Advancements in Drug Delivery: Development and Evaluation of Ibuprofen Loaded Biodegradable Hydrogels

Jing, Serena

Ibuprofen is a non-steroidal anti-inflammatory drug, effective in the treatment of inflammatory diseases such as arthritis. This research aims to develop a biodegradable and in situ forming hydrogel based vehicle for the intraarticularly localized delivery of ibuprofen; and test the resultant hydrogel's ability to provide controlled and sustained release of the ibuprofen. The hydrogels produced were composed of Oxidized dextran (ODex) cross linked with sulfopropyl chitosan (SCH), which obtain biodegradable and biocompatible properties. Two tests were conducted to fulfill the aim of the research. In the first test, gels were loaded with 10%, 20% and 30% ibuprofen and tested in Phosphate Buffered Saline (PBS) for controlled release over 24 hours. In the second test, gels were loaded with 20% ibuprofen and released in Lysozyme (10 μg/mL) and PBS as a mock in vivo study and to test whether the gels exhibited sustained release. The drug release was monitored with a spectrophotometer. The first test results show that 91%, 75% and 72% ibuprofen were released over 24h for the hydrogels loaded with 10%, 20% and 30% respectively. The second test showed the drug release lasted for 8 days in the lysozyme solution and 9 days for PBS. In addition, degradation was observed on the gel in the lysozyme solution- which perhaps caused the ibuprofen to release faster. The controlled and sustained release implies that this biodegradable SCH and ODex hydrogel is a promising vehicle for the delivery of NSAIDS such as ibuprofen in the reduction of pain in arthritic patients.

Awards Won: