ALZHEIMER'S DISEASE

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Alzheimer's Disease (AD) is a multifactorial neurodegenerative disease, characterised by progressive decline in cognitive function and memory loss (1,2). One of the first signs exhibited by individuals suspected of AD is an increasing difficulty in remembering recent events and retaining new information. AD sufferers experience difficulties such as loss of orientation, difficulty in performing daily activities, linguistic problems and an inability to retrace steps, etc (3). In Australia, it is currently estimated that approximately 200,000 people are suffering from dementia. This figure is predicted to almost quadruple by 2050 (4). By 2050, the estimated number of AD sufferers in America is predicted to reach 19 million (3). In 2006, it was estimated that there were approximately 26.6 million AD sufferers worldwide (4), and it has been estimated in the Delphi Consensus that the number of people suffering from AD will reached 81.1 million worldwide by 2040 (5).

The global increased incidence in AD means a greater demand for dementia care and a greater economic burden. This increasing demand presents a problem, as the healthcare standard in developing countries is not on a par with that of developed countries, and healthcare is less accessible, especially in rural areas. In addition, people with AD or dementia together with a serious medical condition are more likely to require longer hospitalisation times compared to people with serious medical conditions without AD or dementia (3). AD is currently estimated to be costing $A3.2 billion a year in direct costs to the Australian health system (6). This is estimated to increase to $A6 billion within the next 5 years (6). As baby boomers or people born between 1945 and 1964 (after World War II) age, the strain on existing healthcare will continue to increase exponentially. Thus the need to address, understand, diagnose earlier and possibly provide earlier interventions for AD is only going to become increasingly more important.

Risk factors such as age, apolipoprotein E (APOE) E4 alleles and high cholesterol levels had been associated to the pathogenesis of AD.

Apolipoprotein E (ApoE) is a transport protein of lipids that exist in three isoforms namely E2, E3 and E4. APOE E4 is strongly associated with familial and sporadic late-onset AD. Although the molecular mechanisms underlying how ApoE exerts risk of AD is not understood, there is some evidence to indicate that it plays a role in altering brain lipid metabolism. Sulfatide content in brain tissues had been demonstrated to be modulated and influenced by apoE isoforms (7). Both ApoE E4 (2,8-10), testosterone (11-14) and high cholesterol levels (15-17) have been linked to amyloid-β-peptide (Aβ) metabolism, a major hallmark of AD. Furthermore, Kakio *et al*. showed that lipid rafts act as surface catalysts able to accelerate the aggregation of Aβ, a hallmark of AD (18). Interestingly, an imbalance in phosphatidylinositol 4,5 biphosphate (PIP_2) metabolism has been observed in individuals carrying PS-1 and PS-2 Familial AD mutations (19). These evidences suggested a link between lipid and AD which may be crucial in the early diagnosis of AD.

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