Am I at risk of developing Alzheimer's disease?

You may be worried that you are at risk of developing Alzheimer's disease, particularly if you have a close relative who has the condition. This information sheet outlines what we currently know about the risks associated with Alzheimer's disease. Research is continuing; some of the results can be found on the Internet.

What is Alzheimer's disease?
Alzheimer's is a progressive disease affecting the brain. As the disease progresses physical changes take place in the structure of the brain. 'Plaques' and 'Tangles' develop in the brain tissue and chemical changes lead to the depletion of key neurotransmitters, the 'messengers' of the brain.
People with Alzheimer's experience a gradual decline in their ability to remember, understand, communicate and reason.

We are not yet sure what causes these changes in the brain. But we do know that it is unlikely that there is a single cause of Alzheimer's. Researchers believe that many factors, including age, genetic background and lifestyle work together, leading to the onset of the disease.

Age
We normally think of Alzheimer's as a disease of older people. While it is possible to develop Alzheimer's early in life, the chances of developing the condition increase dramatically as we get older. One in 50 of those between the ages of 65 and 70 have a form of dementia, compared to one in five of those over the age of 80. The majority of people with dementia have Alzheimer's disease.

At the moment we are uncertain of the relationship between the 'normal' process of ageing and Alzheimer's. Some scientists believe that Alzheimer's is associated with the physical degeneration we all experience in old age. They point out that it is often difficult to distinguish between forgetfulness in old age and mild dementia. Other researchers believe Alzheimer's is a specific condition, separate from the ageing process.

Gender
Women are slightly more likely to develop Alzheimer's disease than men, even when we allow for the fact that women are more likely to live longer. A lack of estrogen in women after the menopause may be one factor in the development of Alzheimer's disease. Recent studies suggest that women who undergo hormone replacement therapy may reduce their chances of developing the disease.

Genetics
Scientists have been aware for some time that our genetic background, the genes we inherit from our parents, may partly determine whether we will develop specific diseases. The role of genetics in the development of Alzheimer's is still not fully understood, but researchers have made some important advances in recent years.

ApoE
Scientists have already identified a protein called apolipoprotein E (ApoE) that, in a particular form, may predispose us to develop Alzheimer's disease. Whether or not we will go on to have Alzheimer's may be dependent on a variety of other factors, including age and possibly lifestyle.

The protein identified, ApoE, comes in three forms, known as ApoE2, ApoE3 and ApoE4. We each inherit two copies of the gene, one from our mother, one from our father. ApoE4 is associated with higher risk of Alzheimer's disease. A 'double dose' of ApoE4 – one from each parent – means that the risk of developing Alzheimer's is increased by ten times. Having one ApoE4 gene increases the risk by about four times. Having ApoE2 means we have a lower risk of developing Alzheimer's disease. ApoE3 is associated with an average risk.

Familial Alzheimer's disease
We also know that there are a few rare cases, associated with early onset Alzheimer's disease, where there is a clear genetic inheritance within specific families. These are families where members inherit genetic faults on chromosomes 21, 14 or 1.

In these cases half of the children of the person with Alzheimer's are likely to have the genetic effect. All those who inherit the gene will go on to develop Alzheimer's. If you are concerned that your family may have one of these genetic faults, consult your GP in the first instance. They may be able to refer you for genetic counseling.

Down's syndrome and Alzheimer's
Researchers have been aware of a connection between Down's syndrome and Alzheimer's disease since the 1940s. People with Down's syndrome, who inherit an extra copy of chromosome 21, develop the same 'plaques' and 'tangles' in their brains as people with Alzheimer's disease. A high proportion of people with Down's syndrome go on to develop Alzheimer's disease at an early age.

Education
People with lower education levels appear to have a higher risk of developing Alzheimer's disease.

It is possible that highly educated people may develop more complex connections in their brains in childhood, meaning they have a reserve capacity to cope with the physical changes to the brain associated with Alzheimer's disease.

Head Injury
People who suffer severe or repeated head injuries – in a car accident, for example – are at increased risk of developing dementia. It is possible that deposits that form in the brain as a result of injury may be linked to the onset of Alzheimer's disease.

Professional boxers often develop a form of dementia known as 'the punch drunk syndrome'.

Environment
Trace levels of many metals have been found in the brains of people with Alzheimer's disease. Aluminium is the environmental agent that has been most often studied and which has received the most publicity. Aluminium is extremely common in our environment and exists in many different chemical forms. Exposure is extremely difficult to measure. Although we know that aluminium is toxic and affects the nervous system, most scientists do not believe aluminium causes Alzheimer's disease.

Lifestyle

Smoking
Until recently researchers suggested that the nicotine in cigarettes might offer some protection against Alzheimer's disease. Nicotine has been shown to act in the same areas of the brain as a key neurotransmitter, acetylcholine, which is depleted in Alzheimer's disease. However, smoking has an extremely harmful effect on the heart, lungs and vascular system. Vascular disease is associated with a form of dementia (see other diseases below)

Alcohol
Although there is no proven direct link between alcohol and Alzheimer's disease, people who drink excessive amounts of alcohol over a long period of time may develop a form of dementia. For more information see the information sheet *What is Korsakoff's syndrome?*

Other diseases

Arthritis
We already know that people who have arthritis are at a lower risk of developing Alzheimer's disease. Researchers are investigating whether the anti-inflammatory drugs that people with arthritis take to control the pain and swelling in their joints may provide some protection against Alzheimer's.

Raised blood pressure and vascular disease
Scientists have found that raised blood pressure and higher levels of what are known as ‘lipids’ (a form of fat found in the blood) in midlife are also associated with a doubling of the risk of dementia in later life. We know that diseases of the heart, lungs and circulation can lead to dementia. When the blood supply to the brain is impaired – as a result of a stroke, for example – the structure of the brain may be damaged, leading to a form of dementia called ‘vascular dementia’.

Researchers are now highlighting possible connections between vascular disease and Alzheimer’s.