

SCIENTISTS DISCOVER WHERE + HOW ALZHEIMER'S BEGINS IN THE BRAIN, PROMPTING HOPE OF EARLIER DIAGNOSIS + TREATMENT

- Starts in brain's 'default mode network' – area that's active even as we daydream
- Currently, drugs are given when disease has already taken hold and it's too late
- Now experts say the finding could help halt the devastating illness earlier
- Scientists know the process begins up to 20 years before symptoms develop
- Ageing population will drive numbers to soar further over coming decades

Scientists believe they have identified the where Alzheimer's disease begins in the brain – sparking hopes for a cure for the devastating illness.

They say it is in the brain's 'default mode network' – an area that remains active when we are apparently idle.

Neurons are triggered here when we are daydreaming or thinking about the past or future.

One of the reasons so many drug trials have failed is patients are given them when their condition has already taken hold and it is too late for them to work.

Now it is hoped the discovery will bring earlier diagnosis and treatment.

In the US, Alzheimer's affects more than five million, while 850,000 suffer in the UK. An ageing population is expected to drive numbers to soar further over the coming decades.



It's hoped the discovery of where Alzheimer's disease begins will bring earlier diagnosis and treatment (stock photo)

'A big piece of the puzzle'

In Alzheimer's, the initial changes occur through a build up of the protein beta amyloid.

It gathers into clumps, destroying brain cells and leading to memory loss and confusion.

But scientists now know the process begins up to 20 years before the first symptoms develop.

Giving patients medications sooner would increase the chances of delaying the disease for much longer, and may even lead to a cure.

Study author Professor Sebastian Palmqvist, of the University of Lund, Sweden, said: 'A big piece of the puzzle in Alzheimer's research is now falling into place.'

'We previously did not know where in the brain the earliest stages of the disease could be detected.

'We now know which parts of the brain are to be studied to eventually explain why the disease occurs.'

Key findings

Professor Palmqvist's team, whose discovery is published in Nature Communications, say the evidence is convincing.

They found the default mode network is in the inner parts of the brain and is key to being on 'autopilot'.

It allows us to finish tasks quickly and accurately, and is believed to be essential in performing routine tasks.

Abnormalities in it have previously been linked to Alzheimer's, as well as schizophrenia. But it was not known dementia starts there.

The network has several functions in the brain. The researchers said it is most active when we are in an awake but tranquil state, for example when we daydream and are not interacting with the outside world.

The network belongs to the more advanced part of the brain. Among other things, it processes and links information from lower systems.

How the study was carried out

SIMPLE BLOOD TEST THAT COULD PREDICT EARLY ALZHEIMER'S

A simple blood test could help predict someone's risk of Alzheimer's disease in their forties.

Scientists have discovered a warning sign for the devastating condition which appears decades before any memory loss.

This is extreme inflammation – an overreaction of the immune system often triggered in middle age by weight gain, high blood pressure or diabetes.

When more than 1,600 people were given blood tests for five signs of inflammation, those with three or more later showed clear signs of Alzheimer's disease.

In old age, their brains had shrunk five per cent smaller in areas linked to dementia, including the hippocampus or 'memory centre'.

When given a memory test to remember 10 words, they showed signs of that brain damage, remembering only five.

People with no signs of inflammation in middle age were able to remember 5.5 words on average.

The study, led by Johns Hopkins University in the US, offers hopes of an early test for Alzheimer's disease.

The research, which also included professors at the University of Gothenburg and the University of California, was based on data from about people in the US and Sweden at increased risk of developing Alzheimer's.

The brains of all the participants were scanned for two years, and compared to a control group without any signs of the disease.

The difficulty of determining which individuals are at risk of developing dementia later in life, in order to subsequently monitor them for research, has been an obstacle.

So the Swedish and US team developed a unique method to identify, at an early stage, which vulnerable individuals begin to accumulate beta amyloid.

The technique combines cerebrospinal fluid test results with PET scan brain imaging. This provides valuable information about the brain's tendency to accumulate beta amyloid.

In addition to serving as a roadmap for future research studies of Alzheimer's disease, the new results also have a clinical benefit.

Study leader Professor Oskar Hansson, a medical consultant at Skane University Hospital, in Sweden, said: 'Now we know where Alzheimer's begins, we can improve the diagnostics by focusing more clearly on these parts of the brain, for example in medical imaging examinations with a PET camera.'