



2 arthritis models in the guinea pig: Evaluation of pain behavior and bone destruction

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The primary aim of the study was to describe and correlate pain behavior and changes in bone morphology in two animal models for arthritis. Arthritis was induced by either injection of complete Freund's adjuvans (CFA) or iodoacetate solution into the knee joint of guinea pigs to obtain a model for rheumatoid and osteoarthritis, respectively. After induction of arthritis into the left knee joint, animals were behaviorally followed during a period of, respectively, 12 and 19 days. During these observation periods increasing pain behavior was observed in animals with arthritis, characterized by decreased mechanical thresholds and decreased weight bearing on the affected limb. After euthanasia μ -computed tomography scans of the arthritic knee were evaluated for bone destruction. In arthritic animals a decreased average area of bone fragments, bone volume and trabecular number, and increased trabecular separation were indications of osteolysis, while an increased trabecular pattern factor and structure model index were signs of loss of connectivity and transformation of plate like trabeculae into rods. Different bone parameters indicative of osteolysis and decreased trabecular connectivity were significantly correlated with the observed pain behavior. Detailed description of morphological changes in arthritic joints better characterizes these different animal models and adds to the knowledge on the working mechanisms of analgesic compounds that influence bone development.