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RESEARCH AREA

Chronic primary pain conditions including Complex Regional Pain Syndrome (CRPS) and fibromyalgia (FM) are unmet medical needs. Despite intensive research, their aetiology and the pathophysiology are not understood, partly due to the lack of a translationally relevant animal models mimicking the main clinical symptoms and pathophysiological mechanisms.

Based on our earlier results, our research hypothesis is that neuroinflammatory mechanisms at the level of the primary sensory neurones in the dorsal root ganglia and pain-related brain regions leading to central sensitization play a crucial role in the development and maintenance CRPS and stress-related pain like FM. To identify new therapeutic options, our experiments will identify the main pathophysiological pathways and networks responsible for the chronic phase of CRPS and stress-related pain, and the role of pathogenic autoantibodies in the processes leading to the prolonged and maintenance of CRPS-related pain. We will explore the potential role of neuroinflammatory mechanisms in the chronic phase of CRPS and stress-related pain, and the role of inflammasomes and their cytokines in the brain.

TECHNIQUES AVAILABLE IN THE LAB

In vivo functional measurements: nociception, inflammatory parameters, learning and behavioural tests; blood and tissue sampling; immunohistochemistry and histology (e.g. staining, brain-spinal cord sectioning); analysis of transcriptomic and metabolomic data; statistical evaluations.

SELECTED PUBLICATIONS

Pohóczky, K., Kun, J., Szentes, N., Aczél, T., Urbán, P., Gyenesei, A., Bölcskei, K., Szőke, É., Sensi, S., Dénes, Á., Goebel, A., **Tékus, V.**, Helyes, Z. (2022). Discovery of novel targets in a complex regional pain syndrome mouse model by transcriptomics: TNF and JAK-STAT pathways. **Pharmacol Res 182:** 106347.

Helyes, Z., **Tékus, V.**, Szentes, N., Pohóczky, K., Botz, B., Kiss, T., Kemény, Á., Környei, Z., Tóth, K., Lénárt, N., Ábrahám, H., Pinteaux, E., Francis, S., Sensi, S., Dénes, Á., Goebel, A. (2019) Transfer of complex regional pain syndrome to mice via human autoantibodies is mediated by interleukin-1-induced mechanisms. **Proc Natl Acad Sci U S A 116:** 13067–13076.

Tékus, V., Horváth, Á. I., Csekő, K., Szabadfi, K., Kovács-Valasek, A., Dányádi, B., Deres, L., Halmosi, R., Sághy, É., Varga, Z. V., Adeghate, E., Kőszegi, T., Mátyus, P., Gábriel, R., Ferdinandy, P., Pintér, E., Helyes, Z. (2021) Protective effects of the novel amine-oxidase inhibitor multi-target drug SZV 1287 on streptozotocin-induced beta cell damage and diabetic complications in rats. **Biomed Pharmacother 134:** 111105.

Horváth, Á., T**ékus, V.**, Bencze, N., Szentes, N., Scheich, B., Bölcskei, K., Szőke, É., Mócsai, A., Tóth-Sarudy, É., Mátyus, P., Pintér, E., Helyes, Z. (2018) Analgesic effects of the novel semicarbazide-sensitive amine oxidase inhibitor SZV 1287 in mouse pain models with neuropathic mechanisms: Involvement of transient receptor potential vanilloid 1 and ankyrin 1 receptors. **Pharmacol Res 131:** 231–243.

Horváth, Á. I., Szentes, N., **Tékus, V.**, Payrits, M., Szőke, É., Oláh, E., Garami, A., Fliszár-Nyúl, E., Poór, M., Sár, C., Kálai, T., Pál, S., Percze, K., Scholz, É. N., Mészáros, T., Tóth, B., Mátyus, P., Helyes, Z. (2021) Proof-of-Concept for the Analgesic Effect and Thermoregulatory Safety of Orally Administered Multi-Target Compound SZV 1287 in Mice: A Novel Drug Candidate for Neuropathic Pain. **Biomedicines 9:** 749.