The world’s leading Alzheimer’s disease (AD) clinical researchers wrapped up the fifth international conference in Clinical Trials on Alzheimer’s Disease (CTAD) today in Monaco after identifying several pathways to possible interventions. In particular, a pair of complementary and dynamic talks centered around the phase III clinical trials of the compounds bapineuzumab (Pfizer) and solanezumab (Eli Lilly) resulted in some consensus on the path forward in Alzheimer’s disease (AD) research and interventions.

Opening CTAD on Monday, U.S. Food and Drug Administration (FDA) Director Russell Katz, MD, of the Division of Neurology Products in the Center for Drug Evaluation and Research clarified FDA’s willingness to consider evidence of cognitive improvement. Dr. Katz suggested that FDA would take a close look at compounds with evidence of both a cognitive and a biomarker impact in certain instances may be enough for the FDA to make regulatory decisions regarding clinical trial and/or clinical use of AD-related interventional compounds.

On a separate but related track, the European Medicines Agency (EMA) discussed new guidance on the use of both amyloid imaging and cerebrospinal fluid (CSF) biomarkers for enriching subject selection in clinical trials. Both of these agencies are working closely with industry partners, academic researchers, advocacy and interest groups to harmonize regulatory requirements. The increasing importance of biomarkers and neuroimaging makes harmonization and standardization of protocols ever more important.

The Bapinezumab and Solanezumab Data

Presentations at CTAD indicated that despite recent disappointing overall results in high profile AD trials, intriguing clues have emerged from recent trial data that may elucidate pathogenic mechanisms and inform the design and execution of future trials as well as the decisions by regulatory agencies regarding approval of drugs. In this regard, a few of the CTAD presentations were particularly compelling including a symposium with presentations by Paul Aisen, MD (UCSD), Director of the Alzheimer’s Disease Cooperative Study (ADCS), and Reisa Sperling, MD (Harvard University/BWH) on the solanezumab and bapineuzumab trials.

Dr. Aisen reviewed the independent ADCS raw data analysis of the solanezumab trial. Solanezumab slowed down the rate of cognitive decline in patients with mild AD by about 34%; however, it did not slow down the rate of decline on functional scales. In looking at subjects who had positive amyloid PET scans, there was a statistically significant change in total beta-amyloid in CSF.
Both of these findings are exciting and indicate that the anti-beta amyloid drug has a statistically significant effect on cognition and on a biomarker of AD; a first in AD research.

In an earlier CTAD session, Dr. Sperling presented additional data from the bapineuzumab Phase 3 clinical trial, which recently reported a failure to meet clinical endpoints. (Meaning it did not show any benefit in efficacy compared to placebo.) However, she pointed out that bapineuzumab did lower beta-amyloid levels in the brain.

In the symposium with Dr. Aisen, Dr. Sperling discussed results from both the bapineuzemab and solanezumab trials and provided a presentation of what the results of these two studies really mean. Dr. Sperling offered her observation that the next step for solanezumab will most likely include a confirmatory trial. The researchers are optimistic about its chances given the fact that there was significant effect in cognition and biomarkers.

**Harmonization, Biomarkers and Compounds**

**Selecting subjects for presymptomatic trials**

As the focus of AD drug development moves increasingly to the presymptomatic stages of the disease, it has become essential to identify people who are on track to develop AD so that trials can be enriched with subjects likely to show benefits from treatment within a relatively short period of time. Measures of brain shrinkage and cognitive decline are commonly used to differentiate individuals on the AD trajectory from those with normal brain aging. However, a study presented at CTAD by Dominic Holland, Ph.D. from the University of California, San Diego, showed that it may be difficult to distinguish AD from normal aging in the oldest old, since clinical decline and brain atrophy tend to slow with advanced age in individuals with MCI and AD, but speed up in healthy controls. “If you are interested only in having power to detect change, the younger the cohort the better, but if you develop a therapy you want to know how well it is tolerated by various age groups, so you would want to enroll older people,” said Dr. Holland.

Dr. Holland also presented data showing that while rates of change in measures of regional brain atrophy and cognitive performance are high enough in the MCI phase of the disease to detect a statistically significant effect with a reasonably sized trial over a reasonable time period, there can be significant gains (i.e., smaller numbers of subjects needed) by selecting those likely to be at elevated risk for AD based on cerebrospinal fluid (CSF) levels of the AD-relevant proteins beta-amyloid and tau, or baseline measures of regional brain atrophy. However, in cognitively normal individuals, even those showing biomarker signs of being at elevated risk for presymptomatic AD, structural and cognitive rates of change are too low to adequately power a trial of standard duration. These findings mean that long natural history studies of AD are needed to understand the biomarker changes that precede dementia, said Dr. Holland.

