Utilization of human Parkinson’s disease specific neuroepithelial stem cells to define disease associated cellular phenotypes in a co-culture of oligodendrocytes and dopaminergic neurons – CORE

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Title of project or programme

Utilization of human Parkinson's disease specific neuroepithelial stem cells to define disease associated cellular phenotypes in a co-culture of oligodendrocytes and dopaminergic neurons - CORE

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FNR

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€ 632,000

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01/03/2014

Total duration of award in years

3.0

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

Research Abstract

Parkinson’s disease (PD) is an age associated progressive neurodegenerative disease. With the advent of iPSC technology several disease specific cellular defects in neurons have been described. However, in these studies usually isolated and dissociated cultures of relatively pure dopaminergic neurons are used. In contrast to these models in vivo dopaminergic neurons are in close contact with other cell types including oligodendrocytes. Furthermore, previous studies have shown that besides dopaminergic neurons also oligodendrocytes degenerate during PD. Finally, our recently published data indicate that oligodendrocytes have a huge regenerative potential for PD. In the here proposed project we aim on generating an in vitro disease modelling system for Parkinson’s disease, that mimics the in vivo situation better than currently used cultures of isolated dopaminergic neurons do. In order to achieve this aim we will make use of human Parkinson’s disease patient specific induced pluripotent stem cells to generate dopaminergic neurons and oligodendrocytes. We will investigate disease associated cellular phenotypes/defects in these individual cell types. Most importantly we will address the question whether co-cultures of these cell types modify the before identified cellular defects. Finally, we will scale up the whole system to be able to use high-content imaging. This will allow us to conduct screens for genes or small molecules that modify or inhibit the before identified cellular phenotypes. In this project we will focus on the PD-associated LRRK2 G2019S mutation. However, future projects will also include other PD-related genes and mutations. Additionally, this project is part of a long-term strategy where we aim on in vitro modeling PD. Future approaches are planned to involve co-cultures with astrocytes and microglia.

Lay Summary

Further information available at:

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Investments > €500k

Member States:
Luxembourg

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Parkinson's disease & PD-related disorders

Years:
2016

Database Categories:
N/A

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