

into four parts, is to investigate two pronounced abnormal structures of the Alzheimer brain — neurofibrillary tangles and neuritic plaques — to determine what these structures are made of and how they are formed, according to George Merz, one of the principal researchers.

Tangles and plaques are found in a normal aged brain, but are more numerous in an Alzheimer brain.

Researchers have found a strong correlation between the number of tangles and plaques and the degree of dementia in an Alzheimer brain. By focusing on the two structures, scientists hope to uncover clues in determining the cause of the disease, Merz said.

The first part of the project, "Analysis of Amyloid Fibers In Neuritic Plaques," will be directed by David Miller, chief of the molecular biology department at the institute. An accumulation of amyloid protein is found in plaques located outside a cell.

Miller will attempt to determine whether amyloid protein is related to other proteins found in the brain. One question he is asking is: Is amyloid a normal protein that has been altered or does it originate from another source, such as an abnormal cell?

The second part, "In Vitro Studies of Amyloid-Associated Cells," led by Merz, head of the nerve cell tissue culture laboratory, will focus on whether microglia cells, believed to be responsible for producing amyloid, are indeed forming the amyloid protein.

"Pathogenesis of Neurofibrillary Tangles," is the third part, headed by Inge Grundke-Iqbal, head of the neuro-immunology lab. She will create monoclonal antibodies, or specific antibodies selected to strike a specific location, which react with pathological filaments (PHF) found in neurofibrillary tangles.

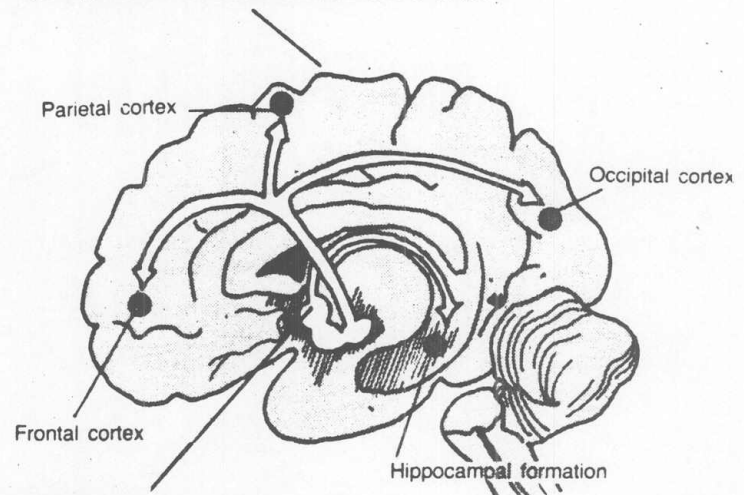
These filaments, or proteins, occur in a normal aged brain, but are much more numerous in an Alzheimer brain.

Alzheimer's disease

Alzheimer's disease is characterized by progressive mental deterioration. Symptoms typically first appear in persons in their 40s. Loss of memory of events occurring minutes earlier is usually the first symptom. Patients may lose the ability to read, write, calculate or use language appropriately. Other possible symptoms are irritability, paranoia and hallucinations.

Cortex

Parts of the cortex are involved in language, memory and the senses. Alzheimer's disease reduces the chemical messengers from the basal forebrain to the cortex.



Basal forebrain

Contains nerve cell bodies that produce acetylcholine, chemical brain messengers important for thought processes. In Alzheimer's disease, these cell bodies selectively degenerate.

Chicago Tribune Graphic. Source: Science

The fourth part, "Ultrastructural Analysis of PHF," conducted by Patricia Merz, research scientist in the department of pathological neurobiology, will attempt to distinguish the proteins trapped by the tangle and other protein that make up the fiber.

Fourteen full-time scientists, including eight from the institute and six outside scientists, four of whom are from Staten Island, will work on the project. The institute employs 290 researchers — 220 are state employees and 70 are on federal or private grants.

About half of the grant will be spent on salaries for the outside experts and fringe benefits for researchers of the institute. The rest will be used to buy equipment, such as microscopes, incubators and chemicals.

The Institute for Basic Research in Developmental Disabilities is the only research center for the state Office of Mental Retardation and Developmental Disabilities.

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