis Collins, MD, PhD, Re-Appointed as NIH Director

On June 6, President Donald J. Trump announced the continuation of Dr. Francis Collins' tenure as director of the NIH. Dr. Collins was originally sworn in on August 17, 2009 as the sixteenth director of NIH.

NIH Directors Testify Before Congress

In presentations to Congress, Dr. Collins and directors of several NIH institutes described NIH's biomedical research investments and highlighted the scientific opportunities on the horizon. They met

with the House and Senate Appropriations Subcommittees on Labor, HHS, Education, and Related Agencies on May 17 and June 22, respectively. At the Senate hearing, Dr. Collins discussed the FY 2018 budget request and described some of the medical research taking place to combat diseases. The leaders outlined their respective work in areas such as diabetes, Alzheimer's disease, cystic fibrosis, cancer research, and opioid addiction.

Dr. Collins Highlights Recent Advances in Improving Patient Safety at NIH Clinical Center

In an NIH-wide announcement July 31, Dr. Collins acknowledged major achievements in the NIH Clinical Center's continuous efforts to improve patient safety. The Clinical Center established daily patient safety meetings for staff to begin each day with patient safety at the forefront of all activities. A new framework for clinical quality and patient safety and the Patient Safety, Clinical Practice and Quality Committee were formed to ensure rigorous surveillance for, and reporting of, patient safety events. Morbidity and Mortality meetings are now systems-based and open to all Clinical Center staff. The hospital implemented a new safety tracking system called STARS to report and track safety metrics. All NIH investigators and research staff have been retrained to ensure full awareness and compliance with event reporting requirements. An anonymous hotline number has been established so that anyone at the NIH Clinical Center with a safety concern can report it. So far, NIH has invested approximately $50 million in improving patient safety, most of which has supported infrastructure improvements at the Clinical Center and aseptic manufacturing facilities. Learn more at the NIH Clinical Center Patient Safety and Clinical Quality Continuous Improvement webpage.

NIH Launches the Next Generation Researchers Initiative

On June 8, Dr. Collins announced the launch of the Next Generation Researchers Initiative, a new approach designed to bolster support for early-stage and early-established biomedical investigators. The initiative was developed to address longstanding challenges faced by researchers trying to launch and sustain independent research careers. The initiative will take a multi-pronged approach to increase the number of NIH-funded early-stage and early-established investigators, stabilize the career trajectory of scientists, and enhance the potential of the next generation of researchers. Efforts include extending the payline for applications from early stage investigators and prioritizing funding for applications from particularly promising early-established investigators, as well as the use of NIH funding programs aimed at early-stage and early-established investigators, such as NIDCR's Sustaining Outstanding Achievement in Research (SOAR) awards, NIH Common Fund's New Innovator Awards, National Institute of Arthritis and Musculoskeletal and Skin Diseases Supplements to Advance Research (STAR) from Projects to Programs, and National Institute of General Medical Sciences Maximizing Investigators' Research Award (MIRA). The total NIH cost is estimated (pending availability of funds) at around $210 million the first year, ramping up over five years to reach approximately $1.1 billion per year.

Clinical Trial Requirements for Grants and Contracts

NIH is launching a series of initiatives in 2017-2018 to enhance clinical research accountability and transparency. These initiatives target key points along the clinical trial lifecycle, from concept to results reporting, and they address challenges and shortcomings in the design, efficiency, and timely reporting of clinical trials. Implementation of these policy changes will ensure rigor, transparency, and effectiveness of the US federally-funded clinical trial enterprise.

Brenda Fitzgerald, MD, Appointed Director of the Centers for Disease Control and Prevention (CDC)

On July 7, Dr. Brenda Fitzgerald was appointed as the seventeenth director of the CDC and as the administrator of the Agency for Toxic Substances and Disease Registry. Dr. Fitzgerald previously served as the commissioner of the Georgia Department of Public Health and was a state health officer from 2011 to 2017. Dr. Fitzgerald is a board-certified obstetrician-gynecologist and has practiced medicine for three decades. She holds a BS in microbiology from Georgia State University and an MD from Emory University School of Medicine. She completed post-graduate training at the Emory-Grady Hospitals in Atlanta and held an assistant clinical professorship at Emory Medical Center. As a major in the US Air Force, Dr. Fitzgerald served at Wurtsmith Air Force Strategic Air Command Base in Michigan and at Andrews Air Force Base in Washington, D.C.

Alfred C. Johnson, PhD, Appointed as NIH Deputy Director for Management

Dr. Alfred C. Johnson was appointed NIH deputy director for management on May 28. Dr. Johnson had been serving as the NIH acting deputy director for management since May 2016. Before joining the NIH Office of the Director leadership team, Dr. Johnson was the director of the NIH Office of Research Services (ORS), a position he had held since 2006. Before joining ORS, Dr. Johnson held several leadership positions at NIH including assistant director in the Office of Intramural Research, acting director of the Office of Loan Repayment and Scholarship, and principal investigator in the Laboratory of Molecular Biology, Center for Cancer Research at the National Cancer Institute. He joined NIH in 1985 as an American Cancer Society postdoctoral fellow. Dr. Johnson received a BA in chemistry at Albany State University in 1979. He completed his PhD in biomedical sciences at the University of Tennessee in 1985, and conducted his doctoral research at the biology division of Oak Ridge National Laboratory.

The NIH Office of Behavioral and Social Sciences Research (OBSSR) Welcomes New Deputy Director Christine Hunter, PhD, ABPP

On August 1, The NIH OBSSR announced the appointment of Dr. Christine Hunter as its new deputy director. Prior to joining OBSSR, Dr. Hunter served as the director of behavioral research at the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). Dr. Hunter received her PhD in clinical psychology from the University of Memphis and completed a post-doctoral fellowship at Wilford Hall Medical Center. Prior to joining NIH in 2006, she served in the US Air Force, stationed at Keesler Medical Center, Wilford Hall Medical Center, and the Air Force Medical Support Agency with the Office of the Surgeon General.

NIH Hosts Workshop on Advances and Future Needs in Human Microbiome Research

On August 16-18, NIH hosted "The Human Microbiome: Emerging Themes at the Horizon of the 21st Century," a workshop to share the latest research on the human microbiome. Topics included how the microbiome may be manipulated to maintain or improve our health and evaluations of what is needed to advance this field over the next decade. Dwayne Lunsford, PhD, director of NIDCR's Microbiology Program in the Division of Extramural Research, served on the organizing committee for the trans-NIH workshop. Keynote speakers included Howard Ochman, PhD, professor, Department of Integrative Biology, University of Texas at Austin; Jeffrey Gordon, MD, Dr. Robert J. Glaser Distinguished University Professor at the Washington University School of Medicine in St. Louis; and Eric Alm, PhD, professor of biological engineering at the Massachusetts Institute of Technology. The three-day workshop closed with a joint agency panel, which included representatives from US federal agencies participating in human microbiome research activities. Learn more at the workshop website with agenda.

