PROJECT TITLE: Injectable, calcium-scavenging hydrogels to prevent premature bone fusion

Physical Requirement : Able to lift 5 lbs
Project's Technical Skills Requirement : Basic experience with lab procedures (weighing reagens, using pipettes, etc)

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Project Description

Craniosynostosis, or premature fusion of one or more of the connecting sutures between bones in the skull, is a serious condition that affects many infants in the US. If left untreated, these premature bone fusions can cause skull deformations, abnormal head shapes, and even neurological damage due to increased pressure on the growing brain from the diminished skull cavity. Children afflicted with these disorders are typically treated with highly invasive surgical procedures; in the most serious cases, the patient’s skull bones are cut out, re-shaped into a larger volume with proper symmetrical shape, and then placed back in the patient. Though these procedures have a reasonably high success rate, preventing these premature fusions would eliminate the need for large-scale surgeries and improve patient quality of life.

To this end, our lab is currently developing a calcium-scavenging hydrogel that can be injected into the sutures of at-risk children to prevent premature bone fusion. For this proposed project, the co-op student will be working with a team to develop and characterize these injectable hydrogels. The student will assist in characterizing these new hydrogels for their calcium-scavenging ability, time to hardening after injection, mechanical strength, and cellular toxicity in preparation for future pre-clinical testing in more complex biological models.