



HACKATHON

BIOCOMPATIBLE IMPLANTS WITH MRI CAPABILITIES

PROBLEM DESCRIPTION

Magnetic resonance imaging (MRI) has seen a strong increase in growth over the past decade. Additionally, MRI extends past other imaging methods by allowing for functional imaging. Metabolic functions such as tissue oxygenation, flow, diffusion, and perfusion can be visualized in MRI. Although other imaging modalities like computed tomography provide detail on tissue condition, MRI provides information on surrounding organs, vascular networks, and soft tissue around the implant. Medical implants have functioned as organ stimulation devices as well as tools for cosmetic and dental purposes. Structural implants in the form of stents, braces, rods, heart valves, bones, pins, hip prosthesis, eye, ear, skull implants and knee replacements have also been designed. To gain market footing and wider usage as an alternative implant material, medical imaging compatibility must be ensured for successful clinical translation of implants. MRI offers the ability to observe soft tissue surrounding implants as they degrade during healing, an essential aspect for physicians.

Motivation: To make biocompatible implants with MRI imaging capabilities which will help to monitor the performance of the implants

Expected Outcomes:

Biocompatible material composition for implant fabrication should be identified. It should have compatibility with wide fabrication methods. MRI capabilities, properties, compatibility and efficacy should be evaluated. Any implant could be proposed: blood vessel, nerve graft, bone implant etc.

