



## ***Learning more about the role of mitochondrial dysfunction in Parkinson's to help develop better therapies***

In Europe today, more than one million people live with Parkinson's and this number is forecast to double by 2030. While there are symptomatic therapies available for Parkinson's, they do not improve all symptoms, nor do they slow or prevent the progression of the condition over time. Long-term treatment is also associated with adverse side effects. New, more effective treatments are urgently needed.

Research has shown that malfunctioning mitochondria, the powerhouses of the cell, are involved in Parkinson's. However, researchers and companies developing new drugs need to know more about how mitochondrial malfunctioning is involved in disease progression and better models are needed for drug discovery and development.

PD-MitoQUANT ([www.pdmitoquant.eu](http://www.pdmitoquant.eu)) is an Innovative Medicines Initiative (IMI) project that will help to address these challenges. Academic experts, SMEs, pharmaceutical companies from the European Federation of Pharmaceutical Industries and Associations (EFPIA), and the patient advocacy organisation Parkinson's UK will come together to:

- improve our understanding of mitochondrial malfunctioning in Parkinson's
- identify and validate molecular drivers and mechanisms in Parkinson's and other neurodegenerative conditions
- develop better models for studying Parkinson's, and
- discover innovative therapeutic targets that can be further progressed by the EFPIA partners in the future.



Coordinator,  
Prof. Jochen Prehn

**Message from Coordinator Prof Jochen Prehn:** *"There is growing evidence that mitochondrial dysfunction is involved in Parkinson's, but no effective treatments have been developed based on this knowledge. PD-MitoQUANT focuses on how mitochondria, the 'powerhouses' of the cell, contribute to neurodegeneration and cell death when they malfunction. This project will deepen our understanding of precisely how mitochondria malfunction in Parkinson's, and develop improved tools for the early stages of drug development so pharmaceutical companies can develop better treatments in the future. PD-MitoQUANT will join together the forces of top scientists in academia and industry to bring a fresh look at how we identify and test novel drugs for the treatment of this devastating movement disorder."*



## Meet PPI Volunteer Richard Campbell



Researchers know that patients can, and should, be involved in all aspects of research, including study design, communication, and ethics. Patients bring unique knowledge and skills to projects, which can improve the quality of research. The IMI encourages public and patient involvement (PPI) in all of its projects.

PD-MitoQUANT is fortunate to have two people with Parkinson's involved in the project through our patient advocacy partner Parkinson's UK ([www.parkinsons.org.uk](http://www.parkinsons.org.uk)). In this newsletter, we meet Richard Campbell. In the next newsletter, we'll introduce Paula Scurfield.



PPI Volunteer  
Dr Richard Campbell

*"I was a University Lecturer/Senior Lecturer in a Department of Biological Sciences for 30 years with my main interest in forestry, agricultural and industrial microbiology and I, therefore, have a general science background, have published many peer-reviewed scientific papers, written textbooks and served on editorial boards of scientific journals. I retired more than 20 years ago and was diagnosed with Parkinson's 11 years ago. I have developed an interest in PPI on projects with Parkinson's UK, with an NHS hospital group on anti-microbial drug development and as a lay PPI member of the steering group on a stage 3 trial for repurposing a drug for use in Parkinson's.*

*When I heard about the PD-MitoQUANT project, I was attracted by the pure science aspects, rather than drug development, and thought I could contribute my experience in research, scientific writing and editing, and lately PPI, even though that expertise was in a different scientific field and was no doubt in need of serious updating. I am excited, though slightly apprehensive, to be joining an international group of experts to try to understand some of the basic changes in cell biology that lead to Parkinson's."*

## Learn the lingo!

**$\alpha$ -synuclein ( $\alpha$ -Syn)** – is a protein normally found in neurons and other cells. In Parkinson's and other neurodegenerative diseases, this protein builds up and clumps together into aggregates that affect how neurons work. In PD-MitoQUANT, we will investigate the role of  $\alpha$ -Syn in Parkinson's, particularly its role in mitochondrial dysfunction.

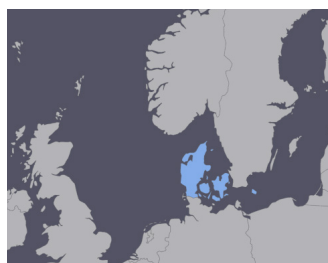
**Mitochondria** – are known as the 'powerhouses' of the cell, providing the energy cells need. PD-MitoQUANT is studying how malfunctioning mitochondria are involved in Parkinson's.