**Trial Shows Benefits from Multi-Domain Intervention**

Professors Bruno Vellas, Thierry Voisin, and Pierre Payroux from Toulouse University Hospital, and Carole Dufouil from Bordeaux University Hospital, presented data from three imaging sub-studies of the MultiDomain Alzheimer’s Preventive Trial (MAPT). MAPT was set up to test systematically whether a multi-domain intervention that provides nutritional counseling, physical exercise, cognitive stimulation, and social activities, in combination with omega-3 fatty acid supplementation, is effective in slowing cognitive decline in elderly, frail individuals. Results from the imaging studies suggest that the intervention reduced markers of neurodegeneration, although it is too early to tell whether those changes lower the risk of developing AD.

Epidemiologic studies have suggested a role for nutrition, physical exercise, cognitive activities, and social stimulation in maintaining cognitive function. The MAPT intervention trial randomized 1680 subjects to one of four groups: multi-domain treatment plus omega-3 fatty acids, multi-domain plus placebo, omega-3 alone, or placebo alone. Cognitive and functional assessments are conducted at baseline, 6, 12, 24, and 36 months by research staff blind to the intervention received. In addition, subgroups of subjects agreed to undergo imaging studies intended to determine whether the treatment produced a biological effect that could be detected either by a change in brain metabolism, decreased brain shrinkage, or a change in the deposition of amyloid plaques in the brain.

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Brain metabolism was assessed using FDG-PET scans performed at baseline and 6 and 12 months in 34 subjects receiving the multi-domain intervention plus omega-3 fatty acids and another 34 subjects in the non multi domain intervention group, placebo or omega 3 but without physical and cognitive exercise. Hypometabolism in certain areas of the brain has been linked to AD and, when used as a longitudinal measure, is thought to be a marker of neurodegeneration. The results from the MAPT FDG-PET ancillary study support this idea: Those in the treatment group showed significantly higher brain metabolism compared to the placebo group in the pre-frontal region of the brain at both 6 months and 12 months. These results, while preliminary, suggest not only that the multidomain intervention may help protect frail elderly individuals from neurodegeneration, but also support using FDG-PET to monitor treatment effectiveness.

Another subgroup of MAPT subjects participated in a study of florbetapir (Amyvid), an imaging agent that enables the visualization of amyloid plaques in the brain of living individuals. The florbetapir ancillary study of MAPT was designed to examine the association between amyloid deposition and frailty in a subset of 184 non-demented elderly individuals. This analysis revealed that at baseline, nearly 37% of the volunteers had florbetapir uptake levels in the cortex that were considered positive for amyloid pathology. Amyloid positivity was associated with lower cognitive function but not frailty.

The final subgroup included 444 subjects who underwent MRI scans to assess mean intracranial volume, brain parenchymal fraction, and total hippocampal volume. All three measures have been linked to neurodegeneration in AD patients. The goal of the study was to define the relationship between frailty and markers of brain atrophy and whether they might represent a common pathway in AD. Hippocampal volume was significantly correlated with walking speed and repeated chair stands, but there was no such association with global atrophy. Further analyses are planned using additional frailty markers and MRI measures such as voxel-based analysis, cortical morphology, diffusion tensor imaging and functional MRI.

Pr. Vellas said that these studies highlight the importance of considering both frailty and cognitive function in prevention trials. “In clinical practice when an older adult has some kind of physical impairment they are also more likely to become demented. This must be taken into consideration when we do larger studies.”

Moreover, the increasing importance of biomarkers and neuroimaging makes harmonization and standardization of protocols ever more important. Professor Giovanni Frisoni reported the latest results from an international consortium of experts who reached agreement on a protocol for assessing magnetic resonance scans. This protocol is now undergoing validation at multiple worldwide sites. Harmonization of the protocol will ensure that a scan performed in one location can be compared to one performed elsewhere.

There are also efforts to identify new biomarkers of disease as well as more sensitive clinical assessment tools. Karim Bennys reviewed studies assessing event related potentials (ERPs) in early AD. ERP assesses synaptic dysfunction, which is thought to be affected in the earliest stages of the disease. Bennys suggested ERPs may be useful as biomarkers to identify those at risk for AD, predict the transition from MCI to AD, and assess the effectiveness of new treatments.

Meanwhile, the search continues for other drugs that may offer even better efficacy. Merck reported progress on a drug that reduces the level of amyloid in the cerebrospinal fluid (CSF) by inhibiting an enzyme that cleaves the amyloid precursor protein into what are thought to be toxic fragments. In healthy subjects, the drug was well tolerated and reduced CSF beta amyloid by up to 94%. According to Michael Egan, M.D., the drug offers a new approach to test the hypothesis that amyloid is responsible for AD pathogenesis.