Josie Briggs, MD, Director of the National Center for Complementary and Integrative Health (NCCIH), Retires

Dr. Collins recently announced that Dr. Josie Briggs will retire in October from the directorship of the NCCIH. She will become the editor-in-chief of the *Journal of the American Society of Nephrology*. Dr. Briggs has been a member of the NIH community for more than 20 years. She joined NIH in 1997, recruited away from a professorship at the University of Michigan, to be the director of the Division of Kidney, Urologic, and Hematologic Diseases at the NIDDK. She left briefly for a senior position at the Howard Hughes Medical Institute, before returning to NIH to become the NCCIH director in 2008. Following Dr. Briggs' departure, David Shurtleff, PhD, the current NCCIH deputy director, will serve as acting director.

Discovery Documentary "First in Human" Explores How Advances in Medicine are Made at the NIH Clinical Center

A three-part documentary on the NIH Clinical Center premiered on August 10 on Discovery. "First in Human" offers a first-hand look at the successes and setbacks that are a part of developing new medicines that may ultimately benefit millions worldwide. Over a period of a year, film crews embedded in the hospital followed four patients who volunteered to participate in experimental

treatments in the hopes they could help them, or others in the future. The series also follows the dedicated doctors and nurses who carry out the research while caring for the patients. More than 1,000 staff members across the intramural research program and 125 patients voluntarily participated in the production. For more than a year, NIH staff worked behind the scenes to enable this complicated production in ways that diligently protected the integrity of hospital operations as well as the safety and privacy of patients and staff. Learn more at the First in Human website.

HHS Requests Public Comments for Healthy People 2030

HHS is soliciting written comments on the proposed framework for Healthy People 2030. The Healthy People initiative provides science-based, 10-year national objectives for improving the health of all Americans. Members of the public—including citizens, stakeholders, and organizations—are invited to provide comments on the Healthy People 2030 framework, including its vision, mission, foundational principles, plan of action, and overarching goals. This round of public comment will be open through September 29, 2017.

***All of Us* Research Program Begins Beta Testing Phase, Enrolling its First Participants**

On June 5, the *All of Us* Research Program announced that researchers had begun enrolling the first participants as beta testers of the program. The program consists of a nationwide team of universities, medical centers, and technology companies that will collect data, blood, and urine samples -- as well as information about participants' health, lifestyles, and environments -- over the course of many years to create a research resource to drive future discoveries. The beta phase will start at one site and gradually expand to more than 100 sites, aiming to enroll at least 10,000 people across the country. The beta phase will test systems and processes to fix any problems that arise. A national launch is anticipated for late fall 2017 or early in 2018, with the goal of building a national research cohort of 1 million or more participants in the US.

NIDCR UPDATE

NIDCR Proposes FY 2019 Research Initiatives

Over the summer, NIDCR requested public input about research areas for new initiatives for fiscal year 2019. Each year, NIDCR identifies broad research topic areas and develops a specific initiative proposal for each area. Many proposed initiatives from previous years have become funding opportunities. The deadline for input was September 4. The nine research initiatives proposed for FY 2019 were as follows:

- Advancing our Understanding of Enamel Development
- Basic and Translational Research on HIV and AIDS-Related Pathogens in the Oral Cavity
- Bioinformatics/Data Science Jumpstart for Dental, Oral, and Craniofacial Diseases
- Biological Factors Underlying Dental, Oral, and Craniofacial Health Disparities
- Biology of Aging in Dental, Oral, and Craniofacial Tissues
- Dental Practice-Based Research Networks
- FaceBase 3 – Bioinformatics and Data Management Hub
- Precision Imaging of Oral Lesions
- Understanding Gene-Environment Interactions in Dental, Oral, and Craniofacial Diseases

NIH Workshop on Chronic Inflammation Biomarkers in Disease Development and Prevention

Preethi Chander, PhD, director of the Salivary Biology and Immunology Program in NIDCR's Division of Extramural Research (DER), co-organized the "Chronic Inflammation Biomarkers in Disease Development and Prevention" workshop, held in Bethesda, MD on May 31 - June 1. Other participating NIH institutes and centers included the National Cancer Institute (NCI), National Eye Institute, National Heart, Lung, and Blood Institute, National Institute on Aging, National Institute of Allergies and Infectious Diseases, National Institute of Nursing Research, and the Office of Dietary Supplements. Dr. Chander moderated a session on imaging and sensor technologies for detecting and monitoring localized inflammation. The workshop brought together extramural experts from multiple research disciplines who are investigating chronic inflammation and its role in disease development and treatment. The two goals of the workshop were: 1) to gain deeper insight into disease-promoting inflammation from different research perspectives through exploration and evaluation of current findings, state-of-the-art techniques, and enabling technologies; and 2) to identify strategies to improve accuracy in gauging an individual's inflammation status prior to disease onset and at different stages of disease progression and resolution. A perspective manuscript on the topics discussed will be published in an immunology-focused scientific journal.

Science of Behavior Change Good Clinical Practices Workshop

Melissa Riddle, PhD, chief of the Behavioral and Social Sciences Research Branch in NIDCR's DER, along with other program officers from across the NIH who are affiliated with the Science of Behavior Change Common Fund program, hosted a one-and-a-half-day workshop in Bethesda, MD on July 6-7 on NIH policies related to good clinical practice. The goals of the workshop were to seek recommendations from experts in the behavioral and social sciences research fields about the highest-priority challenges in implementing the NIH Clinical Trials Policies; to identify potential resources, tools, and strategies to address challenges in interpreting the NIH Clinical Trials Policies; and how best to adapt, develop, and disseminate those resources and tools. Learn more at the Science of Behavior Change website.

ENAMEL Workshop

Jason Wan, PhD, director of the Mineralized Tissue Physiology Program, in NIDCR's DER, organized a workshop titled "Encouraging Novel Amelogenesis Models and Ex Vivo Cell Lines (ENAMEL) Development" on June 23 in Bethesda, MD. Fourteen attendees from NIDCR and the NIH Center for Scientific Review participated in talks and discussions on model organisms, stem cells, cell lines, and 3D tissue cultures and organoids. The goals were to: 1) ascertain the needs of the research community for research models of amelogenesis; 2) identify knowledge gaps and technological barriers in enamel research; 3) determine methods and tools needed for generation of novel *in vivo* and *ex vivo* models to study processes and conditions that are physiologically relevant in enamel formation; and 4) identify opportunities that can significantly accelerate understanding of multiscale processes to inform strategies to reproduce native enamel for repair and regeneration.

