

Human cell-based models to study neurodegeneration

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Human cell-based models have emerged as valuable tools for studying neurodegeneration, offering advantages over traditional animal models and post-mortem human tissue studies. These models enable researchers to investigate disease mechanisms, screen potential therapeutic compounds, and personalize medicine approaches. By taking advantage of stem cell technology, we are able to derive diverse models, including mono-cultures at one end of the spectrum and 3D organoids and transplantation into intact brains at the other. The choice of culture-system is guided by the experimental question under investigation. Lehtonen's lab is particularly interested in the glial non-cell-autonomous mechanisms and identifying key therapeutic targets and pathways responsible for pathological glial phenotype, especially in Parkinson's disease. We utilize patient-derived brain cells in 2D and 3D culture systems to more accurately mimic the disease's pathological conditions. These models hold promise for advancing personalized medicine approaches by enabling the development of patient-specific therapies tailored to individual genetic backgrounds and disease profiles.