Magnetic Resonance Imaging in animal models of Rheumatoid arthritis (RA)

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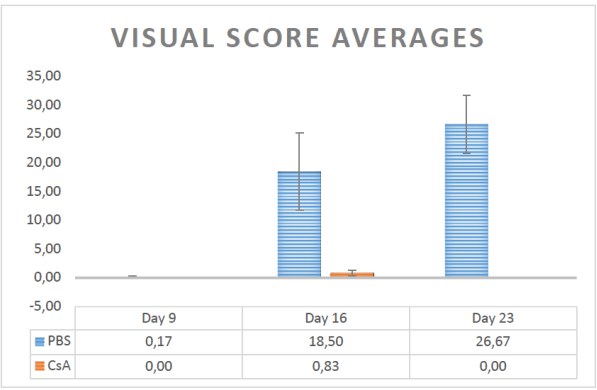
MODEL DESCRIPTION

Established under the IMAID program (Eurostars E9215) Redoxis is part of a consortium offering services in advanced in vivo imaging in preclinical animal models of autoimmune conditions. Magnetic resonance imaging (MRI) is a standard diagnostic tool in Rheumatoid arthritis and could be a valuable tool for evaluation of drug efficacy providing more detailed and extensive information. Together with Image Analysis Group (UK) and Lund University Bioimaging Center (LBIC) we offer a service for efficacy evaluation of new drugs for autoimmune conditions. Redoxis offer standardised in vivo imaging models with relevance for autoimmune diseases including RA and MS. Image Analysis offer state of the art in vivo imaging computer-aided diagnosis for detection of inflammation in animal models. Their cloud based platform Dynamika provide multiple analytic tools within a common user interface. Their DEMRIQ test are validated for clinical studies and represent a more automated assessment system based on dynamic contrast enhanced MRI.

MRI in arthritis models in rat.

There are a number of valid models reflecting different aspects of the human disease. Redoxis offers passively and actively induced models of RA in both rats and mice. All have their own characteristics and cellular mechanisms and careful model selection is therefor crucial for successful experiments.

The pathogenesis is complex due to dependency on both environmental and genetic factors. Central to the pathogenesis is activation of macrophages by autoreactive T cells and resulting release of proinflammatory cytokines, including TNF-a, IL-1, IL-6 and IL-17. Therapies targeting these cytokines or downstream pathways have bene shown to be successful in disease management.



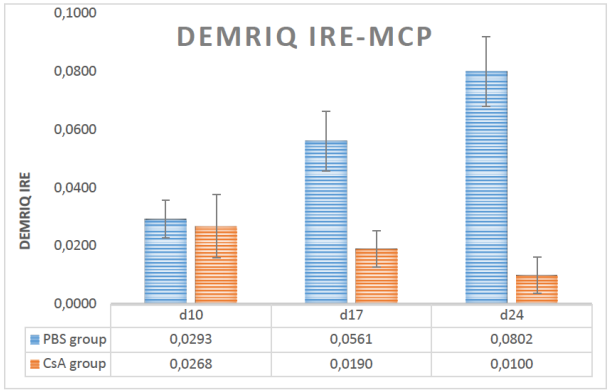
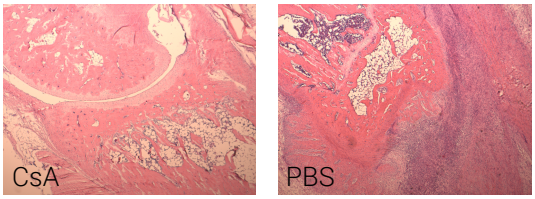
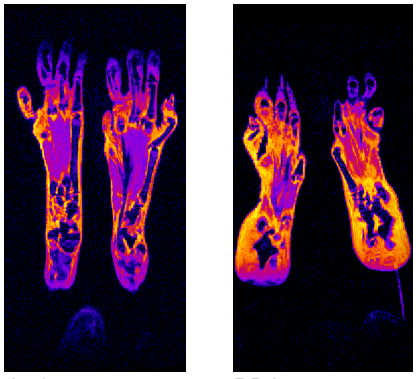


Figure 1. Rats were injected with Pristane day 0 and treated with cyclosporine and followed for macroscopic signs of arthritis (number of inflamed joints). Control animals were treated with PBS: MRI was performed at three time points during the experiment, at onset (day 10), in the acute phase (day 17) and during established disease (day 24). DEMRIQ IRE was analysed and correlated with degree of disease.



Histology (H&E) was performed at termination of the experiment Left image show CsA treated joint with minor inflammation and right image show control joint with severe inflammation.



MRI images of arthritic paws from PIA induced rats. Left image show CsA treated paw with minor inflammation and right image show PBS control rat with severe inflammation.

Know more:
Redoxis (www.redoxis.com),
Image analysis group (www.ia-grp.com),
Lund university bio imaging center (https://www.lbic.com)
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