

Shark Tank McGraw Family Opioid Innovator Award Fall 2019		
Name	Project	Summary
<p>Joji Suzuki, MD, Assistant Professor, Psychiatry, BWH</p>	<p>Pilot study of cannabidiol (CBD) for the treatment of opioid use disorder</p>	<p>Research has shown that buprenorphine (suboxone) reduces the risk of overdose among individuals with opioid use disorder (OUD) by up to 70%. However, 50% of patients will leave treatment in the first 6 months, partly due to the emergence of strong cravings in response to cues. Recent animal and human studies demonstrate that cannabidiol (CBD), a non-addictive constituent of marijuana, helps to blunt the cravings that emerge after exposure to cues. Our team propose to conduct a pilot study to determine if CBD will reduce cue-induced cravings among OUD patients currently taking buprenorphine. If successful, this study will lay the groundwork for a NIH-funded study to conduct a series of human trials with CBD for OUD patients as an adjunct to buprenorphine treatment.</p>

Peter Chai, MD, MMS, Assistant Professor, Emergency Medicine, BWH

Enabling smart sewers to measure community level opioid and naloxone consumption

This project seeks to deploy a robotic wastewater collection system, Biobot, that integrates onto existing maintenance hole covers to measure the amount of opioid exposure in municipal wastewater catchment areas in Boston. While existing opioid reporting data sources paint a grim story of opioid misuse and overdose death, these data are limited in their ability to describe patterns of opioid misuse and overdose deaths at the community level where most ground-level efforts are focused to combat the opioid epidemic. Biobot, represents an exciting and effortless method that converts city sewers to smart sewers to provide near real-time reporting of fluctuations in opioid consumption and naloxone use. This relevant, community-level data can be used to inform the progress and targeting of opioid use disorder interventions.

Christopher Connor, MD, PhD
Assistant Professor, Anesthesiology,
BWH

Imaging opioid effects,
tolerance and addiction in
C. elegans

C. elegans is a small, transparent, nematode worm, about 1mm long. It was the first creature to have its DNA completely sequenced, and the only creature in which we know the exact origin and interconnectedness of every one of its cells. I have personally used *C. elegans* with genetically-engineered neurons to show how anesthetic gases make the worm become unconscious. Opioid research needs a new basic approach, in which we figure out how the perception of pain is integrated into the nervous system, and how addiction and tolerance hijack our vestigial reward systems. *C. elegans* has the ideal simple nervous system in which to study opioid exposure.

Athena Petrides, PhD, Assistant Professor, Pathology, BWH

DigiToxRx: Treating Pain is No Longer Painful

Interpreting urine toxicology results is a time-consuming and complex task for clinicians prescribing opioids. Approximately 500 toxicology results are misinterpreted annually at Brigham and Women's Hospital, potentially leading to inappropriate opioid refills and discontinuation of appropriate opioid treatment. DigiToxRx offers a complete solution, which encompasses a novel testing methodology paired with software that automates personalized toxicology interpretations. Our recent study demonstrated that personalized interpretations improved clinician confidence in result review by 34% and increased the speed of review by 46%. Financial support of DigiToxRx will allow us to automate personalized interpretations and to scale this service across Partners and potentially other healthcare systems.

Jason R. Yong, MD, MBA,
Instructor, Pain Medicine, BWH

Smart Pill Dispenser to
Enhance Opioid
Compliance and Patient
Outcomes

Efforts to combat the opioid epidemic have been limited by our lack of understanding on how, when, and why patients take prescription opioids. Instead of waiting months between visits, a Bluetooth enabled pill dispenser paired with a smartphone app will provide the clinician with real-time data about their patients' pain levels and opioid use, including automatic alerts when detecting dangerous escalations in use. We hope that by researching this intersection of technology, remote patient monitoring, and patient reported outcomes, we can provide tailored pain management plans, increase prescription adherence, and intervene early when detecting high-risk behavior.