Ultrasound Waves for the Destruction of Bacteria.

blasteria

Problem

Globally, antimicrobial resistance (AMR) leads to hundreds of thousands of deaths yearly. In the U.S alone, more than 2.8 million infections occur each year. AMR is a by-product of misprescribed drugs, accounting for 30% of overall antibiotic usage each year. Someday, resistant microorganisms will mutate faster than the rate at which new drugs are developed. We are in desperate need for an alternative.

Solution

Blasteria is a proprietary “bacteriotripsy” system that provides an end-to-end High Intensity Focused Ultrasound (HIFU) treatment for infectious biofilms. These bacterial structures form due to an accumulation of bacterial cells, have high prevalence in chronic infections, and are extremely tolerant to conventional antibiotics.

Reduced Dependency

With our treatment, we can look forward to a future without superbugs. This can save the 400,000 Canadians expected to die to AMR in the next 30 years.

$30B

Less Stress on Healthcare

Over the next 3 decades, it is estimated that the Canadian healthcare industry will face over $30B in expenses due to AMR bacteria. Using our therapy, these costs can be diminished.

Making Implants Safer

Biofilms are a growing concern on surgical implants, with a 5% risk rate. Ultrasound can non-invasively eliminate biofilms on implants, without second surgeries.

The Process

1

Ingestible Microbubbles

Each patient is given a dosage of microbubble solution, the administration method of which is dependent on the observed symptoms. Our custom-engineered microbubbles come equipped with targeting ligands corresponding to the extracellular polymeric substances of infectious biofilms.

2

Applying HIFU

Using the pressure difference between the gas inside of the microbubble and the extracellular fluids outside of the biofilm, we are able to cause inertial cavitation using HIFU. This phenomena allows us to cause subcellular damage to the biofilm, using an external ultrasound transducer. The pressure difference also allows physicians to leverage microbubbles as a contrast agent for ultrasound imaging, enabling for real-time imaging during the therapy.

3

Clearing Debris

Once the biofilms have been ablated, another round of HIFU will be delivered, with a fresh microbubble dosage. This step is crucial to clean up any colony forming units (CFUs) that may have survived in the biofilm debris. This step is repeated until a physician can guarantee that no CFUs can be detected by ultrasound.