Alzheimer's and Parkinson's disease could be cured after scientists reverse symptoms of conditions in new study

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The study successfully reversed symptoms by destroying two chemicals found in the brain of Alzheimer's and Parkinson's disease

A cure for [Alzheimer's](http://www.mirror.co.uk/all-about/alzheimers-disease) and [Parkinson's](http://www.mirror.co.uk/all-about/parkinsons-disease-1) disease is on the horizon after scientists successfully reversed symptoms by destroying two chemicals found in the brain.

The diseases are caused by the degeneration of neurons and cannot be cured.

But scientists who successfully blocked harmful compounds in fruit flies now hope symptoms in humans could also be reversed, since their brains - although much larger - are strikingly similar since they share many of the same [genes](http://www.mirror.co.uk/all-about/genetics).

Dr Carlo Breda, of Leicester University, said: "A key finding of our study is we can improve 'symptoms' in fruit fly models of Alzheimer's and Parkinson's disease by feeding them a drug-like chemical."

The study published in Proceedings of the National Academy of Sciences focused on protecting brain cells lost in Alzheimer's disease and Parkinson's - and could provide a turning point in the fight against the two most common neurological conditions.

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It used the common laboratory fruit fly Drosophila melanogaster in order to explore the role of molecules known as KMO and TMO, which Alzheimer's and Parkinson's patients have a raised level of, leading to a build-up of poisonous proteins.

They also lead to another, much rarer neuro-degenerative disease - Huntington's.

The five year study found that inhibiting the enzymes improved the function of flies genetically engineered to develop the three conditions because of increased levels of a 'protective' chemical known as kynurenic acid.

This counteracts the effects of the toxic metabolites, reports Proceedings of the National Academy of Sciences.

Professor Flaviano Giorgini said: "We are excited by these results as they suggest TDO and KMO inhibition could be a general strategy employed to improve symptoms in a myriad of neurodegenerative disorders - not just Parkinson's and Alzheimer's.

"Indeed five years ago we first showed these manipulations could improve 'symptoms' in Huntington's disease model flies so our next step is to validate our work in mammalian models and ultimately to see if such drugs could be helpful to patients in clinical trials."

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The researchers said KMO and TMO cause damage in an area of nerve cells known as the kynurenine pathway - leading to Alzheimer's, Parkinson's or Huntington's.

Prof Giorgini said: "There's a fine balance between levels of 'good' and 'bad' metabolites that occurs in the kynurenine pathway.

"In disease it shifts towards the 'bad' and by inhibiting TDO or KMO we shift it back to 'good'.

"For example we find if we inhibit either TDO or KMO in Huntington's flies we reduce loss of neurons.

"In Alzheimer's or Parkinson's flies we see extension of the shortened lifespan exhibited by these flies and we also reverse the defects they have in movement.

"We have even used a drug-like chemical to inhibit TDO and found this also alleviates 'symptoms'."

Dr Breda said: "There's considerable interest in developing drugs that 'turn down' these enzymes so our hope is our work could lead to drugs to treat these devastating disorders in the future.

"Neurodegenerative disorders are devastating diseases with limited treatment options. The major risk factor for these diseases is ageing - and as our society is becoming longer lived we're facing dramatic increases in the number of individuals suffering from these disorders."

Professor Giorgini, of the internationally acclaimed Department of Genetics at Leicester, said: "Our research is focused on better understanding the mechanisms that contribute to onset and progression of disease symptoms in neurodegenerative disorders.

"These are diseases in which specific populations of nerve cells within the brain die, leading to severe problems in movement and cognitive deficits in patients.

"The two most common neurodegenerative disorders worldwide are Alzheimer's and Parkinson's disease. The treatment options for these diseases are limited, and to date no cures exist.

"Our hope is that by improving our knowledge of how these nerve cells become sick and die in the brain, we can help devise ways to interfere with these processes, and thereby either delay disease onset or prevent disease altogether."

Claire Bale, a spokesperson for Parkinson's UK, said: "Parkinson's is a progressive neurological brain condition with symptoms emerging when 70% of nerve cells in the brain have been lost.

"Unfortunately current treatments are only able to tackle the symptoms of the condition but cannot slow or stop the degeneration of these cells.

"This research which focuses on protecting brain cells - such as those lost in Parkinson's - by targeting proteins in the kynurenine pathway could provide a turning point in the fight against this condition - which currently has no cure.

"There's a lot of potential in harnessing the power of protective proteins to prevent brain cell loss and Parkinson's UK is exploring this by investing in a clinical trial of GDNF, a protein which may also support the survival of brain cells.

"Research such as this continues to help open doors to further discoveries into treatments which one day could tackle the underlying cause of the condition which affects 127,000 people in the UK."

Alzheimer's disease affects about 850,000 people in the UK.