

Brain Tissue Changes in Alzheimer Patients

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Alzheimer's Disease (AD) is a progressive neurodegenerative disease mostly affecting people beyond the age 65. Under rare conditions it also affects younger people causing Early or Younger Onset Alzheimer's Disease. APOE $\epsilon 4$ gene causes early onset of this disease whereas APOE $\epsilon 2$ causes Alzheimer's Disease later in life.

This disease usually begins with mild memory loss and later leads to difficulty in carrying out day-to-day activities. These patients find it difficult to communicate and to respond to the environment. The risk factors associated with Alzheimer's Disease are age, genetics, physical activity, BMI, diet, alcohol consumption and smoking.

Memory loss is common among aged people. International Society For Stem Cell Research has reported that the disease has its origin much earlier in life, possibly during embryogenesis. The only way to differentiate Alzheimer's Disease from other brain related mental illness is through the presence of abnormal clumps called β -amyloid plaques and tangled bundles called tau tangles. These causes damage to the brain tissues leading to the loss of cell-to-cell communication. People with Down Syndrome are at the higher risk of developing Alzheimer's Disease as they carry APP gene which leads to the build up of β -amyloid plaques in the brain.

Earlier this disease was detected only through autopsies. At present, with advancement in technologies, β -amyloid plaques and tau proteins can be detected through Biomarkers, PET Scans, MRI, certain blood and CSF tests.

Treatment includes use of Cholinesterase inhibitors which facilitates cell-to-cell communication thereby improving behavioural changes in patients. Cholinesterase inhibitors along with Memantine reduces the progression of the disease. In 2023, FDA has approved an effective immunotherapy drug, Lecanemab (Leqembi) which has been said to dissolve β -amyloid plaques and tau proteins. Ongoing researches are done in the field of Gene Silencing drugs.

A study in Maryland, published in the Journal of Alzheimers has highlighted the importance of maintaining brain health in older people. Walking, jogging and other physical activities should be done on daily basis to maintain physical and mental health