

14th World Congress on

TOXICOLOGY AND PHARMACOLOGY

March 12-14, 2018 Singapore

Hyaluronic acid hydrogel as drug carrier for rheumatoid arthritis treatment

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Patients with rheumatoid arthritis-related diseases show an increasing trend. Although many drugs for rheumatoid arthritis (RA) have been appeared in the market, the drugs have some disadvantages; short half-life *in vivo*, inconvenience of taking drugs for a long period of time and drug toxicity in oral administration. Thus, a study of formulations that can continuously release the drug is being required. Recently, injectable drug carriers into the joints as a treatment for RA have been suggested as a very effective treatment. Therefore, in this study, we have developed the effective drug carrier via hyaluronic acid (HA), which has a high bioavailability, for RA treatment. The cross-linking agent was introduced into HA having a molecular weight of 1,000,000 to improve the physical properties of the HA hydrogel and control the pore size of each HA hydrogel for continuous drug release. We also investigated cell viability and inflammation test by using Alamar blue assay and enzyme-linked immune-sorbent assay (ELISA) about RAW264.7 cells and SW 982 cells. By near-infrared (NIR) fluorescence imaging, we confirmed the local release of NIR from the depot injected into the articular joint over an extended period. The effect of HA hydrogel as a RA drug delivery depot was evaluated *in vivo* experiments through extraction and staining over 1 week, 3 weeks and 6 weeks. Collectively, these results indicated that the drug depot formed after intra-articular injection of methotrexate loaded cross-linked HA hydrogel induced long-lasting drug release and allowed to result in enhanced RA repair.

Biography

Jiyoung Seo majored in Applied Chemistry and Biotechnology at Ajou University and obtained a Bachelor of Science (BS) in Engineering (2017). She was selected as the Research Director of the program sponsored by the Ministry of Science and ICT and Korea Research Foundation. In the program, she studied the delivery of rheumatoid arthritis medications. She is currently pursuing Master's degree in the Ajou University Regenerative Medicine Laboratory.

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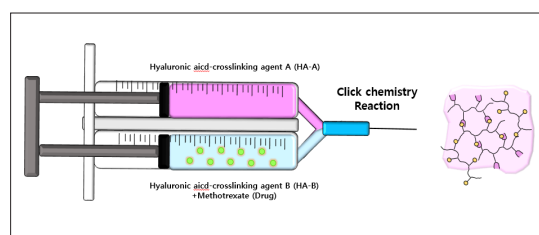


Figure-1: Hydrogel loaded dual syringe. Hyaluronic acid hydrogel (HA, each introducing crosslinking agent) loaded in dual syringe. The HA including Methotrexate is cross-linked through the needle of a syringe. The hydrogel becomes a better viscous drug carrier for treatment of Rheumatoid arthritis.

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