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Immune modulatory and anti-inflammatory activities of a PDE –inhibitor and its solvent

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Aim of the Study: PDE inhibitors are possible agents against chronic inflammatory diseases. PDE4 inhibitors reduce the synthesis and release of proinflammatory mediators, cytokines and active oxygen species. The present study aims at investigating the effect of rolipram, as a representative of PDE-4 inhibitors, and its solvent dimethylsulfoxide on edema of arthritic joints and cytokines in adjuvant-induced arthritis (AIA).

Methods: AIA was induced by intradermal injection of 0.1ml squalene before inoculation of Freund's adjuvant into a different site in the subplantar surface of right hind paw. Volume of edema, in both hind paws, was measured daily from day 0 until day 30 after adjuvant inoculation. Serum samples were taken for TNF-alpha and IL-10 assay.

Results: Prophylactic and therapeutic rolipram significantly ($P<0.05$) inhibited the increase of hind paws volume of arthritic rats in a dose- dependent manner. Interestingly, prophylactic and therapeutic DMSO protocols were effective in inhibiting the increase in right hind paw volume and its prophylactic administration entirely prevented the change of left hind paw volume. Prophylactic or therapeutic administration of rolipram did not alter significantly the serum level of TNF-α. Serum levels of IL-10 were significantly higher ($P<0.05$) in rat groups given therapeutic rolipram compared to levels in adjuvant non-treated animals.

Conclusion: Systemic use of rolipram and its solvent dimethylsulfoxide significantly ameliorated edema of inflamed joints in rats and increase level of the anti-inflammatory cytokine IL-10. Further studies are needed to prove whether the dramatic antiinflammatory and immunmodulatory effects are owed to rolipram or to its solvent.