American Dental Association (ADA) Recognizes Lawrence Tabak, DDS, PhD

On August 7, the ADA awarded Dr. Lawrence Tabak, NIH principal deputy director and former NIDCR director, a presidential citation from ADA President Gary L. Roberts, DDS. Dr. Roberts commended Dr. Tabak for his contributions to dentistry, including his work at NIDCR to improve interactions among dental and medical researchers and expanding NIDCR's scope into areas such as genetics and dental materials.

NIH History Office Releases Oral History of NIDCR Researcher Abner Notkins, MD

The NIH History Office recently released a transcribed interview in which Dr. Abner Notkins, chief of NIDCR's Experimental Medicine Section, recounted his early life, education, and 56 years of research at NIH. The interview traces the course of his research from his start at the NCI to the present day, where his lab focuses on the role of antibodies and autoantigens in the development of autoimmune diseases.

Public Submits Ideas for NIDCR 2030 Initiative

NIDCR 2030, a strategic visioning initiative, began with the launch of an interactive website in March to solicit ideas about future directions for NIDCR-supported research in five key areas: integrating oral health with overall health; developing precision prevention, treatment, and public health interventions; monitoring health and treating disease in real time using devices in and around the mouth; taking advantage of the body's ability to heal itself through autotherapies; and building/fostering a multi-disciplinary and diverse dental, oral, and craniofacial research workforce. The website attracted more than 4,000 visitors. Hundreds of ideas, comments, and votes were submitted by the June 2 deadline. This public input is accessible at nidcr2030.ideascale.com. A panel of NIDCR staff is now reviewing the submissions, which will be considered when setting future research priorities and funding opportunities.

NIDCR Analysis Shows Improved Oral Health Status of Young Children

Using data from the National Health and Nutrition Examination Survey, staff in NIDCR's Office of Science Policy and Analysis, in collaboration with a University of Maryland School of Dentistry researcher, found that both untreated caries and severe dental caries in young children decreased significantly between the period 1999-2004 and the period 2011-2014. Caries also declined in preschool-aged children in low-income families, while the prevalence of caries remained mostly stable in older children and adolescents. The findings were published online on June 13 in the *Journal of the American Dental Association*.

NIDCR's Nadya Lumelsky, PhD, Co-Authors National Academy of Medicine Paper on Regenerative Medicine

In a National Academy of Medicine paper published on June 23, Dr. Nadya Lumelsky and co-authors outlined the proceedings of an October 2016 workshop on the state of the science in regenerative medicine, convened by the National Academies of Sciences, Engineering, and Medicine's Forum on Regenerative Medicine. Among other topics, the workshop highlighted the fact that while the number of regenerative medicine products in the clinical pipeline and on the market are increasing, the industry needs to improve procedures for optimizing and standardizing cell sources, cell manufacturing protocols, and safety and efficacy testing for cell-based regenerative medicine products. A June 2017 workshop titled Navigating the Manufacturing Process and Assuring the Quality of Regenerative Medicine Therapies included further discussions to address these issues.

Personnel Update

On August 9, Tim Iafolla, DDS, MPH, chief of the Program Analysis and Reporting Branch in the NIDCR's Office of Science Policy and Analysis was announced as the manager of NIDCR's public-private partnership efforts. This initiative is a major focus area of NIDCR's Office of the Director. Dr. Iafolla will work closely with the NIDCR deputy director to develop and manage collaborative projects with industry, advocacy, academic, and government partners in advancing new scientific goals.

On September 1, NIH Director Francis S. Collins, MD, PhD, presented the NIH Director's Award to several NIDCR staff for their contributions to working groups and committees:

- Dwayne Lunsford, PhD, director of the Microbiology Program in NIDCR's Division of Extramural Research, as part of the Office of the Director Group Award I-Corps Program Expansion Team for the administration and expansion of the I-Corps program with substantial benefit to enhancing the NIH and Centers for Disease Control and Prevention missions

- John Prue as part of NIDCR's Group Award for the Office of Management and Budget (OMB) M-16-02 Implementation Workgroup for developing and delivering a successful response to the initial requirements of OMB's desktop and laptop category management policy, M-16-02

- Carol Beasley, Taleva Hall, Matt Sierra, and Larry Sutton as part of the National Heart, Lung, and Blood Institute (NHLBI) Group Award for the Trans-NIH ePMAP administrative board members for leading the implementation of ePMAP across the NIH, supported by the NHLBI technical team

Meetings and Conferences

Staff Presentations

Dr. Jacqueline Mays, DDS, PhD, chief of the Oral Immunobiology Unit, Division of Intramural Research (DIR), gave a speech at the Victor L. Hancock Symposium on May 11 at Howard University College of Dentistry in Washington, D.C. titled "Mucosal Immunology- the Guardian of Oral Health".

Dr. Marian F. Young, PhD, chief of the Molecular Biology of Bones and Teeth Section, DIR, was an invited speaker at the Center of Excellence in the Study of Dental and Musculoskeletal Tissues Distinguished Lecturer Seminar at the University of Missouri, Kansas City, on May 24.

Pamela G. Robey, PhD, chief of the Skeletal Biology Section, DIR, gave a plenary lecture titled "The role of tissue-specific stem/progenitor cells in tissue engineering and regenerative medicine" at the European Chapter of the Tissue Engineering and Regenerative Medicine International Society on June 29 in Davos, Switzerland.

Ashok Kulkarni, PhD, chief of the Functional Genomics section, DIR, recently was re-appointed president of the IADR Neuroscience Group until 2019.

Orlando Lopez, PhD, presented "Computational Modeling in Dental, Oral and Craniofacial Applications Interests and Opportunities" at the kick-off meeting for the Department of Defense Working Group on Computational Modeling of Human Lethality, Injury, and Impairment from Blast-related Threats held on May 23 in Tysons, VA. Dr. Lopez represented NIDCR by highlighting opportunity areas for computational modeling in dental, oral, and craniofacial applications. The event included representatives from prominent research groups working on computational modeling of the human body to discuss new strategies for collaboration, integration, and future development efforts across government agencies.

Jane Atkinson, DDS, director of the Center for Clinical Research, DER, co-chaired the planning committee meeting of the "Inclusion Across the Lifespan" workshop with Samir Sauma, PhD, National Institute of Aging. The workshop, held on June 1-2, focused on increasing the inclusion of pediatric and older adult populations in clinical trials. The workshop was convened after the signing of the 21st Century Cures Act, which called for NIH to convene a workshop focused on the inclusion of pediatric and older adult populations in clinical trials. Yasamin Moghadam, MS, a health specialist in the Center for Clinical Research, DER, also attended the workshop and provided support for one of the workgroups.

Chiayeng Wang, PhD, director of the Oral and Salivary Gland Cancer Biology Program, DER, attended the 42nd International Symposium on Ultrasound Imaging and Tissue Characterization on June 5-7 in Arlington, VA. The symposium focused on clinical evaluation of novel methodologies and instrumentation for tissue characterization. The program highlighted technical advances in assessing tissue elasticity, therapy response, and imaging and robot-assisted imaging/guidance. At the conference, Dr. Wang also served as an NIDCR representative, along with National Cancer Institute representative Houston Baker, PhD, in the NIH Program Funding Question and Answer session on June 5.

