AQP4 expression in trigeminal neurons and SGCs under normal and inflammatory conditions relevant to craniofacial pain conditions.

Methods: Rat trigeminal ganglia (TG) were isolated from adult male Sprague-Dawley rats subjected to a model of trigeminal inflammation evoked by unilateral complete Freund's adjuvant (CFA) injection in temporomandibular joint. Immunohistochemistry was performed on TG sections of CFA-treated animals. NeuN and GS markers were used for identification of neurons and SGCs, respectively. AQP4 expression was investigated in both ipsilateral and contralateral TG sections. The study protocol was approved by the local ethics committee.

Results: Co-localization of NeuN-AQP4 and GS-AQP4 were identified in both ipsi and contralateral trigeminal ganglia of the CFA-treated rats. However, we did not detect any difference between the ipsi- and contralateral side in terms of alteration in AQP4 receptor expression.

Conclusions: AQP4 was expressed both on trigeminal neurons and SGCs and CFA did not cause a remarkable change in AQP4 expression, when ipsilateral and contralateral TG of the test animals was compared. Previously, it has been shown that in a neuropathic pain model no difference is detectable between wild type and AQP4-deficient mice, for mechanical and thermal perception; however, in formalin pain model AQP4-deficient mice have higher thermal pain thresholds. Further investigation is required to clarify role of AQP4 in pain.

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Preoperative synovitis in knee osteoarthritis is predictive for pain 1 year after total knee arthroplasty

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Background: Knee osteoarthritis (KOA) was previously considered a degenerative joint disease due to wear and tear. After total Knee replacement (TKR) 13–38% of patients develop persistent post-operative pain. Emerging evidence has shown that the etiology of pain in KOA is multifaceted and may involve different structures including the synovial membrane, musculotendinous structures and neuronal tissue. Current preoperative assessment does not take these into account, thus the current study examines the role of preoperative synovitis on patient reported outcomes one-year post surgery.

Material and methods: 40 patients with end-stage KOA answered the KOOS questionnaire prior to receiving total knee replacement surgery. During the procedure synovitis was scored systematically at six sites where synovial excision biopsies were obtained. Macro scoring was based on three parameters (hypertrophy, vascularity and synovitis) on a 0–4 point scale. Micro biopsies where also graded based on three parameters (synovial hyperplasia, inflammatory infiltration and activation of synovial stroma) but on a 0–3 point scale. Patients received a follow up KOOS questionnaire one-year post surgery.

Results: 33 patients completed the KOOS questionnaire at follow-up. A high correlation between the micro mean, micro max, macro mean, and macro max was found. The micro mean was chosen as a proxy for the amount of synovitis. A multiple linear regression analysis, correcting for baseline values of BMI, age, smoking, point pressure thresholds (PPTs) and KOOS pain, showed that the synovitis measurement at baseline was significant for the change in KOOS pain with an effect of 22.22 ($p = 0.0498$). Hence, the more synovitis at baseline, the higher the follow-up KOOS Pain was compared to baseline KOOS Pain (an improvement). The standard deviation (SD) of the synovitis measure was 0.42, hence a change of 1 SD in synovitis gave an increase of 9 in KOOS Pain at follow-up compared to at baseline.

Conclusions: These preliminary results indicate that the synovitis score attained during operation is positively correlated with improvement in KOOS-pain post operatively.

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Biomarkers alterations in trapezius muscle after an acute tissue trauma: A human microdialysis study

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Aims: Alteration in muscle milieu has been proposed as one of the main contributors underlying chronic musculoskeletal pain (CMP). Microdialysis (MD) provides real-time information on release of pain and metabolic biomarkers in muscle. However, insertion of MD probe causes a local tissue trauma, which may affect the tissue milieu. Whether an acute tissue trauma alter pain and metabolite biomarkers in trapezius muscle of patients with CMP is not known. Hence, this study investigated changes in muscle metabolites following MD probe insertion in patients with CMP in comparison with healthy controls.

Methods: Nineteen patients (11 women and 8 men; 41.4 years) with CMP and 20 pain-free volunteers (10 women and 10 men; 36.5 years) were recruited (project approval number: 2013/151-31). Baseline pressure pain thresholds (PPT) at trapezius muscle were obtained bilaterally with a reference point at the tibialis muscle. Pain questionnaires were used for determining levels of anxiety and depression and catastrophizing impact. Interstitial samples were collected from trapezius muscles by aid of MD (20 kDa cut-off) during a period of 40 min. Collected dialysates at 2 time-points of 20 and 40 min were stored at −70 °C until analysis. Concentrations of glucose, lactate, pyruvate, glycerol, and glutamate were analyzed by ISCUSS^{flex}. $P \leq 0.05$ was considered significant.

Results: No potential case with respect to anxiety, depression or catastrophizing impact was found. Lower PPTs were found in CMP group ($P \leq 0.05$). Significantly lower levels of pyruvate were found in CMP group at both 20 min ($P = 0.003$) and 40 min ($P = 0.006$). Gender-based analysis indicated higher concentrations of glutamate in female patients with CMP.

Conclusions: This study was first to demonstrate metabolite alterations during trauma phase of MD in trapezius muscles of CPM compared with healthy controls. This model proved beneficial for investigating pain and metabolic biomarkers during acute phase of MD.

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