

## **ALZHEIMER'S DISEASE**

### **Alzheimer's Disease (AD)**

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Alzheimer's Disease (AD) is a neurodegenerative disease that causes a deterioration of the brain functions especially in the areas associated with memory and cognition. AD is a form of dementia representing 60 to 80 percent of all dementia cases. The risk of acquiring AD genetically is less than 10% while the remaining 90% of cases, the trigger for developing this disease is unknown.

Historically, this disease was initially identified and characterised by a German psychiatrist and neuropathologist, Alois Alzheimer in 1901 began observing a 51 year old female patient named Auguste Deter who was suffering from severe memory loss and cognitive dysfunction. After she passed away in early 1906, he performed a brain autopsy and he used new staining techniques to identify the presence of structures called amyloid plaques and neurofibrillary tangles in the brain. He presented his findings to a scientific meeting later that year but it wasn't until around 1911 that doctors began using his name to describe patients presenting with the same symptoms. The protein that is largely present in these amyloid plaques was not identified till many years later in 1985 by an Australian pathologist, Colin Masters and his German colleagues, Gerd Malthaup and Konrad Beyreuther. They purified the amyloid plaques from human brains and they found that it was predominantly composed of a single protein containing at least 40 amino acids and they called it, beta amyloid. For many years, it was proposed that these large amyloid plaque structures were toxic and killing the brain cells to cause this disease. However, scientists are now in agreement that smaller structures termed oligomers are the toxic species that is responsible for killing brain neurons and causing this disease. However, the precise mechanism of how this small molecule kills the brain cells is currently being investigated by many research laboratories. There are many hypothesis and as a result, many scientists have developed different drugs or different treatment strategies to treat this disease but unfortunately, the best drugs available today are only marginally beneficial to some patients.

A large stumbling block for finding a cure for this disease is the lack of good diagnostic testing for this disease. There is no universally accepted blood test to characterise this disease. Diagnosis for AD is largely based on a number of psychiatric memory and cognitive function tests. In recent years, scientists have developed new and better brain imaging machines and dyes which can enter the brain and attach to the brain amyloid plaques and this allows the radiologist to detect the presence of these plaques in brains. The cost of performing these brain scans for routine diagnostic testing is currently too expensive to make is available to the clinic. It is being used as a tool to screen patients for clinical drug trials which is a good step. Importantly, it is being used to help identify clinically relevant super control patients. A problem with lots of clinical drug trials in the past have been the selection of clinically normal people into drug trials that end up developing early stages of the disease and therefore potentially affecting the interpretation of the drug trial results. Other potential problems with trying to find a cure for this disease is that patients who are recruited to the drug trials have late stage AD and the amount of brain associated damage is quite difficult to reverse or even stop. Because we can now better screen AD subjects, new strategies are being developed to look at treating AD patients who are at the very early stages of the disease and prevent the disease from becoming worse or slowing it down dramatically.

Some of the best methods for slowing the progression of AD is to stay healthy, exercise both physically and mentally on a daily basis. Eat foods that are high in antioxidants such as brocolini and berries, Asians foods that contain turmeric or ginkgo biloa extracts, having low levels of salt and fat in the food, drinking red wine in moderation, and for desert, eating chocolate in moderation.