Nadya Lumelsky, PhD, director of the Tissue Engineering and Regenerative Medicine Program, DER, attended a workshop organized by the National Academies Forum for Regenerative Medicine titled "Navigating the Manufacturing Process and Assuring the Quality of Regenerative Medicine Therapies." This one-day workshop took place on June 26, in Washington D.C. Dr. Lumelsky took an active part in planning the scientific program of this workshop and was involved in group and individual discussions during the meeting.

Jason Wan, PhD, director of the Mineralized Tissue Physiology Program, DER, gave a presentation titled "Perspectives of a Program Officer (PO)," in a brown bag session organized by the Review Policy Committee. This trans-NIH event, held July 24 in Bethesda, MD., brought together program and scientific review officers (SRO) and featured the theme of "Enhancing Communication and Collaboration between SROs and POs".

Dave Clark, DrPH, and Melissa Riddle, PhD of the Behavioral and Social Sciences Research Branch, DER, attended the 29th Annual Meeting of the Association for Psychological Science in Boston, MA and helped facilitate a pre-conference workshop titled "The Science of Behavior Change". The session combined brief didactic lessons with hands-on exercises to teach attendees how to apply the experimental medicine approach to their own research programs. They also hosted the annual NIDCR Building Bridges poster session where student awardees presented their oral health research.

Bruce Dye, DDS, director of the Dental Public Health Residency Program, and Tim Iafolla, DMD, MPH, chief of the Program Analysis and Reports Branch, attended a colloquium titled "Digital Research in Dentistry" on March 19 in San Francisco, CA. Sponsored by the University of Manchester, UK, the meeting brought together an international roster of experts to explore the benefits, uses, and challenges of digital epidemiology techniques in dental research. Both NIDCR attendees spoke at the conference: Dr. Iafolla's presentation was titled "Digital Dentistry: Uses Across Dental Research", and Dr. Dye's was titled "Calibrating and Examining Remotely".

Dr. Dye gave the John Green Memorial Dental Epidemiology Lecture at the University California, San Francisco's Scientific Session on April 8. The title of his lecture was "Dental Epidemiology and Informatics in the Era of Big Data."

Alex Kailembo, DDS, MPH, the 2016-17 NIDCR Dental Public Health Resident, presented the results of his research project on June 16 to complete his residency requirements. The manuscript, titled "Poverty and wealth as predictors of socioeconomic disparity in dentist visits among adults aged 20 years and over in the United States, 2011-2014," has been submitted to the *Journal of Community Dentistry and Oral Epidemiology* and is under review.

Dr. Iafolla presented NIDCR's annual science activity report to the American Dental Association's National Fluoride Advisory Committee on June 27.

Leslie Frieden, PhD, extramural training officer in the Research Training and Career Development Branch, Division of Extramural Activities, presented a seminar, "NIDCR Research Training and Career Development Opportunities" to NIDCR T90/R90 trainees and faculty mentors at the University of Washington, Seattle on June 14.

Staff Attendance

The Division of Extramural Research staff attended conferences, workshops, and meetings to offer their expertise to investigators and trainees involved in NIDCR-supported research:

- Pragmatic Clinical Trials - Unique Opportunities for Disseminating, Implementing & Sustaining Evidence-Based Practices into Clinical Care, held on May 24, Bethesda, MD.
- Annual Meeting of the Society for Prevention Research, held May 31-June 2, Washington, D.C.
- Microbe-2017, June 1-5, New Orleans, LA.
- 2017 National Library of Medicine Conference on Consequential Clinical Research: Accelerating Continuous Improvement, on June 14-15, Bethesda, MD.
- International Society for Stem Cell Research Conference, June 14-17, Boston, MA.
- Joint Meeting for the Multicenter AIDS Cohort Study (MACS) and Women's Interagency HIV study (WIHS), held June 20-22, Rockville, MD.
- Kids First Data Analysis Collaboration Meeting (X01s), held on June 16, Bethesda, MD.
- Multinational Association of Supportive Care in Cancer Annual Meeting, held June 22-23, Washington, D.C.

- Forum on Regenerative Medicine and conducted outreach to investigators at the National Academies of Sciences, held June 26, Washington, D.C.

- GTEx Community Meeting, held on June 28, Bethesda, MD.

- Structural Biology Related to HIV/AIDS Meeting, held on June 29, Bethesda, MD.

- NIH's Cutting Edge Meeting Series to End the Opioid Crisis. Meetings included Medications Development for Opioid Use Disorders and Overdose Prevention/Reversal, held on June 5, Development of Safe, Effective, Non-Addictive Treatments, held on June 16, and Understanding the Neurobiological Mechanisms of Pain, held on July 7, Bethesda, MD.

- Gordon Research Conference on Human Genetics & Genomics, held July 9-14, Stowe, Vt.

- Joint Statistical Meeting, held July 29-August 4, Baltimore, MD.

- The Gabriella Miller Kids First Pediatric Research Program, First Annual Meeting, held September 6-7, Rockville MD.

Dr. Dye, DDS, MPH, director of the Dental Public Health Residency Program, and Wendy Knosp, PhD, health science policy analyst in the NIDCR's Office of Science Policy and Analysis (OSPA), attended the International Association for Dental Research/American Association for Dental Research General Session and Exhibition in San Francisco, CA. on March 22-25.

OSPA staff also attended the National Oral Health Conference in Albuquerque, NM on April 24-26, including Dr. Dye, Margo Adesanya, DDS, MPH, chief of NIDCR's Science Policy and Planning Branch, Tim Iafolla, DMD, MPH, chief of the Program Analysis and Reports Branch, and Alex Kailembo, DDS, MPH, dental public health resident.

Dr. Adesanya attended the NIH Tribal Advisory Committee meeting September 14-15 in Bethesda, MD. The Committee serves as an advisory body to NIH, helping to ensure that tribes and American Indian/Alaska Native people have meaningful and timely input in the development of relevant NIH policies, programs, and priorities.

Training and Career Development News

Outreach

The NIDCR Office of Education in the Division of Intramural Research participated in many activities to recruit students and researchers at all levels. These activities are highlighted below:

- **In-Depth Grant Writing Course**

  The NIDCR Office of Education supports the career development of our postdoctoral community. In May, 4 selected NIDCR trainees completed a 5-week grant-writing course titled "NIH Grant Writing Course - An In-Depth Workshop." This course was led by Paula Gregory, PhD (associate professor, Department of Genetics at Louisiana State University) and was hosted in collaboration with the National Human Genome Research Institute (NHGRI), National Institute of Child Health and Human Development (NICHD), and the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS). The course gave its participants the opportunity to write a rough draft of an NIH grant using their own data and to participate in an NIH grant mock study section.

