ÁGOTA APÁTI

HUN-REN Research Centre for Natural Sciences
Institute of Molecular Life Sciencest

Address: Magyar Tudósok körútja 2.,
H-1117 Budapest, Hungary

RESEARCH AREA

Stem cell research - Use of human pluripotent stem cells in disease modelling. In addition to the fact that cell lines with normal karyotypes can be established from pluripotent cells, they can also create a wide variety of cell types of the organism by changing the culture conditions. In our laboratory, we generate human pluripotent stem cells, primarily from blood samples, and differentiate them into cell types affected in various diseases (cardiac, neuronal, endothelial and mesenchymal cell types). The models created so far include mental and cardiovascular diseases, such as schizophrenia, DiGeorge and Frank-Ter Haar syndrome, arteriosclerosis and type II diabetes. In these models, calcium signalling and electrophysiological properties are examined, often using transgenic cell reporter systems, to understand the mechanisms of diseases and explore new directions for treatment options.

TECHNIQUES AVAILABLE IN THE LAB

Stem cell culture and differentiation (into cardiac, neural, mesenchymal, endothelial and liver cells), mRNA analysis techniques (RT-QPCR, mRNA sequencing), protein studies (immunocytochemistry: FACS and imaging techniques), genetic modifications (gene editing, gene insertion, gene knockout with transposon and CRISPR techniques), functional studies (calcium signals, electrophysiological studies), 2- and 3-dimensional cultures (monolayer, spheroid and organoid formation).

SELECTED PUBLICATIONS

Farkas, K. G., Vincze, K., Tordai, C., Özgen, E. İ., Gürler, D., Deli, V., Lilienberg, J., Erdei, Z., Sarkadi, B., Réthelyi, J. M., & **Apáti, Á.** (2025). Functional Analysis of Antipsychotics in Human iPSC-Based Neural Progenitor 2D and 3D Schizophrenia Models. **Int J Mol Sci** 26(9): 4444.

Jezsó, B., Kálmán, S., Farkas, K. G., Hathy, E., Vincze, K., Kovács-Schoblocher, D., Lilienberg, J., Tordai, C., Nemoda, Z., Homolya, L., **Apáti, Á.**, & Réthelyi, J. M. (2024). Haloperidol, Olanzapine, and Risperidone Induce Morphological Changes in an In Vitro Model of Human Hippocampal Neurogenesis. **Biomolecules 14(6):** 688.

Spathopoulou, A., Sauerwein, G. A., Marteau, V., Podlesnic, M., Lindlbauer, T., Kipura, T., Hotze, M., Gabassi, E., Kruszewski, K., Koskuvi, M., Réthelyi, J. M., **Apáti, Á.**, Conti, L., Ku, M., Koal, T., Müller, U., Talmazan, R. A., Ojansuu, I., Vaurio, O., Lähteenvuo, M., … Edenhofer, F. (2024). Integrative metabolomics-genomics analysis identifies key networks in a stem cell-based model of schizophrenia. **Mol Psychiatry 29(10):** 3128–3140.

Tordai, C., Hathy, E., Gyergyák, H., Vincze, K., Baradits, M., Koller, J., Póti, Á., Jezsó, B., Homolya, L., Molnár, M. J., Nagy, L., Szüts, D., **Apáti, Á.**, & Réthelyi, J. M. (2024). Probing the biological consequences of a previously undescribed de novo mutation of ZMYND11 in a schizophrenia patient by CRISPR genome editing and induced pluripotent stem cell based in vitro disease-modeling. **Schizophr Res 273:** 107–120.

Broca-Brisson, L., Harati, R., Disdier, C., Mozner, O., Gaston-Breton, R., Maïza, A., Costa, N., Guyot, A. C., Sarkadi, B., **Apáti, A.**, Skelton, M. R., Madrange, L., Yates, F., Armengaud, J., Hamoudi, R., & Mabondzo, A. (2023). Deciphering neuronal deficit and protein profile changes in human brain organoids from patients with creatine transporter deficiency. **eLife 12:** RP88459.

Reé, D., Fóthi, Á., Varga, N., Kolacsek, O., Orbán, T. I., & **Apáti, Á.** (2022). Partial Disturbance of Microprocessor Function in Human Stem Cells Carrying a Heterozygous Mutation in the DGCR8 Gene. **Genes 13(11):** 1925.

László, L., Maczelka, H., Takács, T., Kurilla, A., Tilajka, Á., Buday, L., Vas, V., & **Apáti, Á.** (2022). A Novel Cell-Based Model for a Rare Disease: The Tks4-KO Human Embryonic Stem Cell Line as a Frank-Ter Haar Syndrome Model System. **Int J Mol Sci 23(15):** 8803.