

Extracellular Vesicle Therapeutics: From Scalable Manufacturing to Precision Neuroprotection

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We are interested in:

Development of extracellular vesicle (EV)-based therapeutics for neurodegenerative diseases, particularly Parkinson's disease, focusing on neuroprotection, modulation of neuroinflammation and preservation of dopaminergic neurons.

Scalable and GMP-compatible manufacturing of stem cell-derived EVs, including bioreactor-based production, downstream processing, purification, quality control and standartisation.

EV-mediated neurovascular protection and blood brain barrier (BBB) repair, investigating microglia-endothelial communication.

Human-relevant preclinical models for EV therapeutic development, including iPSC-derived neuronal and microglial models, Parkinson's disease midbrain organoids, human BBB models and organ-on-chip platforms.

HORIZON-HLTH-2027-02-DISEASE-14 – Clinical trials for innovative interventions in neurodegenerative diseases
HORIZON-HLTH-2027-02-DISEASE-01 – Innovative healthcare interventions for non-communicable diseases
HORIZON-HLTH-2027-03-TOOL-02 Advancing bio-printing of living cells for regenerative medicine

Main goal

To develop and validate a next-generation platform for stem cell-derived EV therapeutics targeting neurodegenerative and neurovascular disorders, integrating scalable GMP-compatible manufacturing, advanced molecular characterization, mechanism-of-action studies and human-relevant preclinical models to accelerate clinical translation.

Specific objectives

Establish scalable and reproducible EV manufacturing platforms

Define the molecular determinants of EV therapeutic activity

Investigate EV-mediated regulation and repair of the neurovascular unit of BBB

Validate therapeutic potential and prepare for clinical translation

Our expertise

Stem cell-derived extracellular vesicles: EV isolation, production, purification, molecular and functional characterization, and development of cell-free therapeutics.

Scalable and GMP-compatible manufacturing: Bioreactor-based EV production, TFF, SEC, bioprocess optimisation and quality control.

Human BBB modelling: Development and application of human in vitro BBB models using human brain endothelial cells and microglia, including co-culture systems for investigating neurovascular interactions and therapeutic responses.

Neurovascular biology and BBB research: EV-mediated microglia-endothelial communication, BBB integrity and repair

Selected publications: **Expert Opin Ther Targets**. 2026 Oct;30(10):1057-1071; **Stem Cell Rev Rep**. 2026 Jul;22(5):2528-2548; **Stem Cells Transl Med**. 2026 Apr 27;15(5):szag024; **FASEB J**. 2026 Mar 31;40(6):e71631; **FEBS J**. 2024 Aug;291(16):3706-3722; **Function** (Oxf). 2024 Jan 9;5(2):zqae002; **Cell Biol Int**. 2024 Mar;48(3):358-368; **Neurochem Res**. 2023 Apr;48(4):1211-1221; **Int J Mol Sci**. 2021 Oct 11;22(20):10970; **J Cell Physiol**. 2021 Nov;236(11):7642-7654; **Cell Mol Neurobiol**. 2021 Apr;41(3):551-562; **Cell Mol Neurobiol**. 2021 Apr;41(3):605-613; **Stem Cells Transl Med**. 2019 May;8(5):490-499; **Cytotherapy**. 2015 Jul;17(7):932-9.

We are looking for partners with complementary expertise in the following areas:

- **Clinical neurology and neurodegenerative diseases:** Parkinson's disease and other neurodegenerative disorders, access to patient cohorts and clinical expertise.
- **Preclinical disease models:** In vivo models of Parkinson's disease, ischemic stroke and neurovascular injury, including therapeutic efficacy and safety assessment.
- **Advanced human-relevant models:** iPSC-derived neuronal and microglial models, midbrain organoids, advanced human BBB models and organ-on-chip technologies.
- **EV biology and molecular profiling:** EV proteomics, lipidomics, transcriptomics, bioinformatics and AI-driven integration of multi-omics data.
- **Biopharmaceutical development and clinical translation:** GMP manufacturing, analytical development, regulatory affairs, toxicology and preparation for early-phase clinical trials.

Particularly welcome: European clinical research centres, academic groups with expertise in neurovascular biology, biotechnology SMEs and industrial partners interested in EV-based therapeutics and advanced biomanufacturing.