- **Three Minute Talk Science Communication Competition**

  In June, the NIDCR research trainees participated in the Three Minute Talk Science Communication Competition. Fourteen graduate students, postdoctoral fellows, and clinical fellows from three institutes competed as finalists in this event, including four individuals from NIDCR. Participants learned how to effectively communicate their research to a broad scientific audience using a single power point slide. They also attended training sessions led

by the Alan Alda Center for Communicating Science, and had one-on-one professional coaching sessions in public speaking. Their presentations were scored by a panel of judges and the top three received travel awards. Augustin (Alex) Chibly of NIDCR was the second-place winner.

- **NIDCR FARE Award Recipients**

  Three talented NIDCR trainees were announced as recipients of the 2017 NIH Fellows Awards for Research Excellence: Loreto Abusleme and Nicolas Dutzan (in the lab of Nikki Moutsoupoulos, DDS, PhD), and Kuniyuki Nakamura (in the lab of Yoshi Yamada, PhD). They were among 199 award winners across NIH. This competition provides recognition for outstanding scientific research performed by intramural postdoctoral fellows and awards a $1000 stipend to attend a scientific meeting at which they will present their research findings.

- **Grant Writing Seminar**

  On July 13, the NIDCR, along with the National Eye Institute, NHGRI, NICHD, and NIAMS, co-hosted its annual grant-writing seminar with a total of 70 attendees. Participants were led through interactive exercises on how to write and submit a successful research grant using the latest NIH guidelines for grant submission. A smaller workshop focused on developing the specific aims portion of a grant.

- **NIDCR Summer Program**

  This summer, 30 high school, undergraduate, graduate, dental, and medical students participated in the 2017 NIH Summer Internship Program. Twelve of these students were NIDCR Summer Dental Student Award (SDSA) recipients, and one was a Graduate Summer Opportunities to Advance Research Program student. Highlights of this year's summer activities included: the summer student research introduction and welcome reception, field trips to the Samuel D. Harris National Dental Museum and the University of Maryland Baltimore Dental School to hear research presentations, a career panel discussion titled "Future Careers in Research and Dentistry", summer project oral presentations to the NIDCR research community, and participation in the NIDCR and NIH Poster Day sessions.

- **NIDCR Summer Dental Student Award**

  The 2017 NIDCR SDSA Program hosted 12 dental students from eight dental schools: University Mississippi Medical Center, Columbia University College of Dental Medicine, University of Connecticut School of Dental Medicine, University of Texas Health San Antonio Dental School, University of Maryland School of Dentistry, Boston University School of Dental Medicine, University of Puerto Rico School of Dental Medicine, and University of Missouri-Kansas City School of Dentistry.

- **NIH High School Scientific Training and Enrichment Program (HISTEP)**

  Deborah Philp, PhD, director of the NIDCR Office of Education, participated in the planning committee for the creation of the NIH HISTEP. The goal of HISTEP is to expand the pipeline of students interested in biomedical and healthcare careers by expanding opportunities for high school students from schools with a large population of financially disadvantaged students. High school sophomores, juniors, and seniors interested in science, technology, engineering, mathematics, and medically-related fields participated in a six-week summer program June 27-August 10 on the NIH campus in Bethesda, MD, exploring scientific research and current topics in human health disparities. The students also received coaching in college preparation and career advice.

The NIDCR Research Training and Career Development Branch in the Division of Extramural Activities reaches out to the community through conferences, meetings, and workshops to develop research training programs and to encourage predoctoral students, postdoctoral fellows, and junior investigators to apply for NIDCR research training and career development awards. These activities are listed below:

- Leslie Frieden, PhD, presented a seminar titled "NIDCR Research Training and Career Development Opportunities" to NIDCR T90/R90 trainees and faculty mentors at the University of Washington, Seattle on June 14.

Highlights of Trainee Scientific Achievements

Trainees Who Have Achieved Subsequent NIH Grants

First R01/U01s

- Donna Calu, PhD, former NIDCR predoctoral T32 trainee, assistant professor, Department of Anatomy and Neurobiology, University of Maryland. (NIDA) R01, "Role of basolateral amygdala projections in mediating individual differences in motivation and flexibility."

- Erica Scheller, DDS, PhD, NIDCR K99/R00 awardee, assistant professor, Division of Bone & Mineral Disease, Washington University. (NIDCR) R01, "Development of a Wireless Biosensor to Track Bone Resorption in Periodontitis"

Pathway to Independence Awards (K99/R00)

Hope Amm, PhD, assistant professor, Department of Oral and Maxillofacial Surgery, University of Alabama at Birmingham. R00: "Hedgehog Pathway Activity and Targeting in KCOT"

Melodie Weller, PhD, assistant professor, Section of Oral Biology, Medicine and Pathology, University of Utah. R00: "The Role of Hepatitis Delta Virus in Sjogrens Syndrome."

Transitions from Institutional Training Grant Support to Individual Awards

NIDCR strongly encourages trainees supported on institutional training grants to apply for and transition to individual fellowships or career development award support.

- Jonathan An, University of Washington, NIDCR F30 predoctoral fellowship to support dual degree DDS-PhD training, "Impact of mTor on the aging periodontium and inflammation."

- Nai-Yuan Nicholas Chang, University of California San Francisco, NIDCR F30 predoctoral fellowship to support dual degree DDS-PhD training, "Infrared Methods for Lesion Activity Assessment."

- Emilie Rosset, Medical University of South Carolina, NIDCR F30 predoctoral fellowship to support dual degree DMD-PhD training, "SPARC controls transglutaminase-mediated collagen I cross-links in periodontal disease."

- Shaoping Zhang, DDS, PhD, University of North Carolina Chapel Hill, NIDCR Dentist Scientist Pathway to Independence Award (K99/R00), "Investigating the role of Tumor Necrosis Factor-Receptor Associated Factor 3 Interacting Protein 2 (TRAF3IP2), a critical adaptor in IL-17 pathway, in periodontal disease."

Recent Publications from Trainees:

F Fellows

Brackley AD, Gomez R, Guerrero KA, Akopian AN, Glucksman MJ, Du J, Carlton SM, Jeske NA. A-Kinase Anchoring Protein 79/150 Scaffolds Transient Receptor Potential A 1 Phosphorylation and Sensitization by Metabotropic Glutamate Receptor Activation. *Sci Rep.* 2017 May 12;7(1):1842.

Brackley AD, Sarrami S, Gomez R, Guerrero KA, Jeske NA. Identification of a signaling cascade that maintains constitutive δ-opioid receptor incompetence in peripheral sensory neurons. *J Biol Chem.* 2017 May 26;292(21):8762-8772.

