**PROJECT RESUME**

The **objective** of this project is to develop a microneedle-based technology to facilitate drug-delivery to the knee joint to prevent diseases such as Post Traumatic Osteoarthritis (PTOA). PTOA occurs after acute joint injury, such as rupture of the Anterior Cruciate Ligament (ACL) and currently **no** prophylactic steps are currently taken to prevent development of PTOA. One difficult with intra-articular drug delivery is that any agents delivered to the joint are quickly clearly by lymphatic/vasculature systems.

Microneedle patches are a relatively new technology in the field of medicine, but are a highly promising and are an exciting candidate to solve this particular problem. Microneedles were first used to deliver vaccinations transdermally, to avoid hypodermic needle injection. Micron-sized needles carrying a specific antigen, would penetrate dermal layers and reach immune cells (and thus have the desired inoculating effect), without activating pain receptors. This external/transdermal application has been quite successful, and has recently expanded to have internal applications (oral, gastrointestinal, cardiac etc.) and in this project we propose to apply this technology **intra-articularly** to the knee joint.

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