Investigating the role of calcium in Parkinson’s

**Project information**

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<tr>
<th>Lead researcher</th>
<th>Professor Sandip Patel</th>
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<tr>
<td>Location</td>
<td>University College London</td>
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<tr>
<td>Cost</td>
<td>£92,276 over three years</td>
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<td>Start date</td>
<td>September 2013</td>
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<tr>
<td>Type of project</td>
<td>PhD Studentship</td>
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<td>Project code</td>
<td>H-1202</td>
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**Project background**

We know that calcium is important for healthy bones and teeth. But calcium also has a vital role in our cells, where it is involved in many activities that are essential for life. Changes in cell calcium levels are thought to be involved in a number of conditions, including Alzheimer’s. But the role of calcium in Parkinson’s hasn’t been studied in detail.

Lysosomes are like tiny waste recycling centres inside cells. They also help to regulate calcium levels by storing and releasing it when needed. In a previous study funded by Parkinson’s UK, Sandip’s team found problems with the way lysosomes handle calcium in skin cells from people with Parkinson’s. Although skin cells are different from nerve cells, they contain the same genetic information and carry out many of the same activities. So they can give us clues about what might be happening in the brain.

A PhD student in Sandip’s lab will use cell and animal models to further explore the role of lysosomes and calcium in Parkinson’s.

- The most common genetic cause of Parkinson’s is a specific change or mutation in a gene called LRRK2, known as G2019S. We don’t know what the LRRK2 protein (made from the gene) does inside cells. But recent research has shown that it may interact with lysosomes.
• Gaucher’s disease is an inherited condition that causes problems with lysosomes. People who carry one or two copies of the gene that causes Gaucher’s disease have an increased risk of developing Parkinson’s. Sandip thinks problems with the way cells handle calcium may link the two conditions.

What the researchers are doing
When lysosomes aren’t working properly, cells need more of them to do the same job. In the first part of the project, the student will measure levels of lysosome markers in skin cells from people with Parkinson’s. If they are higher than normal, this could indicate problems with their lysosomes. This part of the research could potentially be developed into a test for Parkinson’s.

In the second part of the project, the student will look at the way lysosomes handle calcium in cells with the G2019S mutation. They will also investigate where in the brain a recently discovered family of proteins that allow the release of calcium from lysosomes are found.

The last part of the project will focus on calcium in another compartment inside cells known as the endoplasmic reticulum, or ER, which is thought to be particularly important in Gaucher’s disease.

In parallel with the above work, the student will test drugs that block the movement of calcium, to see if they protect cells from the damage caused by Parkinson’s and Gaucher’s disease.

How the research will help people with Parkinson’s
This project is investigating a new idea about the causes of Parkinson’s, which could open up a new avenue of research. Findings from this research could ultimately be useful in the development of new treatments for both Parkinson’s and Gaucher’s disease.

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