Durham E, Howie RN, Parsons T, Bennfors G, Black L, Weinberg SM, Elsalanty M, Yu JC, Cray JJ Jr. Thyroxine Exposure Effects on the Cranial Base. *Calcif Tissue Int.* 2017 Sep;101(3):300-311.

Frenkel ES, Ribbeck K. Salivary mucins promote the coexistence of competing oral bacterial species. *ISME J*. 2017 May;11(5):1286-1290.

Garcia SS, Blackledge MS, Michalek S, Su L, Ptacek T, Eipers P, Morrow C, Lefkowitz EJ, Melander C, Wu H. Targeting of Streptococcus mutans Biofilms by a Novel Small Molecule Prevents Dental Caries and Preserves the Oral Microbiome. *J Dent Res.* 2017 Jul;96(7):807-814.

Grasman JM, Kaplan DL. Human endothelial cells secrete neurotropic factors to direct axonal growth of peripheral nerves. *Sci Rep.* 2017 Jun 22;7(1):4092.

Kim R, Green JBA, Klein OD. From snapshots to movies: Understanding early tooth development in four dimensions. *Dev Dyn.* 2017 Jun;246(6):442-450.

Kulakowski D, Leme-Kraus AA, Nam JW, McAlpine J, Chen SN, Pauli GF, Ravindran S, Bedran-Russo AK. Oligomeric proanthocyanidins released from dentin induce regenerative dental pulp cell response. *Acta Biomater*. 2017 Jun;55:262-270.

Robinson JL, Gupta V, Soria P, Clanaman E, Gurbarg S, Xu M, Chen J, Wadhwa S. Estrogen receptor alpha mediates mandibular condylar cartilage growth in male mice. *Orthod Craniofac Res.* 2017 Jun;20 Suppl 1:167-171.

Teng CS, Yen HY, Barske L, Smith B, Llamas J, Segil N, Go J, Sanchez-Lara PA, Maxson RE, Crump JG Requirement for Jagged1-Notch2 signaling in patterning the bones of the mouse and human middle ear. *Sci Rep.* 2017 May 31;7(1):2497.

K Awardees

Atsawasuwan P, Ouibaidin M, Dalal B, Khan H, Mohammed A. Calvarial bone development and suture closure in Dicer-deficient mice. *Orthod Craniofac Res.* 2017 Jun;20 Suppl 1:26-31.

Geraldeli S, Soares EF, Alvarez AJ, Farivar T, Shields RC, Sinhoreti MAC**, Nascimento MM.** A new arginine-based dental adhesive system: formulation, mechanical and anti-caries properties. *J Dent.* 2017 Aug;63:72-80.

Hu JK, Du W, Shelton SJ, Oldham MC, DiPersio CM, Klein OD. An FAK-YAP-mTOR Signaling Axis Regulates Stem Cell-Based Tissue Renewal in Mice. *Cell Stem Cell*. 2017 Jul 6;21(1):91-106.

Leslie EJ, Carlson JC, Shaffer JR, **Buxó CJ,** Castilla EE, Christensen K, Deleyiannis FWB, Field LL, Hecht JT, Moreno L, Orioli IM, Padilla C, Vieira AR, Wehby GL, Feingold E, Weinberg SM, Murray JC, Marazita ML. Association studies of low-frequency coding variants in nonsyndromic cleft lip with or without cleft palate. *Am J Med Genet A.* 2017 Jun;173(6):1531-1538.

Novince CM, Whittow CR, Aartun JD, Hathaway JD, Poulides N, Chavez MB, Steinkamp HM, Kirkwood KA, Huang E, Westwater C, Kirkwood KL. Commensal Gut Microbiota Immunomodulatory Actions in Bone Marrow and Liver have Catabolic Effects on Skeletal Homeostasis in Health. *Sci Rep.* 2017 Jul 18;7(1):5747.

Scoffield JA, Duan D, Zhu F, Wu H. A commensal streptococcus hijacks a Pseudomonas aeruginosa exopolysaccharide to promote biofilm formation. *PLoS Pathog.* 2017 Apr 27;13(4):e1006300.

Shi J, Lee S, Pan HC, Mohammad A, Lin A, Guo W, Chen E, Ahn A, Li J, Ting K, **Kwak JH.** Association of Condylar Bone Quality with TMJ Osteoarthritis. *J Dent Res.* 2017 Jul;96(8):888-894.

Institutional Training Grant (T15/T32/T90/R90) Trainees and K12 Scholars

Agnello M, Cen L, Tran NC, Shi W, McLean JS, He X. Arginine Improves pH Homeostasis via Metabolism and Microbiome Modulation. *J Dent Res.* 2017 Jul;96(8):924-930.

Bates AM, Lanzel EA, Qian F, Abbasi T, Vali S, Brogden KA. Cell genomics and immunosuppressive biomarker expression influence PD-L1 immunotherapy treatment responses in HNSCC-a computational study. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2017 Aug;124(2):157-164.

Carney MN, Johnston WM. The development of a novel shade selection program for fixed shade translucent dental materials. *J Dent.* 2017 Jul;62:81-84.

Coombs MC, Petersen JM, Wright GJ, Lu SH, Damon BJ, Yao H. Structure-Function Relationships of Temporomandibular Retrodiscal Tissue. *J Dent Res.* 2017 Jun;96(6):647-653.

Decker AM, Cackowski FC, Jung Y, Taichman RS. Biochemical Changes in the Niche Following Tumor Cell Invasion. *J Cell Biochem.* 2017 Aug;118(8):1956-1964.

Kulakowski D, Leme-Kraus AA, Nam JW, McAlpine J, Chen SN, Pauli GF, Ravindran S, Bedran-Russo AK. Oligomeric proanthocyanidins released from dentin induce regenerative dental pulp cell response. *Acta Biomater.* 2017 Jun;55:262-270.

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Schlecht SH, Smith LM, Ramcharan MA, Bigelow EM, Nolan BT, Mathis NJ, Cathey A, Manley E Jr, Menon R, McEachin RC, Nadeau JH, Jepsen KJ. Canalization Leads to Similar Whole Bone Mechanical Function at Maturity in Two Inbred Strains of Mice. *J Bone Miner Res.* 2017 May;32(5):1002-1013.

PUBLICATIONS

Selected Extramurally Funded Science Advances

During the past four months, 334 extramurally funded studies were published in the scientific literature. Below is a list of the most important papers published from each program area.

New Investigator R01-funded Projects

Wilkins OM, Titus AJ, Gui J, Eliot M, Butler RA, Sturgis EM, Li G, Kelsey KT, Christensen BC. Genome-scale identification of microRNA-related SNPs associated with risk of head and neck squamous cell carcinoma. *Carcinogenesis.* 2017 Jun 5. doi: 10.1093/carcin/bgx056

Behavioral and Social Sciences Research

Ramoni RB, Etolue J, Tokede O, et al. Adoption of dental innovations: The case of a standardized dental diagnostic terminology. *J Am Dent Assoc*. 2017;148(5):319-327.

