What is the link between Gaucher’s disease and Parkinson’s?

Anthony answered these questions from Parkinson’s UK in his final report.

What inspired you to study this area of Parkinson’s research?
Around ten years ago, it was noticed by doctors that people in families with a history of a genetic condition called ‘Gaucher’s disease’ were also more likely to develop Parkinson’s. Gaucher’s disease is directly caused by mutations in a gene called GBA1 and now we believe that inheriting this faulty GBA1 gene significantly increases an individual’s chances of Parkinson’s. I believe understanding how mutations of this gene result in Parkinson’s will improve our understanding of the cause as well as help design future treatments.

What were your goals for the project?
We wanted to recruit patients and relatives with GBA1 mutations to help us understand how mutations in this crucial gene increase risk of Parkinson’s. We also wanted to study the changes in post-mortem brain tissue from GBA1 carriers, and to study how the gene works in cells in the lab. Overall, we wanted to gain a much better understanding of the GBA1 gene and the part it plays in the development of Parkinson’s.
What have you found?
We’ve found that mutations in GBA1 cause problems with ‘GCase’, an enzyme which plays an important role in the cell’s recycling system.

When GCase doesn’t work properly the cell struggles to get rid of unwanted proteins. This leads to increased levels of alpha synuclein inside cells – a protein we know to be of paramount importance in Parkinson’s.

But interestingly, we’ve also discovered that it works the other way too. High levels of alpha synuclein cause problems with the GCase enzyme. Our work suggests that boosting GCase activity could be an exciting new approach for treating Parkinson’s.

What are the next steps?
We have successfully secured more funding from both Parkinson’s UK and the Medical Research Council to continue this exciting work. We are continuing to study GBA1 mutations and the GCase enzyme in more depth, and we are already starting to test potential drugs in the lab which could boost GCase activity and help cell’s get rid of alpha-synuclein.

How will your research help people with Parkinson’s?
I hope that the research we’re doing now will lead to new treatments that can slow or even stop the progression of Parkinson’s. And because alpha-synuclein is involved in other conditions – including Lewy body dementia and multiple system atrophy – it is possible the treatments we’re working on could also have beneficial effects in these other conditions.

Sharing this research
Anthony’s new Parkinson’s UK project was featured in a major fundraising appeal in 2015 which helped us raise over £200,000 towards funding his new research.

Find out more about our research, visit our website: parkinsons.org.uk/research

Or contact the Parkinson’s UK research team at: research@parkinsons.org.uk

Parkinson’s UK is the operating name of the Parkinson’s Disease Society of the United Kingdom. A company limited by guarantee. Registered in England and Wales (948776). Registered office: 215 Vauxhall Bridge Road, London SW1V 1EJ. A charity registered in England and Wales (258197) and in Scotland (SC037554). © Parkinson’s UK, Sept 2014