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RESEARCH AREA

Pain sensation is mediated by the nocisensor Transient Receptor Potential ion channels such as the Vanilloid 1 (TRPV1) and the TRP ankyrin 1 (TRPA1). Previous discoveries on TRP channels described important structural and functional properties of these proteins, but very little is known about the function, importance and modulation opportunities of the lipid rafts surrounding them in the plasma membrane. We recently discovered that lipid raft disruption by depletion of various constituents, by methyl β-cyclodextrin (MCD), sphingomyelinase (SMase), myriocin and our carboxi-steroid compound reduced TRP activation on sensory neurons and transfected cells. We examine the potential analgesic effect of MCD, SMase, myriocin or our carboxi-steroid compound in topical dermatological formulation in in vivo mouse models. The lipid raft disruptor myriocin had an antitumor activity in a murine melanoma model. We examine the potential dual effect (antitumor and analgesic activity) of myriocin in our mouse osteosarcoma model.

TECHNIQUES AVAILABLE IN THE LAB

Methods and models: in vitro neuronal culture preparation, fluorescent intracellular calcium imaging, radioactive calcium-uptake experiment, fluorescence spectroscopy, cell viability assay complex in vivo nociception experiments: capsaicin-induced chemonociception; resiniferatoxin-evoked neurogenic inflammation, thermal and mechanical hyperalgesia; acute nocifensive behaviour model; bone cancer pain model; investigation of mechanonociception, thermonociception, spontaneous pain and in vivo imaging by micro-CT.

SELECTED PUBLICATIONS

Szőke É, Börzsei R, Tóth DM, Lengl O, Helyes Z, Sándor Z, Szolcsányi J (2010) Effect of lipid raft disruption on TRPV1 receptor activation of trigeminal sensory neurons and transfected cell line. **Eur J Pharmacol 628:** 67-74.

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Payrits M, Horváth Á, Biró-Sütő T, Erostyák J, Makkai G, Sághy É, Pohóczky K, Kecskés A, Kecskés M, Szolcsányi J, Helyes Z, **Szőke É.** (2020) Resolvin D1 and D2 Inhibit Transient Receptor Potential Vanilloid 1 and Ankyrin 1 Ion Channel Activation on Sensory Neurons via Lipid Raft Modification. **Int J Mol Sci 21:** 5019.

Horváth Á, Biró-Sütő T, Kántás B, Payrits M, Skoda-Földes R, Szánti-Pintér E, Helyes Z, **Szőke É** (2020) Antinociceptive Effects of Lipid Raft Disruptors, a Novel Carboxamido-Steroid and Methyl β-Cyclodextrin, in Mice by Inhibiting Transient Receptor Potential Vanilloid 1 and Ankyrin 1 Channel Activation. **Front Physiol 11:** 559109.

Horváth Á, Payrits M, Steib A, Kántás B, Biró-Sütő T, Erostyák J, Makkai G, Sághy É, Helyes Z, **Szőke É.** (2021) Analgesic effects of lipid raft disruption by sphingomyelinase and myriocin via Transient Receptor Potential Vanilloid 1 and Transient Receptor Potential Ankyrin 1 ion channel modulation. **Front Pharmacol 11:** 593319.