Aldridge K, Collett BR, Wallace ER, et al. Structural brain differences in school-age children with and without single-suture craniosynostosis. *J Neurosurg Pediatr. 2017;19(4):479-489.*

Integrative Biology and Infectious Diseases

Panaccione A, Zhang Y, Ryan M, Moskaluk CA, Anderson KS, Yarbrough WG, Ivanov SV. MYB fusions and CD markers as tools for authentication and purification of cancer stem cells from salivary adenoid cystic carcinoma. *Stem Cell Res*. 2017 May; 21:160-166.

Janakiraman H; House RP; Talwar S; Courtney SM; Hazard ES; Hardiman G; Mehrotra S; Howe PH; Gangaraju V; Palanisamy V. Repression of Caspase-3 and RNA-binding protein HuR cleavage by cyclooxygenase-2 promotes drug resistance in oral squamous cell carcinoma. *Oncogene* 2017 June 36: 3137-3148.

Sanchez B C, Chang C, Wu C, Tran B, Ton-That H. Electron Transport Chain Is Biochemically Linked to Pilus Assembly Required for Polymicrobial Interactions and Biofilm Formation in the Gram-Positive Actinobacterium *Actinomyces oris*. *mBio* May/June 2017, 8(3): e00399-17.

Hwang G, Liu Y, Kim D, Li Y, Krysan DJ, Koo H. *Candida albicans* mannans mediate *Streptococcus mutans* exoenzyme GtfB binding to modulate cross-kingdom biofilm development in vivo. *PLoS Pathog* 2017 13(6): e1006407.

Lee JK, Huwe LW, Paschos N, Aryaei A, Gegg CA, Hu JC, Athanasiou KA. Tension stimulation drives tissue formation in scaffold-free systems. *Nat Mater*. 2017 Jun 12. doi: 10.1038/nmat4917.

Lee SS, Fyrner T, Chen F, Álvarez Z, Sleep E, Chun DS, Weiner JA, Cook RW, Freshman RD, Schallmo MS, Katchko KM, Schneider AD, Smith JT, Yun C, Singh G, Hashmi SZ, McClendon MT, Yu Z, Stock SR, Hsu WK, Hsu EL, Stupp SI. Sulfated glycopeptide nanostructures for multipotent protein activation. *Nat Nanotechnol*. 2017 Aug;12(8):821-29.

Ng JJ, Wei Y, Zhou B, Bernhard J, Robinson S, Burapachaisri A, Guo XE, Vunjak-Novakovic G. Recapitulation of physiological spatiotemporal signals promotes in vitro formation of phenotypically-stable human articular cartilage. *PNAS USA*, 2015 March 114 (10), 2556-2561.

Hu JKH, Du W, Shelton SJ, Oldham MC, DiPersio CM, Klein OD. An FAK-YAP-mTOR signaling axis regulates stem cell-based tissue renewal in mice. *Cell Stem Cell* 2017, July 6, 21, 91-106.e6.

Song HB, Wang X, Patton JR, Stansbury JW, Bowman CN. Kinetics and mechanics of photo-polymerized triazole-containing thermosetting composites via the copper(I)-catalyzed azide-alkyne cycloaddition. *Dent Mater*. 2017 Jun; 33(6): 621-629.

Nasrin S, Katsube N, Seghi RR, Rokhlin SI. Survival Predictions of Ceramic Crowns Using Statistical Fracture Mechanics. *J Dent Res*. 2017 May; 96(5): 509-515.

Kajikawa T, Meshikhes F, Maekawa T, Hajishengallis E, Hosur KB, Abe T, Moss K, Chavakis T, Hajishengallis G. Milk Fat Globule Epidermal Growth Factor 8 Inhibits Periodontitis in Non-human Primates and Its Gingival Crevicular Fluid Levels Can Differentiate Periodontal Health from Disease in Humans. *J Clin Periodontol*. 2017; 44(5): 472-483.

Xiao E, Mattos M, Vieira GHA, Chen S, Corrêa JD, Wu Y, Albiero ML, Bittinger K, Graves DT. Diabetes Enhances IL-17 Expression and Alters the Oral Microbiome to Increase Its Pathogenicity. *Cell Host Microbe*. 2017 Jul 12;22(1):120-128.e4

Chen G, Kim YH, Li H, Luo H, Liu DL, Zhang ZJ, Lay M, Chang W, Zhang YQ, Ji RR. PD-L1 inhibits acute and chronic pain by suppressing nociceptive neuron activity via PD-1. 2017 *Nat. Neurosci*. 20(7):917-26.

Chang W, Berta T, Kim YH, Lee S, Lee SY, Ji RR. Expression and Role of Voltage-Gated Sodium Channels in Human Dorsal Root Ganglion Neurons with Special Focus on Nav1.7, Species Differences, and Regulation by Paclitaxel. *Neurosci. Bull*. 2017 Apr 19 doi: 10.1007/s12264-017-0132-3.

Zhang X, Priest BT, Belfer I, Gold MS. Voltage-gated Na^+ currents in human dorsal root ganglion neurons. *eLIFE*. 2017 May 16;6:e23235.

Clinical Research

Tourbier S, Velasco-Annis C, Taimouri V, Hagmann P, Meuli R, Warfield SK, Bach Cuadra M, Gholipour A. Automated template-based brain localization and extraction for fetal brain MRI reconstruction. *Neuroimage*. 2017 Jul 15;155:460-472.

Kim D, Ho DC, Mai H, Zhang X, Shen SGF, Shen S, Yuan P, Liu S, Zhang G, Zhou X, Gateno J, Liebschner MAK, Xia JJ. A clinically validated simulation method for facial soft tissue change prediction following double-jaw orthognathic surgery. *Med Phys*. 2017 Aug;44:4252-61.

Hutcheson KA, Yuk M, Hubbard R, Gunn GB, Fuller CD, Lai SY, Lin H, Garden AS, Rosenthal DI, Hanna EY, Kies MS, Lewin JS. Delayed lower cranial neuropathy after oropharyngeal intensity-modulated radiotherapy: A cohort analysis and literature review. *Head Neck*. 2017 Aug;39(8):1516-1523.

Gasper MA, Hesseling AC, Mohar I, Myer L, Azenkot T, Passmore JS, Hanekom W, Cotton MF, Crispe IN, Sodora DL, Jaspan HB. BCG vaccination induces HIV target cell activation in HIV-exposed infants in a randomized trial. *JCI Insight*. 2017 Apr 6;2(7):e91963.

Burgette JM, Preisser JS Jr, Weinberger M, King RS, Lee JY, Rozier RG. Impact of Early Head Start in North Carolina on Dental Care Use Among Children Younger Than 3 Years. *Am J Public Health*. 2017 Apr;107(4):614-620.