Ongoing projects

neuron
Network of European Funding for Neuroscience Research

ERA-NET NEURON

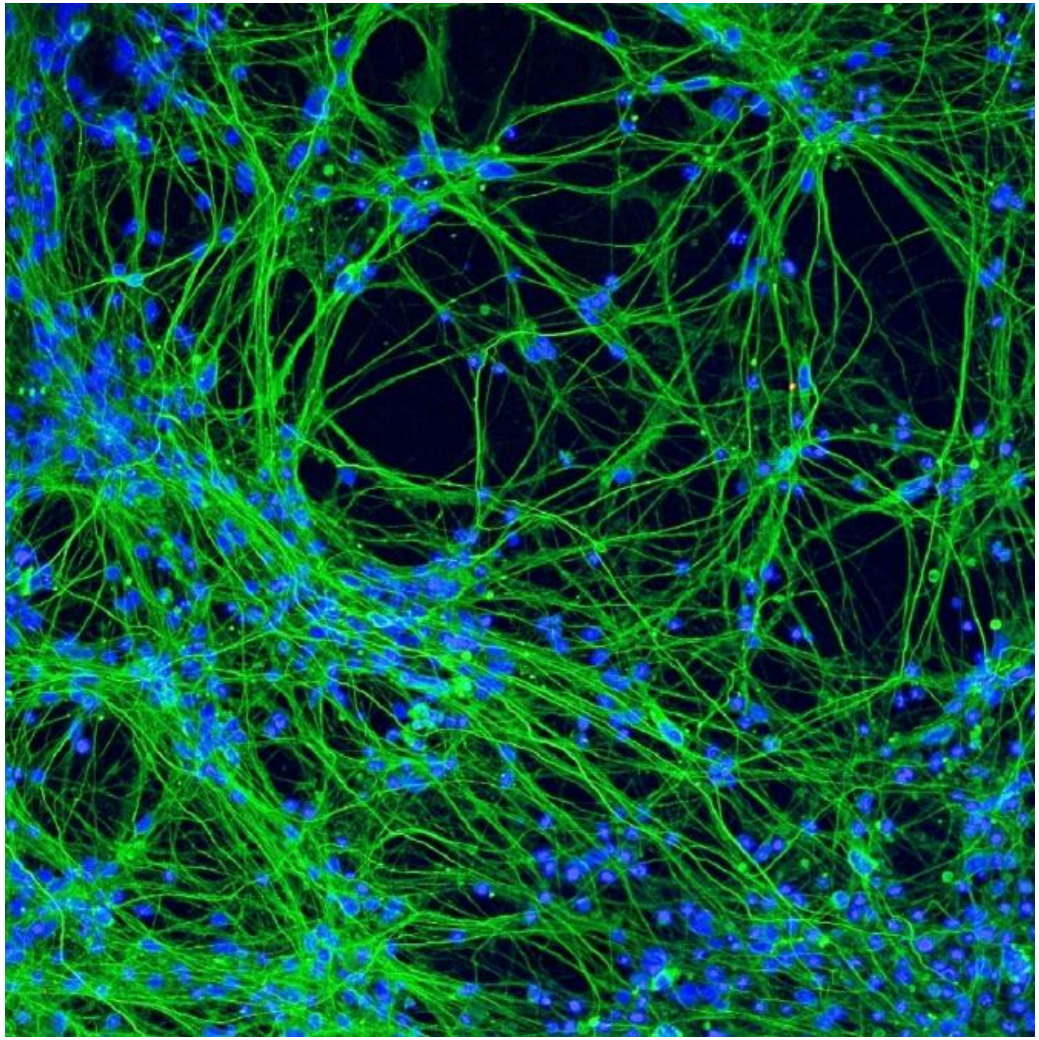
Stem Cell-Derived Extracellular Vesicles as Novel Tools for Inflammatory Recalibration and Resolution of Chronic Pain

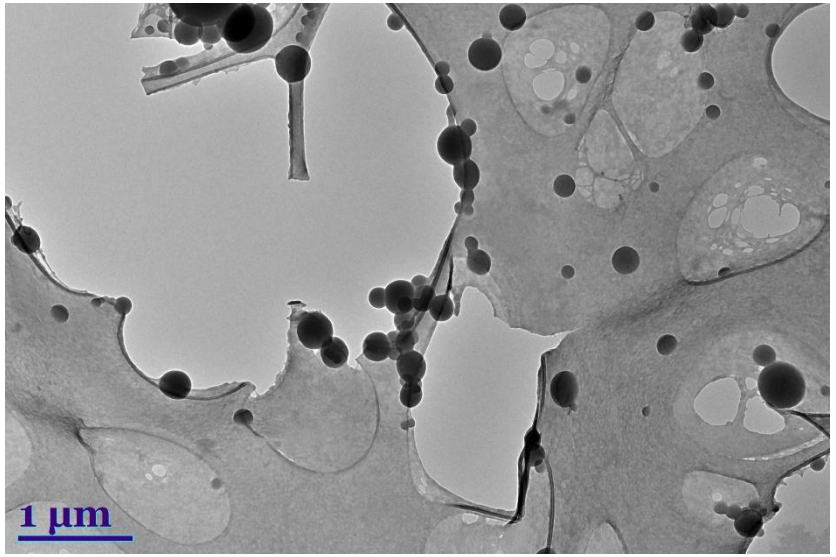


RESOLVE consortium

Partners: University Medicine Essen, University of Reading, University of Medicine and Pharmacy Craiova, Labena d.o.o (LABENA)

Contacts





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