Reflections on Research: Sunstar Innovation **Grant**

SUNSTAR

During the Academy's 102nd Annual Meeting in San Diego, AAP Past President Dr. Wayne Aldredge announced the SUNSTAR Foundation's commitment to pledge $250,000 to the AAP for six research grants to be awarded over a three-year period. The purpose of the grant was to provide support to AAP members whose research endeavors showed significant potential to advance the science and practice of periodontics. Each grant winner received $30,000.

Periospectives reached back out to the recipients for their reflections on the impact of their research.

2017

The first grant recipient, Yvonne Kapila, DDS, PhD, received the AAP's Sunstar Innovation Grant in 2017 for her research project: "Natural Bacteriocins as Pre/Pro-Biotics to Promote Oral Health and Prevent Periodontal Disease."

Dr. Kapila: The initial support Dr. Kapila received for her research project has enabled her to initiate various projects that have led to several publications and two new NIH RO1 grants. The studies that have resulted (and extended) from this initial work encompass nisin's effects not only on biofilms, but also on periodontal disease, peri-implant disease, cancer-related applications and beyond.

2018

In 2018, Hsun-Liang (Albert) Chan, DDS, MS, and Jeff C.W. Wang, DDS, DMSc, each received the AAP's Sunstar Innovation Grant for their research projects, "In-Situ Evaluation of Periodontal Inflammation with Ultrasonography" and "Development of Patient-friendly Oral Health Report with Customized Oral Hygiene Instructional Video for Enhanced Patient Education Modalities," respectively.

Dr. Chan: The grant has helped Dr. Chan and his team with their goal of developing a point-of-care ultrasound device to diagnose and monitor periodontal and peri-implant tissue inflammation. Through this grant, they were able to publish a paper in the *Journal of Dental Research* with the lead author Dr. Shayan Barootchi about classifying peri-implant diseases with ultrasound imaging. Through knowledge and experiences gained from the Sunstar grant, another 4 NIH grants – among other foundational and industrial grants – were secured. Dr. Chan and his team will further explore and validate the efficacy of ultrasound on understanding intraoral wound healing and the disease process for providing better clinical care. They are currently piloting this innovative technology for clinical evaluation of periodontal and peri-implant tissue wound healing at the University of Michigan.

Dr. Wang: With the help of the grant, Dr. Wang and his team have created prototypes for a personalized

oral health report to help patients understand their own oral health condition. Dr. Wang states this has been very successful because information about oral health is presented in a patient-friendly manner, with "clinical photos, noted radiographes, periodontal chart, plaque control heat map, and odontograms." Extended active learning materials explaining their risk factors for caries and periodontal disease are included as well as a customized oral hygiene instructional video. The video was included as part of the package for the patient, which "tremendously improved the efficacy of the home care therapy that was catered to individual needs." The grant has also supported Dr. Wang and his team in launching a proof-of-principle pilot clinical trial.

2019

Kevin M. Byrd, DDS, PhD, Maria L. Geisinger, DDS, MS, and Chun-Teh Lee, DDS, MS, DMSc, were each awarded the AAP's Sunstar Innovation Grant in 2019 for their research projects, "An Atlas of Experimental Gingivitis in Humans at Single Cell Resolution," "Development of Multimedia Educational Materials for Caregivers to Enable Optimal Oral Hygiene Provisions for Patients with Dementia," and "Improving Periodontal Health through a Precision Periodontal Health Care Chart," respectively.

Dr. Byrd: Since receiving the grant funding, Dr. Byrd and his team have enmeshed themselves in the ever-growing community of single-cell and spatial biologists at the axis of data generation, data integration, standardized cell annotation, technology innovation, and ultimately application to the clinic in collaboration with computational scientists who can employ AI/ML strategies for data interpretation. Dr. Byrd informed *Periospectives* that the grant was a catalyst for his team's current leadership within the Human Cell Atlas Oral & Craniofacial Bionetwork, which now has transdisciplinary partnerships with over 60 labs across 5 continents.

Dr. Geisinger: The grant funding has helped Dr. Geisinger and her team parlay their work into programs they have used to train caregivers (both professional and familial) for individuals with moderate to severe dementia at over 10 facilities in the Birmingham area. The data they gathered indicates that utilizing the Managing Oral Hygiene Using Threat Reduction (MOUTh) protocol to reduce care-resistant behavior (CRB) results in substantially longer time spent on oral hygiene activities, reduction in CRB, and improved oral health outcomes. More recently, a secondary analysis revealed tailored strategies may be advantageous in subgroups of individuals living with dementia. Younger individuals who were less dependent upon caregivers for activities of daily living demonstrated less response to MOUTh intervention whereas older individuals with higher levels of dementia and taking more anti-psychotic medications demonstrated larger oral health benefits and reduction in CRBs when MOUTh protocols were used. Dr. Geisinger's group recently submitted a federal grant proposal to further evaluate the potential for development and validity testing of a scalable web-based application to provide training for CRB recognition and amelioration during the delivery of oral care in patients with dementia.

Dr. Lee: With the help of the Sunstar Innovation Grant, Dr. Lee and his team were able to develop the Precision Periodontal Health Care Chart (PPHCC) in the electronic health record system and share it with other institutions. The PPHCC is an electronic form containing risk factors and risk assessment for periodontitis. The dental care provider answers the required questions in PPHCC, and then the PPHCC provides the summary of the periodontal charting, a suggested periodontal diagnosis, a periodontal risk profile, and the risk factor information. This project has been further extended to create algorithms to suggest a preliminary periodontal diagnosis based on the information collected by the PPHCC, as well as develop a deep learning model to assess radiographic bone level to assist clinical diagnoses. According to the results of a survey done by Dr. Lee and his team, dental care providers and patients are highly satisfied with the PPHCC. Patients are better educated and motivated to receive treatments and follow instructions after reading the evidence-based information of risk factors. Clinicians can create a proper treatment plan for patients based on the risk assessment results. The treatment outcomes have improved, and the risk of disease progression has reduced with the use of PPHCC. ■