Understanding, Preventing, Diagnosing, and Treating Alzheimer's Disease: Alzheimer's Disease Neuroimaging Initiative (ADNI)

Neuroimaging Initiative is a major public-private partnership to determine whether sophisticated imaging technologies, other biological markers, and other assessments can improve our understanding of the progression of mild cognitive impairment and Alzheimer's disease and in turn facilitate the efficiency of clinical trials.

Lead Agency: National Institute on Aging (NIA)/National Institutes of Health (NIH)

Agency Mission:

- Support and conduct genetic, biological, clinical, behavioral, social, and economic research related to the aging process, diseases and conditions associated with aging, and other special problems and needs of older Americans.

- Foster the development of research and clinician scientists in aging.

- Communicate information about aging and advances in research on aging to the scientific community, health care providers, and the public.

Principle Investigator:

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Partner Agencies:

National Institute of Biomedical Imaging and Bioengineering (NIBIB)
Food and Drug Administration
Foundation for the National Institutes of Health
Pfizer Inc.
Wyeth Research
Eli Lilly and Company
Merck & Co. Inc.
GlaxoSmithKline
AstraZeneca AB
Novartis Pharmaceuticals Corporation
Eisai Global Clinical Development
Elan Corporation plc
Institute for the Study of Aging (ISOA)
Alzheimer's Association

General Description:

Alzheimer's Disease Neuroimaging Initiative (ADNI)
In October 2004, the National Institute on Aging, in conjunction with several other federal agencies, private companies, and organizations, launched the Alzheimer's Disease Neuroimaging Initiative (ADNI) to test whether serial magnetic resonance imaging (MRI), positron emission tomography (PET), other biological markers, and clinical and neuropsychological assessment can be combined to measure with greater sensitivity the progression of mild cognitive impairment (MCI) and early Alzheimer's disease (AD). The study could help researchers and clinicians develop new treatments and monitor their effectiveness as well as lessen the time and cost of clinical trials. The project is the most comprehensive effort to date to find neuroimaging and other biomarkers for the cognitive changes associated with MCI and AD. The study, which is taking place at 57 sites across the United States and Canada, began recruitment in April 2005. Approximately 800 individuals ages 55 to 90 are participating over the five years of the study.

Nearly three years into the study, ADNI continues to be a major venue for facilitating neuroimaging research relevant to AD. Early results from ADNI show that, in addition to aiding early diagnosis, researchers may be able to reduce the time and expense associated with clinical trials by improving methods and developing uniform standards for imaging and biomarker analysis. For example, one ADNI study found that a standard physical model can be used successfully to monitor performance of MRI scanners at many different clinical sites. This will help ensure accuracy of the MRI images produced from ADNI volunteers. Investigators on another ADNI study compared changes over time in PET scans of brain glucose metabolism in people with normal cognition, mild cognitive impairment, and AD and found that scans correlated with symptoms of each condition and that images from different clinical locations were consistent across sites, suggesting the validity of PET scans for use in future clinical trials.

An important achievement of ADNI is the creation of a publicly accessible database available to qualified researchers worldwide. The database contains thousands of MRI and PET scan brain images and clinical data and will include biomarker data obtained through blood and cerebrospinal fluid analyses. ADNI includes samples and brain scans from 200 people with Alzheimer's, 400 people with mild cognitive impairment, and 200 healthy people. All volunteers are between ages 55 and 90. Confidentiality of the participants is rigorously protected. To date, over 200 researchers have signed up for database access.

Excellence: What makes this project exceptional?

This five-year study is the most comprehensive to date to identify brain and other changes associated with cognitive decline in mild cognitive impairment and Alzheimer's disease. In addition, the Alzheimer's Disease Neuroimaging Initiative is the largest public-private partnership on brain research at NIH and represents an innovative model for other such efforts in the sciences.

Significance: How is this research relevant to older persons, populations and/or an aging society?

As many as 4.5 million Americans currently suffer from AD. Many more suffer from MCI, a precursor condition. Results from the Alzheimer's Disease Neuroimaging Initiative could help researchers and clinicians develop new treatments and monitor their effectiveness as well as decrease the time and cost of clinical trials.

Effectiveness: What is the impact and/or application of this research to older persons?

Early work through the Alzheimer's Disease Neuroimaging Initiative has addressed the "nuts-and-bolts" of clinical imaging research technologies that have the potential to improve methods and decrease time and expense related to clinical trials. Final results are not yet available from the ongoing ADNI clinical study, but we anticipate that the results will have a tremendous impact on our understanding of AD and the best ways to monitor and treat it.

Innovativeness: Why is this research exciting or newsworthy?

The Alzheimer's Disease Neuroimaging Initiative is the largest, most comprehensive study to date to identify brain and other changes associated with cognitive decline in MCI and AD. The study has already begun to identify ways to reduce the time and expense associated with clinical trials and is expected to provide a wealth of information about cognitive impairment and AD.