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RESEARCH AREA

Normal body temperature – which is essential for life – is maintained by various thermoregulatory mechanisms. Thermoregulatory disorders are present in many pathological conditions, e.g., febrile diseases, systemic inflammation (sepsis), organ dysfunctions (e.g., pancreatitis), heat stroke, and hypothermia. It is of utmost importance to discover the pathophysiological processes in the thermoregulatory disorders. More and more influencing factors are identified, such as the pH status and transient receptor potential channels. In our research, we aim at identifying the neural substrates and molecular mediators involved in the thermoregulatory processes mainly in different animal models, but to some extent also in human studies. Our findings can further advance the knowledge of bodily homeostasis, moreover, they can open new directions in clinical practice, most of all intensive therapy, and other sciences. Successful development of drugs designed specifically to target body temperature, could pave the road to pharmacologically controlled temperature management, thereby advancing the therapeutic approaches in clinical conditions with thermoregulatory disorders.

TECHNIQUES AVAILABLE IN THE LAB

Various surgeries in rodents (e.g., brain cannula, i.p. and i.v. catheter implantations, vagotomy, cecal ligation, implantation of abdominal radiotransmitter and osmotic minipump). Thermocouple thermometry (core and skin temperature measurement in incubator chamber). Biotelemetry (investigation of circadian rhythm in rodents). Thermal imaging (skin and core temperature measurement in small animals and humans). Food intake, body composition, and nocifensive reaction measurements. Techniques of blood collection and tissue harvesting, as well as, sample storing for molecular biology experiments.

SELECTED PUBLICATIONS

Toldi, J., Kelava, L., Marton, S., Muhl, D., Kustan, P., Feher, Z., Maar, K., Garai, J., Pakai, E., **Garami, A.** (2023). Distinct patterns of serum and urine macrophage migration inhibitory factor kinetics predict death in sepsis: A prospective, observational clinical study. **Sci Rep 13:** 588.

Keringer, P., Furedi N., Gaszner, B., Miko, A., Pakai, E., Fekete, K., Olah, E., Kelava, L., Romanovsky, A. A., Rumbus, Z., **Garami, A.** (2022). The hyperthermic effect of central cholecystokinin is mediated by the cyclooxygenase-2 pathway. **Am J Physiol Endocrinol Metab 322:** E10–E23.

Kelava, L., Nemeth, D., Hegyi, P., Keringer, P., Kovacs, D. K., Balasko, M., Solymar, M., Pakai, E., Rumbus, Z., **Garami, A.** (2022) Dietary supplementation of transient receptor potential vanilloid-1 channel agonists reduces serum total cholesterol level: a meta-analysis of controlled human trials. **Crit Rev Food Sci Nutr 62:** 7025–7035.

Garami, A., Shimansky, Y. P., Rumbus, Z., Vizin, R., Farkas, N., Hegyi, J., Szakacs, Z., Solymar, M., Csenkey, A., Chiche, D. A., Kapil, R., Kyle, D. J., Van, Horn W. D., Hegyi, P., Romanovsky, A. A. (2020) Hyperthermia induced by transient receptor potential vanilloid-1 (TRPV1) antagonists in human clinical trials: insights from mathematical modeling and meta-analysis. **Pharmacol Ther 208:** 107474.

Pakai, E., Tekus, V., Zsiboras, Cs., Rumbus, Z., Olah, E., Keringer, P., Khidhir, N., Matics, R., Deres, L., Ordog, K., Szentes, N., Pohoczky, K., Kemeny, A., Hegyi, P., Pinter, E., **Garami, A.** (2018) The neurokinin-1 receptor contributes to the early phase of lipopolysaccharide-induced fever via stimulation of peripheral cyclooxygenase-2 protein expression in mice. **Front Immunol 9:** 166.