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Formulation and Analgesic Effect of Sodium Hyaluronate and Magnesium Sulfate Combination in Rats Following Intra-articular Injection

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Abstract

The objective of this study was to formulate hyaluronate (HA) combined with magnesium sulfate (MS) for intra-articular (IA) injection, to provide rapid and profound analgesia in the treatment of osteoarthritis (OA). The injectable HA/MS combination was optimized with respect to the kinds and amounts of buffering agent (10 mM histidine, pH 7.0) and stabilizer (10 mM sodium citrate), by evaluating changes in the appearance, pH, and intrinsic viscosity at 60°C. Increasing concentrations of sodium citrate significantly inhibited the decline in intrinsic viscosity, denoting the depolymerization of HA, preserving over 91% of initial value. In an efficacy study in iodoacetate-induced OA rats, treatment with the HA/MS combination (1/2% w/v) significantly reduced joint swelling and pain, compared to the vehicle and HA-treated groups ($p < 0.05$) at 7 days postdosing. Thus, IA administration of the combination of HA, a slow-acting symptom-modifying agent, with the inorganic analgesic is a potentially effective therapeutic approach for rapid pain relief in the OA knee.

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