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RESEARCH AREA

Our research is focusing on two broad areas. Firstly, our laboratory is interested in developmental mechanisms of enteric nervous system (ENS) formation. This work is aimed at understanding the development of the ENS in normal, abnormal, and evolutionary contexts. We do this by examining the role of the extracellular environment in the embryonic gut that regulate the mechanisms of neural crest derived stem cell differentiation during intestinal morphogenesis. Secondly, our laboratory focuses on mechanisms that underlie lymphoid organ formation. This work also uses the avian embryo as the model system, and addresses cellular (stem cell migration, differentiation), molecular (Foxn1, CXCR4, Shh, BMP4 expression), immunological (IBDV and bronchitis infection) and morphological (confocal, immune electron-microscopy) aspects of the primary and secondary lymphoid organ formation. Our aim is to discover how the avian lymphoid organs are built, and how immunosuppressive diseases affect its organization.

<https://semmelweis.hu/stemcell/en/about-us/>

TECHNIQUES AVAILABLE IN THE LAB

- embryomanipulation, chimeria construction, microsurgery
- stem cell fate mapping in the developing embryo
- histology (lectin and immune)
- electron microscopy
- in situ hybridization to study the gene expression
- retroviral gene delivery, monoclonal antibody technique
- stem cell and organ cultures
- tissue and organ extracellular matrix scaffold
- epithelial and neural organoids.

SELECTED PUBLICATIONS

Nagy, N. (Corresponding author), Kovács, T., Stavely, R., Halasy, V., Soós, A., Szócs, E., Hotta, R., Graham, H., Goldstein, A.M. (2021) Avian ceca are required for hindgut enteric nervous system development by inhibiting neuronal differentiation via non-canonical Wnt signaling and by promoting enteric neural crest cell proliferation. **Development** 148: dev199825.

Dóra, D., Ferenczi, S., Stavely, R., Tóth, V.E., Varga, Z.V., Kovács, T., Bódi, I., Hotta, R., Kovács, K.J., Goldstein, A.M., and **Nagy, N.** (2021) Evidence of a Myenteric Plexus Barrier and Its Macrophage-Dependent Degradation During Murine Colitis: Implications in Enteric Neuroinflammation. **Cell Mol Gasstroenterol Hepatol** 12: 1617-1641.

Nagy, N. (Corresponding author), Barad, C., Hotta, R., Bhavé, S., Arciero, E., Dóra, D., and Goldstein, A.M. (2018) Collagen 18 and agrin are secreted by neural crest cells to remodel their microenvironment and regulate their migration during enteric nervous system development. **Development** 145: dev160317.

Nagy, N. (Corresponding author), Barad, C., Graham, H.K., Hotta, R., Cheng, L.S., Fejszak, N., and Goldstein, A.M. (2016) Sonic hedgehog controls enteric nervous system development by patterning the extracellular matrix. **Development** 143: 264-275. IF: 5,843

Dóra, D., Fejszák, N., Goldstein, A.M., Minkó, K., **Nagy, N.** (2017). Ontogeny of ramified CD45 cells in chicken embryo and their contribution to bursal secretory dendritic cells. **Cell Tissue Res** 368: 353-370.