Metabotropic glutamate receptors (mGluRs) are widely expressed in the CNS, where they function to modulate neuronal excitability and synaptic transmission. Recent anatomical and behavioral data show the expression of G-protein coupled mGluRs in the periphery on nociceptive primary afferent nerve terminals, and provide evidence for a functional role of peripheral mGluRs in inflammatory pain. Studies in animal models of inflammatory pain demonstrate that central and peripheral group I mGluRs are involved in nociceptive transmission in the normal and the inflamed state but group II, III mGluRs are not well established that modulation of peripheral mGluRs reduces pain behaviors and nociceptor activity in arthritis. In the present study, we examined whether the group II, III mGluRs were involved in maintenance of behavioral signs of non-evoked pain and secondary mechanical hyperalgesia induced by knee joint inflammation.

Methods: Complete Freund adjuvant (CFA, 100 μl) and MIA (4 mg/50 μl) were injected into the knee joint space to induce arthritis in male Sprague-Dawley rats under light enflurane anesthesia. Group II mGluR agonist, APDC (10, 500 μM/50 μl), group II mGluR antagonist, LY341495 (200, 500 μM/50 μl), group III mGluRs agonist, L-AP4 (10, 500 μM/50 μl) and group II/III mGluRs antagonist, CPPG (200 μM/50 μl) were intra-articularly (i.a.) injected 5 days after induction of arthritis and behavioral tests for non-evoked pain and mechanical hyperalgesia were conducted for 120 min.

Results: APDC (100 μM) partially reversed the reduction of weight load whereas withdrawal threshold significantly increased both 10 and 100 μM of APDC. L-AP4 showed an antinociceptive effect on weight bearing (500 μM) and secondary mechanical hyperalgesia (10, 500 μM). However, LY341495 and CPPG did not reduce the change of weight load and withdrawal threshold to mechanical stimuli in maintenance of acute knee joint inflammation in rats.

Conclusions: The present study demonstrated that peripheral group II, III mGluRs were involved in maintenance of chronic arthritic pain induced by CFA and MIA in rats. It is suggested that peripheral group II, III mGluRs play a role in inflammatory pain including primary and secondary hyperalgesia.

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RELATIONSHIP BETWEEN CANINE STIFLE STRUCTURAL DAMAGES AND FUNCTIONAL IMPAIRMENT IN EXPERIMENTAL OSTEOARTHRITIS: PODOBAROMETRIC GAIT ANALYSIS COUPLED WITH 1.5 TESLA MAGNETIC RESONANCE IMAGING


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Purpose: Lameness is a cardinal feature of osteoarthritis (OA) and reflects painful functional impairment. The impact of OA joint structural damages on the dog’s gait is to date poorly documented. To gain insight to the structure-function relationship of the impaired joint, we explored the relationships between joint structural damages induced in a dog model of OA, as assessed with a high-field (1.5T) magnetic resonance imaging (MRI) and limb function over a 26-week period.

Methods: In a prospective experimental study, OA was surgically induced by transection of the right cranial cruciate ligament in five dogs. Peak vertical force (PVF), ground contact area (GCA) and MRI were acquired at baseline (before), as well as 4, 8, and 26 weeks post-surgery on the dog’s right stifle. Osteophytosis, joint effusion, meniscal tears and degenerative changes, cartilage defect as well as subchondral bone marrow lesions (BML) were scored using semi-quantitative ordinal scales. Quantitative changes in cartilage volume were determined from computerized reconstruction. Statistical exploratory analysis used Spearman correlation tests and repeated-measures analysis of variance at the 0.05 α-threshold.

Results: As expected, limb impairment (lower PVF and GCA) and OA joint damages (MRI) were significantly induced in this model. More specifically, severe impairment (week 4) was followed by incomplete remission (evolution over the week 4 to 26 period). During the remission phase, the increase in PVF correlated significantly with less severe cartilage defect (p=0.004, rho=-0.97), osteophytosis (p=0.037, rho=-0.90), joint effusion (p=0.013, rho=-0.95) and BML (p=0.001, rho=-0.99) while being slightly associ-