Débora Pita Illobre (ESR 10)

Cell-Based Models for Neurotrophic Therapeutic Testing

Profile

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My Research

The overall goal of my project is to provide a cell-based model of human neuronal function, being a representation of cells with human neuronal characteristics and functionality produced by the controlled differentiation of neuronal stem cells (NSCs) for neurotrophic therapeutic testing. Specific aims are:

1. Differentiation of the NSCs into different types of neurons (cortical neurons, dopaminergic neurons, among many other types of neurons) and glial cells in 2D cultures.
2. Differentiation of the NSCs into different types of neurons and glial cells in 3D cultures.
3. Validation of the cell-based model using synthetic and natural compounds produced in the EuroNeurotrophin network.

Scientific CV

- November 2019 – present: EuroNeurotrophin Early Stage Researcher PhD student at Vrije Universiteit Amsterdam, The Netherlands.
- July 2017: Exposition of the Master's Thesis at "XIII days for young researches in Neuroscience", Santiago de Compostela, Spain.
- January 2017 – July 2017: Master's Thesis. Department of Morphological Sciences, University of Santiago de Compostela, Spain. Name of Thesis: "Angiotensin (1-7)/Mas Receptor in dopaminergic neurons".
- 2016-2017: Master Program in Neuroscience – Specialty in Cellular and Molecular Neurobiology, University of A Coruña, Santiago de Compostela and Vigo (Spain).
- February 2016 – May 2016: Bachelor's Thesis. Department of Hematology, Santa Creu and Sant Pau's Hospital, Barcelona, Spain. Name of Thesis: "Diagnosis of inherited thrombocytopenia using the MLPA".
- July 2015 – September 2015: Intership Erasmus + scholarship, Department of Molecular and Cell Biology – University of Leicester (UK).
- 2012-2016: Biotechnology Degree, University of Vic – Central University of Catalunya (Spain).

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EuroNeurotrophin

A European training network for the discovery of neurotrophins small molecule mimetics as candidate therapeutic agents for neurodegeneration and neuroinflammation

Project Coordinator

Dr Theodora Calogeropoulou,
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Project Partners

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Introduction

Neurodegenerative diseases like Alzheimer's disease or Parkinson's disease are on the rise in developed societies worldwide affecting millions of people. Neurodegenerative diseases primarily affect neurons in the human brain and currently there exists no cure for any of them since most of the available drugs fail to tackle the pathogenesis of neurodegenerative diseases.

Preclinical studies point to the therapeutic potential of neurotrophins, which have been shown to control a number of aspects of survival, development and function of neurons. However, the poor pharmacokinetic properties of neurotrophins render their use as drugs prohibitive.

Objectives

EuroNeurotrophin will address the major limitations of neurotrophins by developing novel small molecule, neurotrophin mimetics with favourable profiles of stability, tissue penetration and targeted biological actions. In the long term, the project will contribute to the further development of small molecule therapeutics for the treatment of neurodegenerative diseases and neuroinflammation, revealing new concepts of neurotrophin receptors signalling and to create a pan-European Neurotrophin Network.

Furthermore, EuroNeurotrophin aims at creating a new generation of young scientists with a broad understanding and skill set in chemical biology with emphasis on the neuroscience field and to educate 14 young researchers regarding the knowledge underpinning the neurotrophin related field as well as on drug and natural products research for neurodegenerative diseases.

Impact

Neurotrophins offer one of the most compelling opportunities to significantly improve the treatment of serious age-related, neurological diseases such as Alzheimer's, Parkinson's, MND/ALS. A major therapeutic advantage of neurotrophic factors is that they tackle both the symptoms of a disease (improving clinical status) as well as its pathogenesis (delaying disease progression) without any prerequisite deep insight into the aetiology or specific pathogenic variables driving the disease process.

We will study neurotrophin small molecule mimetics (synthetic or natural) in depth, and will use them as molecular probes to interrogate the role of neurotrophins and their receptors. It will contribute important new knowledge to the next frontier in biomedical sciences.

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