MedicalXpress

Cold sore virus linked to Alzheimer's

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(PhysOrg.com) -- The virus behind cold sores is a major cause of the insoluble protein plaques found in the brains of Alzheimer's disease sufferers, University of Manchester researchers have revealed.

They believe the herpes simplex virus is a significant factor in developing the debilitating disease and could be treated by antiviral agents such as acyclovir, which is already used to treat cold sores and other diseases caused by the herpes virus. Another future possibility is vaccination against the virus to prevent the development of the disease in the first place.

Alzheimer's disease (AD) is characterised by progressive memory loss and severe cognitive impairment. It affects over 20 million people world-wide, and the numbers will rise with increasing longevity. However, despite enormous investment into research on the characteristic abnormalities of AD brain - amyloid plaques and neurofibrillary tangles – the underlying causes are unknown and current treatments are ineffectual.

Professor Ruth Itzhaki and her team at the University's Faculty of Life Sciences have investigated the role of herpes simplex virus type 1 (HSV1) in AD, publishing their very recent, highly significant findings in the *Journal of Pathology*.

Most people are infected with this virus, which then remains life-long in the peripheral nervous system, and in 20-40% of those infected it causes cold sores. Evidence of a viral role in AD would point to the use of

antiviral agents to stop progression of the disease.

The team discovered that the HSV1 DNA is located very specifically in amyloid plaques: 90% of plaques in Alzheimer's disease sufferers' brains contain HSV1 DNA, and most of the viral DNA is located within amyloid plaques. The team had previously shown that HSV1 infection of nerve-type cells induces deposition of the main component, beta amyloid, of amyloid plaques. Together, these findings strongly implicate HSV1 as a major factor in the formation of amyloid deposits and plaques, abnormalities thought by many in the field to be major contributors to Alzheimer's disease.

The team had discovered much earlier that the virus is present in brains of many elderly people and that in those people with a specific genetic factor, there is a high risk of developing Alzheimer's disease.

The team's data strongly suggest that HSV1 has a major role in Alzheimer's disease and point to the usage of antiviral agents for treating the disease, and in fact in preliminary experiments they have shown that acyclovir reduces the amyloid deposition and reduces also certain other feature of the disease which they have found are caused by HSV1 infection.

Professor Itzhaki explains: "We suggest that HSV1 enters the brain in the elderly as their immune systems decline and then establishes a dormant infection from which it is repeatedly activated by events such as stress, immunosuppression, and various infections.

"The ensuing active HSV1 infection causes severe damage in brain cells, most of which die and then disintegrate, thereby releasing amyloid aggregates which develop into amyloid plaques after other components of dying cells are deposited on them."

Her colleague Dr Matthew Wozniak adds: “Antiviral agents would inhibit the harmful consequences of HSV1 action; in other words, inhibit a likely major cause of the disease irrespective of the actual damaging processes involved, whereas current treatments at best merely inhibit some of the symptoms of the disease.”

The team now hopes to obtain funding in order to take their work further, enabling them to investigate in detail the effect of antiviral agents on the Alzheimer’s disease-associated changes that occur during HSV1 infection, as well as the nature of the processes and the role of the genetic factor. They very much hope also that clinical trials will be set up to test the effect of antiviral agents on Alzheimer’s disease patients.

Paper: The paper ‘Herpes simplex virus type I DNA is located within Alzheimer’s disease amyloid plaques’ by MA Wozniak, AP Mee and RF Itzhaki is available at www3.interscience.wiley.com/cg … /121411445/HTMLSTART

Provided by University of Manchester