SYNCHROTRON FTIR SPECTROSCOPIC ANALYSIS OF THE EFFECTS OF ANTI-INFLAMMATORY AGENTS ON SCAR TISSUE FORMATION AND TISSUE COMPOSITION IN A POST-SURGICAL RAT MODEL

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Excessive scar formation following spinal surgery (peridural scarring) can lead to persistent pain and disability in 10-25% of individuals undergoing elective back surgery. Treatment with anti-inflammatory agents following surgery may reduce oxidative stress and scarring and thus lead to a reduction in post-operative pain. We use a surgical rat model to test the hypothesis that post-surgical inflammation and oxidative stress following laminectomy can be reduced by systemic administration of L-2-oxo-thiazolidine-4-carboxylate (OTC) and quercetin. We apply a multidisciplinary approach combining histochemical, immunohistochemical, in-situ hybridization and FTIR microspectroscopy to monitor changes in scar tissue formation.

Synchrotron FTIR spectromicroscopy data has been collected on OTC, quercetin and saline (control) treated 3 and 21 day post-surgery animals (n=5). Initial data analysis has revealed interesting variations in tissue composition such as the colocalization of components in one area and the mutual exclusivity of the same components in a different area of the same tissue sample. Animals treated with quercetin or OTC appear to display a more organized arrangement of cord-like collagen fibrils within the scar tissue.

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