Atchison KA, Macek MD, Markovic D. Value of a combined word recognition and knowledge measure to understand characteristics of our patients' oral health literacy. *Community Dent Oral Epidemiol.* 2017 Aug;45(4):380-388.

Martin M, Frese W, Lumsden C, Sandoval A. Building a pediatric oral health training curriculum for community health workers. *J Public Health Manag Pract*. 2017 Jun 16.

Albino J, Tiwari T, Gansky SA, Henshaw MM, Barker JC, Brega AG, Gregorich SE, Heaton B, Batliner TS, Borrelli B, Geltman P, Kressin NR, Weintraub JA, Finlayson TL, Garcia RI. The basic research factors questionnaire for studying early childhood caries. *BMC Oral Health.* 2017 May 19;17(1):83.

Translational Genomics Research

Fantauzzo KA, Soriano P. Generation of an immortalized mouse embryonic palatal mesenchyme cell line, *PLoS One*. 2017 Jun 5;12(6):e0179078.

DER Staff Publications

Haddock R, Lin-Gibson S, Lumelsky N, McFarland R, Roy K, Saha K, Zhang Z, and Zylberberg C. Manufacturing Cell Therapies: The Paradigm Shift in Health Care of This Century. Perspective: Expert Voices in Health and Health Care. Publication of the National Academy of Medicine. June 2017.

Fischer DJ, O'Hayre M, Kusiak JW, Somerman MJ, Hill CV. Oral health disparities: A perspective from the National Institute of Dental and Craniofacial Research. *Am J Public Health* 2017 May;107(S1):S36-38.

LeHew CW, Weatherspoon DJ, Peterson CE, Goben A, Reitmajer K, Sroussi H, Kaste LM. The Health System and Policy Implications of Changing Epidemiology for Oral Cavity and Oropharyngeal Cancers in the United States From 1995 to 2016. *Epidemiol Rev*. 2017 Jan 1;39(1):132-147.

Mitchual S, da Fonseca MA, Raja S, Weatherspoon D, Koerber A. Association Between Childhood Traumatic Stress and Behavior in the Pediatric Dental Clinic. *Pediatr Dent.* 2017 May 15;39(3):203-208.

Selected Division of Intramural Research Publications

Daley WP, Matsumoto K, Doyle AD, Wang S, DuChez BJ, Holmbeck K, Yamada KM. Btbd7 is Essential for Region-specific Epithelial Cell Dynamics and Branching Morphogenesis in vivo. *Development*. 2017 Jun 15;144(12):2200-2211.

Friis S, Tadeo D, Le-Gall SM, Jürgensen HJ, Sales KU, Camerer E, Bugge TH. Matriptase zymogen supports epithelial development, homeostasis and regeneration. *BMC Biol.* 2017 Jun 1;15(1):46

Lee H, Macpherson LJ, Parada CA, Zuker CS, Ryba NJP. Rewiring the taste system. *Nature* 2017 Aug 9. doi:10.1038/nature23299.

Liu S, Ma Q, Fattah R, Bugge TH, Leppla SH. Anti-tumor activity of anthrax toxin variants that form a functional translocation pore by intermolecular complementation. Oncotarget. 2017 May 9. doi: 10.18632/oncotarget.17729

Liu S,* de Castro LF,* Jin P, Civini S, Ren J, Reems JA, Cancelas J, Nayak R, Shaw T, O'Brien T, McKenna DH Armant M, Silberstein L, Gee AP, Hei DJ, Kuznetsov SA, Robey PG, Stroncek DF 2017 Manufacturing differences affect human bone marrow stromal cell characteristics and Function: comparison of production methods and products from multiple centers. *Sci Rep* 27(7):46731.

Shirakura M, Kram V, Robinson J, Sikka S, Kilts T, Wadhwa S, Young MF. ECM mediates BMP-2 in a model of temporomandibular joint osteoarthritis *Cells Tissues Organs* 2017 April; 204(2):84-92

van den Bosch MH, Blom AB, Kram V, Maeda A, Sikka S, Gabet Y, Kilts TM, van den Berg W, van Lent PL, van der Kraan P, Young MF. WISP1/CCN4 aggravates cartilage degeneration in experimental osteoarthritis. *Osteoarthritis and Cartilage* 2017 Jul; S1063-4584(17)31100-7

Office of Science Policy and Analysis Staff Publications

Dye BA, Mitnik GL, Iafolla TJ, Vargas CM. Trends in dental caries in children and adolescents according to poverty status in the United States from 1999 through 2004 and from 2011 through 2014. *J Am Dent Assoc*. 2017 Aug;148(8):550-565

FUNDING UPDATE

Program Announcements:

PHS 2017-02 Omnibus Solicitation of the NIH, CDC, and FDA for Small Business Innovation Research Grant Applications (Parent SBIR [R43/R44])
Release Date: June 5, 2017

PHS 2017-02 Omnibus Solicitation of the NIH for Small Business Technology Transfer Grant Applications (Parent STTR [R41/R42])
Release Date: June 5, 2017

Administrative Supplements for Research on Dietary Supplements (Admin Supp)
Release Date: June 7, 2017

Multidisciplinary Studies of HIV/AIDS and Aging (R21)
Release Date: June 23, 2017

Multidisciplinary Studies of HIV/AIDS and Aging (R01)
Release Date: June 23, 2017

Administrative Supplements for the U.S. - Japan Brain Research Cooperative Program (BRCP) - U.S. Entity (Admin Supplement)
Release Date: July 18, 2017

Requests for Applications

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (R43/R44)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (R41/R42)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (U54)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (UM1)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (UC4)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (U24)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (R01)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (R24)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (UM2)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (P50)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (P41)
Release Date: April 28, 2017

Revision Applications for Regenerative Medicine Innovation Projects (RMIP) (U01)
Release Date: April 28, 2017

Notices

Notice of Extension of Expiration Date for PAR-14-346 "NIDCR Clinical Trial or Biomarker Clinical Validation Study Planning Grant (R34)"
Release Date: May 15, 2017

Notice of Change in Application Due Date and Eligibility Requirements for PAR-17-001 "Emerging Global Leader Award (K43)"
(NOT-TW-17-004)
Release Date: May 31, 2017

Notice of NIDCR's Withdrawal from Participation in PAR-16-242 "Bioengineering Research Grants (BRG) (R01)"
Release Date: June 22, 2017

Notice of NIDCR's Withdrawal from Participation in PA-16-040 "Exploratory/Developmental Bioengineering Research Grants (EBRG) (R21)"
Release Date: June 22, 2017

Notice of Intent to Reissue the Funding Opportunity Announcement for the NIH Blueprint Diversity Specialized Predoctoral to Postdoctoral Advancement in Neuroscience (D-SPAN) Award (F99/K00)
Release Date: July 6, 2017