

## Translational Science, Policy, & Health Outcomes Science

4138

### Development of an Antibiofilm Resorbable Membrane for Treating Peri-implantitis\*

Zhou Ye<sup>1</sup>, Joseph R. Rahimi<sup>2</sup>, Nicholas G. Fischer<sup>2</sup>, Hooi Pin Chew<sup>2</sup>, and Conrado Aparicio<sup>2</sup>

<sup>1</sup>University of Minnesota CTSI; <sup>2</sup>University of Minnesota

**OBJECTIVES/GOALS:** Peri-implantitis is the inflammation of peri-implant mucosa and subsequent loss of supporting bone. Its treatment is only <40% successful mainly due to persistent bacterial infection. The goal of this project is to increase success rates by developing a robust antibiofilm multi-biomolecular membrane that can be placed around implant surfaces. **METHODS/STUDY POPULATION:** A collagen membrane was soaked in the antimicrobial peptide GL13K solution overnight to form an interpenetrating fibrillary network. The nanostructure of the membrane was imaged with scanning electron microscope (SEM). The hydrophobicity of the membrane was analyzed by water contact angle (WCA) measurements. The biodegradability was tested in a 0.01 mg/mL Type I collagenase solution for up to 5 weeks. The antimicrobial activity of the membrane was assessed with Gram-positive oral bacteria *Streptococcus gordonii*. The cytotoxicity was evaluated by culturing human gingival fibroblasts (HGF), and the osteogenesis was assessed using preosteoblasts MC3T3. Pure collagen membrane was used as the control. Statistical significance ( $p < 0.05$ ) was determined by one-way ANOVA with Tukey's HSD test. **RESULTS/ANTICIPATED RESULTS:** The antimicrobial peptide GL13K self-assembled to short fibrils (< 1  $\mu\text{m}$  long), which entangled with the larger collagen fibers (around 200 nm in diameter). The collagen fibers presented characteristic periodic banding structures, which provided biomimetic cues for cell behavior as extracellular matrix. The interpenetrated GL13K fibrils turned the highly hydrophilic collagen membrane to a hydrophobic membrane (WCA = 135°) and significantly reduced the rate of degradation by collagenases. The developed membrane was efficient in preventing the attachment of *S. gordonii*. A large portion of the attached bacteria was killed on the surface of the membrane. The incorporation of GL13K did not affect the cytocompatibility of the membrane for HGF. **DISCUSSION/SIGNIFICANCE OF IMPACT:** We developed an antibiofilm membrane with interpenetrating collagen and antimicrobial peptide fibrils. The strong antimicrobial activity and low cytotoxicity support its further translational evaluation as scaffolds for increasing success rate in treating peri-implantitis.

4398

### A Computational Psychiatry Approach to Addiction Using Neuroeconomics Translated Across Species

Brian Sweis<sup>1</sup>, Jazmin Camchong, Samantha Abram, Ann Haynos, Sheila Specker, Kelvin Lim, Angus MacDonald, Mark Thomas, and David Redish

<sup>1</sup>University of Minnesota CTSI

**OBJECTIVES/GOALS:** Decision-making impairments in addiction can arise from dysfunction in distinct neural circuits. Such processes

can be dissociated by measuring complex, computationally distinct behaviors within an economic framework. We aim to characterize computational changes conserved across models of addiction. **METHODS/STUDY POPULATION:** We used neuroeconomic tasks capable of dissociating neurally separable decision processes using behavioral analyses equally applicable to humans and rodents. We tested 12 human cocaine-users and 9 healthy controls on the Web-Surf task designed to match the rodent Restaurant Row task on which 27 mice were trained and then exposed to saline ( $n = 10$ ), cocaine ( $n = 7$ ), or morphine ( $n = 10$ ). All subjects foraged for rewards (humans: entertaining videos; mice: food) of varying costs (1-30s delays) and subjective value (humans: genres; mice: flavors) by making serial accept or reject decisions while on a limited time budget, balancing the utility of wanting desirable rewards despite conflicting costs. **RESULTS/ANTICIPATED RESULTS:** When encountering unique offers for rewards with a delay above one's willingness to wait, cocaine-treated mice like cocaine-exposed humans were less likely to appropriately reject economically disadvantageous offers. Furthermore, these mice and humans did so despite spending more time deliberating between future options. In contrast, morphine-treated mice displayed distinct impairments when given the opportunity to correct past mistakes, a process we previously demonstrated was uniquely sensitive to alterations in strength of synaptic connectivity of the infralimbic-accumbens shell circuit in mice. We anticipate human opioid-users will mirror these latter, computationally distinct findings. **DISCUSSION/SIGNIFICANCE OF IMPACT:** These data elucidate facets of addiction shared across species yet fundamentally distinct between disease subtypes. Our translational approach can help shed light on conserved pathophysiological mechanisms in order to identify novel diagnostic parameters and computational targets for intervention.

4499

### A look at motivation and income level for families in obesity treatment

Melissa Ramel<sup>1</sup>, Denise Wilfley, and Rachel Tabak

<sup>1</sup>Washington University in St. Louis

**OBJECTIVES/GOALS:** An evidence-based approach for childhood obesity is family-based treatment (FBT). Research supports that motivation and income level may impact treatment success; however, the relationship between the two is understudied. Therefore, the objective of this study was to examine whether motivation for beginning FBT is associated with income levels. **METHODS/STUDY POPULATION:** 459 parent and child dyads from the PLAN (Pediatric, Learning, Activity, Nutrition) with Families multi-site study were included in this study. PLAN consists of FBT through personalized health coaching over the course of two years, focusing on nutrition, physical activity, and parenting skills. Parent and child also attend height and weight assessments every 6 months in the study. Outcomes of the study include weight change and mastery of behavioral skills. Motivation and income level were provided by self-report at the beginning of the study. Motivation was based on a scale from 1-10 (1 = no motivation, 10 = high motivation). Income levels were grouped into one of three broader categories: low income (\$80,000/year). **RESULTS/ANTICIPATED RESULTS:** The mean level of motivation for the parent was 8.76 and for the child was 7.87. There was a significant difference in the mean level of motivation for the child and parent,  $t = 7.73$ ,  $p < .001$ . Post-hoc