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Korea develops hybrid hydrogel platform for rheumatoid arthritis treatment

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Alleviating inflammation by NO-scavenging and delivering drugs



A group of researchers at the Department of Chemistry at the Pohang University of Science and Technology (POSTECH) in collaboration with South Korea-based startup OmniaMed has developed a hybrid hydrogel platform that delivers therapeutic drugs to the site of rheumatoid arthritis via syringe injection that locally reacts with and removes nitric oxides (NO) that cause inflammation without any side effects.

The research team designed an injectable hydrogel that can be easily injected into the inflammatory site that can selectively control the anti-inflammatory agent according to the degree of inflammation while being long-lasting in the local injection site.

The researchers first prepared a liquid that can be directly injected using a syringe and cross-linked self-assembled polymeric aggregates capable of carrying anti-inflammatory drugs.

Two injected liquids via dual-syringe are rapidly transformed into hydrogel when mixed simultaneously at injected site, and collects and eliminates the overproduced NO at the target site. In addition, it includes nanometer-sized polymeric aggregates that can self-heal even if damaged by external pressure, helping to replenish the viscosity in joints.

According to the researchers, this NO-scavenging hydrogel system can be applied to various inflammatory diseases with a simple process, presenting applicable potential to treatments currently on the market or in clinical trials.