ADENOSINE RECEPTOR STIMULATION IMPROVES GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Glucocorticoid-induced osteoporosis (GIO) is a secondary cause of bone loss. Bisphosphonates approved for GIO, might induce jaw osteonecrosis; thus additional therapeutics are required. Adenosine receptor agonists are positive regulators of bone remodeling, thus the efficacy of adenosine receptor stimulation for treating GIO was tested.

In a preventive study GIO was induced in Sprague-Dawley rats by methylprednisolone (MP) for 60 days. Animals were randomly assigned to receive polydeoxyribonucleotide (PDRN; 8mg/kg), or PDRN and DMPX (3,7-dimethyl-1-propargylxanthine, an A2 antagonist), or vehicle (0.9% NaCl).

Another set of animals was used for a treatment study, following the 60 days of MP-induction rats were randomized to receive (for additional 60 days) PDRN, or PDRN and DMPX, or zoledronate (7.5 □g/kg), or vehicle. Control animals were administered with vehicle for either 60 or 120 days.

MP treatment determined severe bone loss, the concomitant use of PDRN prevented the developing of osteoporosis. In rats treated for 120 days, PDRN restored bone architecture and bone strength; increased B-ALP, osteocalcin, osteoprotegerin and stimulated the Wnt canonical and non-canonical pathway. Zoledronate reduced bone resorption and ameliorated the histological features, without significant effects on bone formation.

Our results suggest that adenosine receptor stimulation might be useful for preventing and treating GIO.