Development of embolic particles for osteoarthritis

Osteoarthritis (OA) is the most common chronic condition affecting patients over the age of 70, with an approximate prevalence of 303 million patients globally. For OA patients who do not qualify for joint-replacement surgery, particulate embolization of neo-vessels in hypervascular joint tissue in joint OA shows promise as a viable option for pain management. To this end, commercially available embolic agents, which are sub 100 micron-sized particles made of hydrogel microspheres coated with an inorganic perfluorinated polymer (e.g., Embozene, Boston Scientific, Massachusetts, US), have been used to treat OA knee pain. However, these agents are permanent, leading to potential side-effects such as nerve ischemia. In the project, the candidate will work to characterize a colloidal agent, Imipenem-Cilastatin (IPM/CS), an antibiotic traditionally used to treat gram-negative bacteremia, as a potential temporary embolic agent. Although IPM/CS has already been tested as a temporary embolic in patients in Japan, its properties have yet to be fully characterized which is necessary for its translation to clinical practice in Canada. The applicant will first determine the degradation rate of IPM/CS as function of its concentration, size distribution, and suspension media by analyzing microscopy, Coulter Counter, and UV-vis spectroscopy data already collected. The candidate will then help design a prospective study to assess IPM/CS in vivo based on the determined and published properties of IPM/CS. Applicants with a background in colloidal agent preparation and characterization would be well-suited to this project.