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IIT Mandi uncovers critical insights into Parkinson's Disease

29 February 2024 | News

The study focused on Alpha-synuclein, a brain-abundant protein that shows increased phosphorylation in Parkinson's patients



Researchers from the Indian Institute of Technology (IIT) Mandi, with international collaborators, have investigated a crucial protein involved in the progression of Parkinson's disease. The work has offered the key insight that a protein modification seen in Parkinson's also has a normal role in regular brain function.

The team of experts from various Universities, including IIT Mandi, medical schools, and pharmaceutical companies, has used a comprehensive array of techniques to understand the nature of one particular protein that has been associated with Parkinson’s disease. The protein, called *Alpha-synuclein* is abundantly found in the brain. In patients with Parkinson's disease and related conditions, this protein is highly phosphorylated i.e., phosphate groups attached to one amino acid (serine-129) of this protein.

Alpha-synuclein, like other proteins, being polymer chain of amino acids, has a prominent phosphorylation site at the 129th position in the chain which when inhibited results in potentially halting the progression of Parkinson's.

Through a combination of biochemical assays, protein analysis, and gene studies on mouse models, the research team examined the protein and its phosphorylation patterns. When the phosphorylation of this protein was prevented, it significantly impacted normal brain function, suggesting that a-syn Ser129P might act as a switch triggered by brain cell activity to initiate crucial signalling pathways.

The research findings have three practical implications- First, drugs or gene therapies can be designed to ensure that the levels of SER129 are maintained correctly in specific areas of the brain; Secondly, molecules can be designed to either imitate or disrupt the connections between proteins that involve Ser129P to treat diseases like Parkinson’s; and lastly, using this understanding of phosphorylated Ser129, models to study diseases like Parkinson's, can be improved. These models can be used to check if Parkinson's medications affect Ser129P in any way.