**Mitophagy** – is the process cells use to remove damaged or malfunctioning mitochondria, which makes sure the cell continues to work effectively.

**Morphology** – refers to the form and structure of organisms, cells and their inner parts. It can help us learn more about when cells are working effectively or when they are degenerating.



## Partner Spotlight - H. Lundbeck A/S



With headquarters in Denmark, Lundbeck ([www.lundbeck.com](http://www.lundbeck.com)) is a global pharmaceutical company highly committed to improving the quality of life of people living with brain diseases. For this purpose, Lundbeck is engaged in research, drug discovery development, manufacturing, marketing and sale of pharmaceuticals across the world. The company's products are targeted at disease areas within psychiatry and neurology.

Within PD-MitoQUANT, Lundbeck will:

- be a scientific co-leader and part of the Executive Team
- evaluate a range of  $\alpha$ -synuclein ( $\alpha$ -Syn) fibril species to select the most promising for further investigation by the project
- transfer their established  $\alpha$ -Syn fibril primary neuron seeding assay to other partners,
- investigate mitophagy
- transfer samples of  $\alpha$ -Syn fibril seeded primary neurons to partners at Radboud University Nijmegen Medical Centre for investigations of correlations between morphology and functionality
- establish the kinetics of the pathology development in a striatal stereotaxic  $\alpha$ -Syn fibril injection mouse model to define the best timepoint for assessment of mitochondrial dysfunction *in vivo*, and
- validate mitochondrial signatures in models of Parkinson's.

PD-MitoQUANT Scientific Co-leader Dr. Tina Stummann is Senior Research Scientist in the Department of Proteinopathy at Lundbeck and a key driver of their knowledge platform on mitochondrial dysfunction in Parkinson's and Alzheimer's. Additionally, she is responsible for functional electrophysiological endpoints in  $\alpha$ -Syn seeded primary neurons and leads Lundbeck's stem cell activities, with extensive experience in neuronal differentiation of pluripotent stem cells and establishment of stem-cell based Alzheimer's and Parkinson's models.



Scientific Co-leader  
Dr. Tina Stummann

With PD-MitoQUANT's clear-minded approach, participation of mitochondrial experts and IMI funding, Tina hopes that the collaboration ultimately can lead to a better understanding of the molecular mechanisms that cause Parkinson's. Other expectations for the project are establishments of robust tools and models, which are highly crucial for the facilitation of mitochondria research in Parkinson's.

*"We want to understand if mitochondria dysfunction drives Parkinson's progression. New knowledge here will open possibilities for finding new mitochondria-linked targets and ultimately discover new treatments for Parkinson's."*

*It is fundamental to bring together knowledge of industry and academia if we are to take the next quantum steps in finding an adequate treatment for the underlying causes of Parkinson's."*



## Q & A with Prof. Dr. Donato Di Monte

Donato (Dino) Di Monte is Senior Group Leader of the Neurodegeneration and Neuroprotection in Parkinson's unit at the German Center for Neurodegenerative Diseases ([www.dzne.de](http://www.dzne.de)) in Bonn, Germany. We asked Dino a few questions about PD-MitoQUANT and his role in the project.



Prof. Donato Di Monte

*What is your general perspective on Parkinson's research?*

I have been involved in Parkinson's research for the past 30 years and, during this time, our understanding of the processes underlying disease development and progression has improved tremendously. These improvements make me quite an optimist about the possibility that new therapeutic strategies will be successfully tested and could benefit patients in the near future.

*Why is PD-MitoQUANT an exciting project for your group?*

My part of the project will specifically deal with the assessment of mitochondrial function during the development and progression of  $\alpha$ -Syn deposition and neurodegeneration in experimental models of Parkinson's. As part of this consortium, I will greatly benefit from the expertise of other colleagues at other sites. At the same time, I will be happy to share knowledge, laboratory experience and state-of-the-art infrastructure of my scientific team and research organisation with the other PD-MitoQUANT partners. I am looking forward to an exciting and productive scientific "ride"!

To learn more, you can read Dino's World Parkinson's Day interview, "Experts across Europe team up for Parkinson's research" <http://bit.ly/2ZdUKMp>

## PD-MitoQUANT Partners



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