**Why women are at greater risk of Alzheimer's than men: The wiring of the female brain is 'more prone to damage'**

* **Women are at greater risk of being diagnosed with dementia, studies found**
* **New research is first to explain why females are more likely to develop Alzheimer's disease - most common form of dementia**
* **Scientists say female brains are 'more prone to damage' than male brains**

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**PUBLISHED:** 01:00, 17 March 2016 | **UPDATED:** 04:38, 17 March 2016

Women are at greater risk of developing Alzheimer's disease because the wiring of the female brain is more prone to damage, experts today revealed.

It has long been known that the female of the species are more likely to be diagnosed with dementia as their male peers.

But, a new study, is the first to explain why that is the case.

The discovery offers hope of new drugs targeting a protective sheath that boosts communication between neurones, scientists at Nanyang Technological University, Singapore, said.

There are currently 5.4 million Americans who suffer from Alzheimer's disease, while 850,000 in the UK are battling dementia.

Researchers examined post-mortem brain tissue from five male and five female patients, and compared them to 10 healthy controls to investigate the dementia gender gap.

They focused on a process called degenerative protein modifications (DPMs) - changes believed to cause a loss of brain function.

Analysis revealed the protein most affected was myelin basic protein (MBP), which insulates the brain's wiring, producing the protective layer covering the signal-transmitting 'axons' of nerve cells.

Damage to myelin was shown to be more pronounced in the brains of the women than the men.

Professor Sze Siu Kwan said: 'As DPMs are likely to critically influence protein function and activity in the central nervous system, they can be novel drug targets for treatment of dementia.'

Past research has shown women suffering from mild cognitive impairment - a precursor to dementia - appear to go downhill at twice the rate as men.

Furthermore, studies have shown women are more susceptible to developing dementia in the first place.

Figures presented at the Alzheimer's Association's Annual Conference in Washington showed around two thirds of older people living with Alzheimer's are women.

At the age of 65 they have a one in six chance of developing Alzheimer's disease compared with a one in 11 chance for men.

But the underlying mechanisms of this gender difference have remained elusive - until now.

Axons are part of the brain's white matter which transmit signals between neurons and myelin provides an electrically insulating layer around them - similar to the insulation around an electrical wire.

Damage to this can stop electrical impulses from being conducted properly, disrupting communication between different parts of the brain.

Professor Kwan said: 'The number of dementia patients is projected to triple by 2050 and there is an urgent need to identify key mechanisms of how dementia develops.

'Our findings and further study could have direct implications for our knowledge about the progression of dementia that could lead to the development of drugs for treatment of dementia.'

The study published in Molecular Brain used a technique called proteomics to examine altered protein levels to identify changes in the temporal lobe, which is involved in visual memory and the understanding of language.

The researchers scanned thousands of proteins to detect changes in the 'power plants' of cells - known as mitochondria - among the dementia patients.

Disturbance to the proteins in the mitochondria was also more pronounced in women than men.

Study co-author Xavier Gallart-Palau, a PhD student, said: 'The findings of this study indicate proteomics can detect differences between male and female dementia patients on a molecular level which cannot be detected by standard approaches.'

The findings also provide new insight into the molecular basis of increased risk and severity in women suffering from dementia.

They could be a step towards future clinical interventions targeted at reducing dementia risk in both men and women.

Dr Heather Snyder, director of medical and scientific operations at the Alzheimer's Association, told the conference in July: 'Women are disproportionately affected by Alzheimer's and there's an urgent need to understand if differences in brain structure, disease progression and biological characteristics contribute to higher prevalence and rates of cognitive decline.

'To intervene and help reduce the risk of Alzheimer's it's critical to understand the reason for these differences.'