# Researchers unveil structure of PINK1 protein linked to Parkinson's disease



Scientists have made a significant breakthrough in Parkinson’s disease research, unveiling the structure and function of the PINK1 protein, which has long been associated with this neurodegenerative condition. This discovery, which could lead to new drug treatments, was the result of a study conducted by experts at the Walter and Eliza Hall Institute and the Parkinson’s Disease Research Centre in Australia, with findings recently published in the esteemed journal, Science.

For decades, the PINK1 protein’s involvement in the pathophysiology of Parkinson’s has been acknowledged, yet its precise structure and mechanism of action have remained elusive. The new research elucidates how PINK1 attaches to damaged mitochondria and becomes activated, a key step in the process that can contribute to the disease's progression.

Parkinson’s disease impacts approximately 153,000 individuals across Britain and is characterised by a range of symptoms, including tremors, cognitive impairment, speech difficulties, and temperature regulation problems. The condition develops slowly and can take years or even decades to diagnose. Currently, there is no cure, though various treatments are available to help manage symptoms.

Professor David Komander, the corresponding author of the study, has expressed the importance of this breakthrough, stating, “This is a significant milestone for research into Parkinson’s. It is incredible to finally see PINK1 and understand how it binds to mitochondria.” He further remarked that the discovery could lead to methods for altering PINK1 levels, which may be transformative for individuals with the condition.

The research delineates a four-step process employed by PINK1. Initially, the protein detects damage within mitochondria before attaching to them. This attachment allows PINK1 to link with another protein, Parkin, facilitating the recycling of damaged mitochondria. Lead author Dr Sylvie Callegari highlighted the novelty of this revelation, stating, “This is the first time we’ve seen human PINK1 docked to the surface of damaged mitochondria, and it has uncovered a remarkable array of proteins that act as the docking site.”

The implications of this research extend beyond basic understanding. Dr Richard Ellis, a consultant neurologist, indicated that these observations may provide novel strategies for slowing disease progression, while Dr Zhi Yao from Life Arc emphasised the potential for expediting drug discovery processes for not only Parkinson’s disease but also other neurodegenerative conditions.

The significance of understanding PINK1 is underscored by the fact that alterations in the protein have been linked to a rare inherited form of Parkinson's. Becky Jones, research communications manager at Parkinson’s UK, acknowledged this progress as a promising avenue for new drug designs that could potentially slow or halt the progression of the disease.

In sum, this groundbreaking discovery about the PINK1 protein marks a crucial development in the ongoing pursuit of treatment options for Parkinson’s disease, a condition that remains the fastest growing neurological disorder globally. Researchers are optimistic that the insights gained from this study could lead to innovative interventions to better manage, or potentially mitigate, the effects of Parkinson’s on millions of individuals worldwide.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

* <https://elifesciences.org/articles/29985> - This article explains the structure of PINK1 and its role in Parkinson's disease, highlighting how mutations affect its function and the potential for drug development based on its structure.
* <https://www.michaeljfox.org/grant/pink1-structure-function> - This resource discusses the importance of understanding PINK1's structure and function in relation to Parkinson's disease, emphasizing its role in mitochondrial protection and the potential for therapeutic interventions.
* <https://www.genengnews.com/topics/translational-medicine/structure-of-key-parkinsons-disease-protein-pink1-seen-for-first-time/> - This article provides insights into the recent breakthrough in visualizing human PINK1 attached to damaged mitochondria, highlighting its role in mitophagy and the potential for drug development.
* <https://www.parkinsons.org.uk/information-and-support/what-is-parkinsons> - This webpage offers information on Parkinson's disease, including its symptoms and the current state of research into treatments, which aligns with the article's discussion on Parkinson's impact and management.
* <https://www.nhs.uk/conditions/parkinsons-disease/> - This NHS webpage provides details on Parkinson's disease symptoms, diagnosis, and management options, supporting the article's overview of the condition.