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RESEARCH AREA

Changes in the circulatory system affect the respiratory system through heart-lung interactions. Our research group investigates the mechanical and functional characteristics of the respiratory system in both animal experimental and human settings, with particular emphasis on effects arising from direct involvement of the respiratory system as well as from interactions with other organ systems. Our research encompasses controlled animal experiments and human clinical studies. Among our investigative methods, the determination of respiratory mechanical parameters using the forced oscillation technique plays a prominent role, along with measurement of the partial pressure of exhaled carbon dioxide by capnography. Artificial intelligence-based methods are also employed in our data analysis workflow, both for the evaluation of current measurements and the reanalysis of previously collected data.

TECHNIQUES AVAILABLE IN THE LAB

Participation in animal experiments, surgical methods, performing measurements and analysis of respiratory mechanical parameters, recording and analysis of vital parameters. Data analysis methods (with Ai applications), statistical analysis of data. Students can also participate in human experiments of the research group.

SELECTED PUBLICATIONS

Tolnai, J., Rárosi, F., Tóth, I., Babik, B., Novák, Z., Peták, F., & **Fodor, G. H.** (2024). Relationships between capnogram parameters by mainstream and sidestream techniques at different breathing frequencies. **Sci Reports 14**(1): 25443.

Ballók, B., Schranc, Á., Tóth, I., Somogyi, P., Tolnai, J., Peták, F., & **Fodor, G. H.** (2023). Comparison of the respiratory effects of commonly utilized general anaesthesia regimes in male Sprague-Dawley rats. **Front Physiol 14**: 1249127.

Fodor, G. H., Tolnai, J., Rárosi, F., Nagy, A., & Peták, F. (2025). Artificial intelligence-based chatbots improve the efficiency of course orientation among medical students: a cross-sectional study. **BMC Med Educ 25**(1): 1547.

Tarjányi, T., Rosztóczy, C., Peták, F., Kun-Szabó, F., Gulyás, G., Tolnai, J., Bali, K., Somogyi, P., Kiss, R. A., & **Fodor, G. H.** (2025). Nanomechanical Properties of Rib Bones in Diabetic vs. Healthy Rat Models. **Nanomaterials 15**(20): 1582.