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Fat accumulation in brain could be indicator for Parkinson's disease

A high indicator of some types of fat molecules could indicate a future risk of Parkinson's disease in patients.

HEALTH Updated: May 03, 2018 17:14 IST

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Hindustan Times



Parkinson's disease (PD) is a progressive disorder which leads to a major reduction of nerve cells.(Shutterstock)

High levels of some types of fat molecules in the brain could be an early indicator of [Parkinson's disease](#), according to a recent study.

This research could have major implications for identifying patients who could be at [risk of developing Parkinson's disease](#), so that early treatment takes place.

Parkinson's disease (PD) is a degenerative, progressive disorder which leads to a significant reduction of nerve cells, especially dopamine neurons which are involved in movement initiation, in the brain's area called substantia nigra.

For several years, the reason for losing these nerve cells was said to be due to the toxic accumulation of the protein alpha-synuclein. However, in the last 15 years, researchers have been looking into the relationship between the risk of having PD and a group of disorders called lysosomal storage diseases - in particular Gaucher disease, which happens due to mutations, leading to the loss of function in the glucocerebrosidase (GBA) gene.

"This means that lipid accumulation may also be important in PD, and scientists have previously shown that there is an elevation of a class of lipids, called glycosphingolipids, in the substantia nigra of patients with PD," said Ole Isacson, professor at Harvard Medical School in the US.

"Recent studies have shown that there is a risk of developing Parkinson's disease in patients with a group of disorders called Lysosomal Storage Disorder (LSD) especially Gauchers Disease, which is caused by bi-allelic mutations in GBA1, the gene that encodes acid beta-glucocerebrosidase. The enzyme glucocerebrosidase leads to the break up of fat and in the absence of this enzyme in childhood fat (lipids) accumulate in the brain. In a subset of patients affected with Gauchers later they develop symptoms of Parkinsons disease," says Dr R.Sureshkumar Professor, Department of Neurology, Amrita Institute of Medical Sciences, Kochi.

Researchers from McLean Hospital in the US and the University of Oxford in the UK worked together for measuring glycosphingolipids levels in the aging brain, using young and old mice. They discovered that the same glycosphingolipids whose levels go up in the brains of Parkinson's disease patients also rise in the brains of aging mice.

"These results lead to a new hypothesis that lipid alterations may create a number of problems inside nerve cells in degenerative aging and Parkinson's disease, and that these changes may precede some of the more obvious hallmarks of Parkinson's disease, such as protein aggregates," said Penny Hallett, lead author of the study published in the journal Neurobiology of Aging.

"This potentially provides an opportunity to treat lipid changes early on in Parkinson's disease and protect nerve cells from dying, as well as the chance to use the lipid levels as biomarkers for patients at risk," Hallett said.

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