EDIT BUZÁS

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RESEARCH AREA

Extracellular vesicles (EVs) are released by all cellular life forms on Earth. They are nanobubbles enclosed by a phospholipid bilayer and are not capable of independent replication. Their internal cargo includes proteins, RNA, DNA, and metabolites, and they also carry an adsorbed complex biomolecular corona on their surface. EVs participate in all known physiological and pathological processes. However, we still have limited information about their biogenesis, and we lack reliable molecular markers to identify different EV subtypes. There are many unanswered questions regarding immune cell-derived EVs. Similarly, we have limited understanding of the role of human endogenous retroviruses in EVs. One of the most exciting aspects of EVs is that we can genetically engineer cells to secrete EVs with specific molecules inside or on their surface. There is intensive research worldwide focusing on EVs as liquid biopsy markers and therapeutic agents, especially in the context of cancer, neurological, and cardiovascular diseases, as well as the therapeutic application of stem cell EVs.

TECHNIQUES AVAILABLE IN THE LAB

State of the art methods of extracellular vesicle separation and characterisation of extracellular vesicles (differential ultracentrifugation, size exclusion chromatography SEC, TFF, ultrafiltration, affinity capture, immunoprecipitation, microBCA protein assay, SPV lipid assay, NTA, TRPS, high sensitivity flow cytometry TEM, confocal microscopy, Single Particle reflectance imaging sensor (SP IRIS), single molecule array (SIMOA), Western blot, ELISA, cell culture, PCR, qPCR, CRISPR Cas9, transfection of cells, lentiviral transduction,apoptosis and pyroptosis induction.

SELECTED PUBLICATIONS

Kovács, KD., Visnovitz, T., Gerecsei, T., Pete, B., Kurunczi, S., Koncz, A., Németh, K., Lenzinger, D., Vukman, KV., Balogh, A., Rajmon, I., Lőrincz, P., Székác, I., **Buzás, EI.***, Horvath, R.* (2023) Nanoinjection of extracellular vesicles to single live cells by robotic fluidic force microscopy. **J Extracell Vesicles 12(12):** e12388.

Hegyesi, H., Pallinger, É., Mecsei, S., Hornyák, B., Kovácsházi, C., Brenner, GB., Giricz, Z., Pálóczi, K., Kittel, Á., Tóvári, J., Turiak, L., Khamari, D., Ferdinandy, P., **Buzás, EI.** (2022) Circulating cardiomyocyte-derived extracellular vesicles reflect cardiac injury during systemic inflammatory response syndrome in mice. **Cell Mol Life Sci 79(2):** 84.

Tóth, EÁ., Turiák, L., Visnovitz, T., Cserép, C., Mázló, A., Sódar, BW., Försönits, AI., Petővári, G., Sebestyén, A., Komlósi, Z., Drahos, L., Kittel, Á., Nagy, G., Bácsi, A., Dénes, Á., Gho, YS., Szabó-Taylor, KÉ., **Buzás, EI.** (2021) Formation of a protein corona on the surface of extracellular vesicles in blood plasma. **J Extracell Vesicles 10(11):** e12140.

Vukman, KV., Ferencz, A., Fehér, D., Juhos, K., Lőrincz, P., Visnovitz, T., Koncz, A., Pálóczi, K., Seregélyes, G., Försönits, A., Khamari, D., Galinsoga, A., Drahos, L., Buzás, EI. (2020) An implanted device enables in vivo monitoring of extracellular vesicle-mediated spread of pro-inflammatory mast cell response in mice. **J Extracell Vesicles 10(1):** e12023.

Visnovitz, T., Osteikoetxea, X., Sódar, B. W., Mihály, J., Lőrincz, P., Vukman, KV., Tóth, EÁ., Koncz, A., Székács, I., Horváth, R., Varga, Z., **Buzás, EI.** (2019) An improved 96 well plate format lipid quantification assay for standardisation of experiments with extracellular vesicles. **J Extracell Vesicles 8(1):** 1565263.