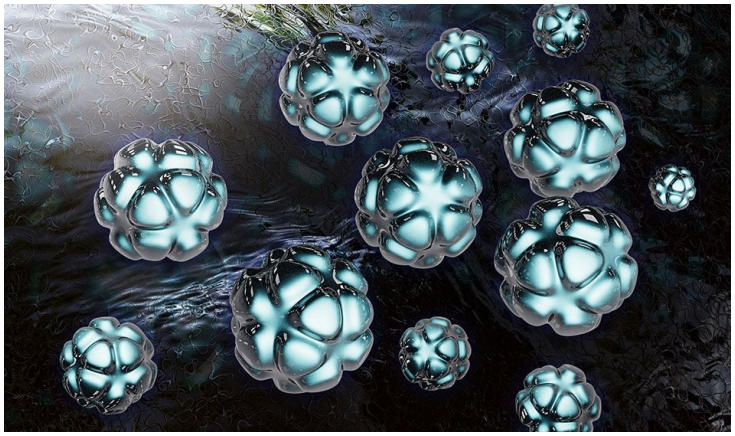
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INST uses nanoparticles to reduce severity of rheumatoid arthritis

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Formulated nanoparticles with chitosan and loaded these nanoparticles with zinc gluconate



Scientists from the Institute of Nano Science & Technology (INST), Mohali, an autonomous institute of the Department of Science and Technology, Government of India, have formulated nanoparticles with chitosan and loaded these nanoparticles with zinc gluconate for reducing the severity of rheumatoid arthritis.

Element Zinc is vital for maintaining normal bone homeostasis, and its levels are reported to get reduced in rheumatoid arthritis patients and arthritis-induced animals. It is also known that oral supplementation of zinc in the form of zinc gluconate have very low bioavailability in humans.

The team prepared Zinc gluconate loaded chitosan nanoparticles using chitosan and sodium tripolyphosphate in double-distilled water, and zinc gluconate was simultaneously added along with the synthesis of chitosan nanoparticles. Nanoparticles were characterized for various physicochemical properties, and then anti-arthritic potential was investigated against collagen-induced arthritis in Wistar rats.

They observed that the treatment of rats with both zinc gluconate and zinc gluconate loaded chitosan nanoparticles reduced the severity of arthritis by reducing joint swelling, erythema, and edema but zinc gluconate loaded nanoparticles exhibited superior efficacy.

The team assessed various parameters like biochemical analysis, histological observations, and immunohistochemical expression of inflammatory markers and suggested that zinc gluconate-loaded chitosan nanoparticles exerted superior therapeutic effects compared to the free form of zinc gluconate. This they attributed due to the inflammatory potential of zinc gluconate-loaded chitosan nanoparticles.

“Nanobiotechnology provides several effective solutions for the problems that traditional pharmaceutical formulations are often not able to address as effectively, such as sustained and targeted release of drugs, bioavailability, and efficacy of drugs and nutraceuticals, etc. The nanoformulation of zinc gluconate-loaded chitosan nanoparticles developed at INST Mohali is a creative example of a superior therapeutics for rheumatoid arthritis,” said Prof Ashutosh Sharma, Secretary, DST.