**Understanding Alzheimer’s: Genetic search uncovers five new genes**

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A leading UK scientist’s search for factors that increase the risk of developing Alzheimer’s has uncovered five new genes to help pinpoint what’s going wrong in the brain.   
  
Professor Julie Williams from Cardiff University’s MRC Centre for Neuropsychiatric Genetics and Genomics has identified an additional five new genes – bringing the total number of genes that increase the risk of developing Alzheimer’s to ten.   
  
"What we did in this study is to follow-up previous work in around 20,000 people with Alzheimer’s and 40,000 well individuals and identified a further five new genes that increase the risk of developing Alzheimer's disease," said Professor Williams, who led the study.   
  
"Through our on-going research we are finding genes that increase a person’s risk of developing Alzheimer's disease, allowing us to pinpoint what may be going wrong, biologically, in the brain," she added.   
  
Published in *Nature Genetics,* the study confirms that Alzheimer’s disease remains a complex condition – it’s not one element going wrong, rather it’s a number of things that are accumulating.

If someone is unlucky enough to get all the elements going wrong in the brain the disease process may be triggered.   
  
However, discovering these five new genes has enabled the team to identify a series of patterns where they are able to tell there is something different about the responses of people with Alzheimer’s disease.   
  
Specifically, they are able to implicate a number of risk factors including: a sufferer’s immune system, the ways the brain processes cholesterol and lipids and for the first time, a process called endocytosis – which, in normal healthy brains removes toxic amyloid-beta protein from the brain.

"What's exciting is the genes we now know of - the five new ones, plus those previously identified – are clustering in patterns," according to Professor Williams.   
  
"So several genes are implicating the immune system, for example - and it's telling us there's something different about the immune system of people who go on to develop Alzheimer's disease.

So their immune response or inflammatory response within the brain is different in Alzheimer's disease.   
  
"Some of the genes are also implicating the processing of cholesterol and lipids in the brain as increasing the risk of developing the disease.   
  
"But what’s most exciting is a new area of research which refers to a process called – endocytosis - which is basically the way a cell brings in big molecules from outside, inside and processes them in a very specific way.   
  
"We now have four genes that implicate this very precise process and it offers a very big clue that this process is playing a strong role in the development of Alzheimer's disease."   
  
This is not the first time Professor Williams and her team have made such significant gene discoveries.

In 2009, she led the largest genetic investigation of Alzheimer's ever conducted, which involved analysing the DNA from more than 16,000 individuals over two years which uncovered new genes closely linked to the illness.   
  
Professor Williams adds: "This study, plus our previous studies, means that we are beginning to piece together the pieces of the jigsaw and gain new understanding.

We still have a long way to go – but the jigsaw is beginning to come together.   
  
"If we were able to remove the detrimental effects of these genes through treatments, we hope we can help reduce the proportion of people developing Alzheimer's in the long-term."   
  
*Common Variant at ABCA7, MS4A6A/MS4A4E, EPHA1, CD33 and CD2AP are associated with Alzheimer’s disease* is published in *Nature Genetics* **(Embargo: 18.00 (GMT) Sunday 3rd April, 2011)** and is funded by the Wellcome Trust, Medical Research Council, Alzheimer’s Research UK and the Welsh Assembly Government.   
  
Rebecca Wood, Chief Executive of Alzheimer’s Research UK said: "UK scientists are leading the field in our understanding of the genetics of Alzheimer’s.

These findings are a step towards defeating dementia. We are yet to find ways of halting this devastating condition, but this work is likely to spark off new ideas, collaborations and more research.   
  
"UK scientists are making fantastic progress towards defeating dementia and we need to support them all the way. With enough investment in research we can offer hope to the 35 million people worldwide who live with dementia."   
  
Professor Chris Kennard, Chairman of the MRC's Neuroscience and Mental Health Board, said: "Using genetics to understand individual predispositions to disease is a major strategic aim for the MRC.

We support research which addresses the big health issues which occur throughout life, so tackling Alzheimer’s disease is an extremely important area.

These are very exciting findings which, in the long term, we hope will lead to the development of treatments for this debilitating condition."   
  
Dr John Williams, The Wellcome Trust's Head of Neuroscience and Mental Health added: "As our population ages, we will see more and more people affected by Alzheimer's disease.

It is distressing both to patients and their families and places a heavy economic burden on our society.

Understanding the complex processes that underpin the disease will be essential to earlier diagnosis and to developing improved treatments.   
  
"This interesting new study takes a step further along this path."   
  
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**Notes to Editors**

*Common Variant at ABCA7, MS4A6A/MS4A4E, EPHA1, CD33 and CD2AP are associated with Alzheimer’s disease*is published in *Nature Genetics* on the 3rd April 2011. A copy of the paper is available, on request.   
  
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