FOSTER
Buerk Center for
Entrepreneurship

Biomedical Commercialization Fellows Projects 2020

1. Kidney Organoids – Lab grown kidney structures to study kidney disease (Beno Freedman, Department of Medicine, Division of Nephrology)

Kidney disease affects one in ten Americans, with limited therapies available and very few that treat the root causes of the disease. We have invented human mini-kidney structures (organoids) that can be grown en masse in the lab. The organoids can be engineered to mimic a range of kidney diseases, including polycystic kidney disease, acute kidney injury, diabetic nephropathy and cystinosis. For commercialization, the platform therefore offers a wide range of discovery and service opportunities. A summer fellow will explore which of these possible applications is likely to be the most attractive to the market, and which strategy is the most likely to succeed in bringing such a product to fruition.

2. HIV medication adherence – A point-of-care test to measure adherence to HIV medication (Paul Drain, Departments of Global Health, Medicine, and Epidemiology)

Pre-exposure prophylaxis (PrEP) with a daily oral pill can prevent acquisition of HIV, but only if clients maintain good adherence to therapy. Currently, there are no methods to monitor PrEP delivery for the over 50 million people, including 1.2 million people in the US, who are eligible for PrEP. We developed an innovative, simple assay to measure HIV drug levels. Our test is suitable for routine use in clinical laboratories and could be integrated into a format for point-of-care (POC) testing in a clinic or for use in a patient's home as a self-test. A student will explore the potential market for such a test in the US to determine the best pathway to commercialization.

3. Clearing implanted catheters – A non-invasive ultrasound technology to clear blocked catheters (Pierre Mourad, Department of Neurological Surgery and Jason Hauptman, Seattle Children's Hospital)

Hydrocephalus is a painful and life-threatening condition in which fluid accumulates in the brain, thereby causing an increase in pressure inside the skull. Some estimates report that that between one and two of every 1000 babies are born with hydrocephalus, requiring surgical intervention that places a catheter through the skull to drain the accumulated fluid. When these intra-cranial catheters clog, the result is excruciating headache, vomiting, neurological symptoms and eventually coma or death. The only treatment available at present is a neurosurgical operation in which the clogged catheter is replaced. Our team has developed a non-invasive transducer of focused ultrasound to generate internal, pulsatile flow within the catheter itself that can clear blockages without surgical removal. A summer fellow will help the team to understand the market for this technology to treat hydrocephalus and other possible indications, as well as explore the regulatory and reimbursement pathways to make the product commercially successful.

4. Holographic ultrasound – Holographic transducers for ultrasound therapy (Adam Maxwell, Department of Urology and Applied Physics Laboratory)

Ultrasound can be used as a non-surgical method to facilitate removal of soft tissues such as tumors or calcifications such as kidney stones in the body. A challenge in using ultrasound for these therapies is determining and creating the right ultrasound beam shape to treat with necessary precision and speed. We are developing holographic beam shaping technology for our ultrasound therapy, a technology used to shape ultrasound beams into specific patterns. This technology can increase the speed and uniformity of ultrasound exposure to a tumor and extend the size of tumors that can be treated in a reasonable time frame. The use of holography to shape the ultrasound beams also creates multiple applications for this technology. A summer fellow will help evaluate the market case for a variety of applications of this technology, including tumor and kidney stone treatment, applications in tissue engineering and drug delivery to tumors.