Evaluation of sepsis survivors with chronic intensive care-related pain to develop preventive strategies and treatments

Aim:
Investigating oxidized lipids as targets for preventive strategies of chronic intensive care-related pain in sepsis survivors

Background:
Lately, the post-intensive care syndrome came into focus with the objective to improve the care of patients after ICU treatment. Amongst major symptoms are critical illness polyneuropathy and myopathy (CIP/CIM) as well as sepsis-associated encephalopathy (SAE). About 30% of the sepsis survivors suffer from chronic intensive care-related pain (CIRP). While glia activation contributes to the development of encephalopathies, CIP initially manifests as polyneuropathy with predominantly axonal damage, resulting in a loss of sensorimotor functions including paralysis and sensory disturbances. The painful neuropathic pain may develop due to damage of primarily unmyelinated C-fibers, known as "small-fibers". Here, little is known about the possible interplay of glia and neurons. Oxidized lipids being generated during inflammation could be target to prevent neuronal or glia cell impairments. Hence, the tested strategies could be used as preventive approaches and treatment options in clinics.

Tasks:

- Clinical assessment of patients surviving sepsis
- Biomarker analysis including oxidized lipidomics
- Functional assessment of oxidized lipids as modulators of sensory neurons and glia

Techniques:
Clinical assessments, oxidized lipidomics (in cooperation), enzyme activity assay, primary cell culture, *in vitro* calcium imaging

Publications:

- **Oehler, B.**, Kloka, J., Mohammadi, M., Ben-Kraiem, A., & Rittner, H. L. (2020). D-4F, an ApoA-I mimetic peptide ameliorating TRPA1-mediated nocifensive behaviour in a model of neurogenic inflammation. *Molecular Pain*, *16*, 1744806920903848. https://doi.org/10.1177/1744806920903848
- Mohammadi, M., **Oehler, B.**, Kloka, J., Martin, C., Brack, A., Blum, R., & Rittner, H. L. (2018). Antinociception by the anti-oxidized phospholipid antibody E06. *British Journal of Pharmacology*, *175*(14), 2940–2955. https://doi.org/10.1111/bph.14340
- **Oehler, B.**, Kistner, K., Martin, C., Schiller, J., Mayer, R., Mohammadi, M., Sauer, R.-S., Filipovic, M. R., Nieto, F. R., Kloka, J., Pflücke, D., Hill, K., Schaefer, M., Malcangio, M., Reeh, P. W., Brack, A., Blum, R., & Rittner, H. L. (2017). Inflammatory pain control by blocking oxidized phospholipid-mediated TRP channel activation. *Scientific Reports*, *7*(1), 5447. https://doi.org/10.1038/s41598-017-05348-3

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