Another amyloid-based drug, ELND005 (scyllo-inositol) is being developed by Elan Pharmaceuticals. A post-hoc analysis of data from a phase 2 study suggested that the drug reduces agitation and aggression in individuals with moderate AD. These two neuropsychiatric symptoms are among the most common and disruptive symptoms of AD.
New study suggests memory impairment tied to object perception

A new study from Georgia Tech and the University of Toronto suggests that memory impairments for people diagnosed with early stage Alzheimer’s disease may be due, in part, to problems in determining the differences between similar objects. The findings also support growing research indicating that a part of the brain once believed to support memory exclusively – the medial temporal lobe - also plays a role in object perception. The results are published in the October edition of Hippocampus.

Mild cognitive impairment (MCI) is a disorder commonly thought to be a precursor to Alzheimer’s disease. The study’s investigators, partnering with the Emory Alzheimer’s Disease Research Center, tested MCI patients on their ability to determine whether two rotated, side-by-side pictures were different or identical.

In the high-interference trials, many photos of the same thing (a blob-like object) were shown. The photos varied only slightly when they weren’t a perfect match, either by shape, color or fill pattern. As expected, MCI patients struggled greatly to identify identical pairings.

In the low-interference trials, these blob-like objects were interspersed with trials in which non-matches were more extreme and varied widely. For example, a picture of a butterfly was shown next to a photo of a microwave. Interspersing the very similar blob-like objects with photos of dissimilar objects greatly reduced the amount of interference.

“Minimizing the degree of perceptual interference improved patients’ object perception by reducing the number of visually similar features,” said project leader Rachel Newsome, a University of Toronto Ph.D. student and Georgia Tech graduate.

The findings suggest that, under certain circumstances, reducing “visual clutter” could help MCI patients with everyday tasks. For example, buttons on a telephone tend to be the same size and color. Only the numbers are different – a very slight visual difference for someone who struggles with object perception. One solution could be a phone with varying sized buttons and different colors.

People diagnosed with MCI weren’t the only ones to struggle in the study. The researchers performed the same tests on candidates at-risk for MCI, people who had previously shown no signs of cognitive impairment. They performed the same as those with MCI, suggesting that the perception test could be used as an early indicator of cognitive impairment.

“People often associate MCI and dementia solely with memory impairment,” said Georgia Tech Psychology Assistant Professor Audrey Duarte, one of the study’s authors. “Memory and perception appear to be intertwined in the same area of the human brain.”

Duarte and her colleagues are among the growing number of researchers studying Alzheimer’s who believe damage to a small area of the medial temporal lobes, the perirhinal cortex, affects object perception.

“Not only does memory seem to be very closely linked to perception, but it’s also likely that one affects the other,” said Toronto’s Morgan Barense, the final member of the team. “Alzheimer’s patients may have trouble recognizing a loved one’s face, not only because they can’t remember it, but also because they aren’t able to correctly perceive its distinct combination of features to begin with.”

Continued on next page...
Eliminating Visual Clutter Helps People with Mild Cognitive Impairment continued...

High-Interference Object Perception
In the high-interference trials, many photos of the same thing (a blob-like object) were shown. The photos varied only slightly when they weren't a perfect match, either by shape, color or fill pattern. As expected, MCI patients struggled greatly to identify identical pairings.

Low-Interference Object Perception
In the low-interference trials, pictures of more extreme, widely varied objects were interspersed with blob-like objects (used in high-performance trials). For example, a picture of a plant was shown next to a photo of a radio. Interspersing the very similar blob-like objects with photos of dissimilar objects greatly reduced the amount of interference. Minimizing the degree of perceptual interference improved patients' object perception by reducing the number of visually similar features.

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For More Information Contact
Jason Maderer
Media Relations
maderer@gatech.edu
404-385-2966
Camels Give President Obama’s Alzheimer’s Plan a Lift

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New research in The FASEB Journal suggests that serum from animals such as camels, llamas, and alpacas could enhance brain imaging and help drugs pass through the blood-brain barrier

Bethesda, MD—President Obama's national plan to fight Alzheimer's disease just got a lift thanks to a team of international researchers whose recent discovery may lead to enhanced imaging of and improved drug delivery to the brain. A research report appearing in The FASEB Journal, describes an entirely new class of antibody discovered in camelids (camels, dromedaries, llamas, and alpacas) that is able to cross the blood-brain barrier, diffuse into brain tissue, and reach specific targets. Having such antibodies, which are naturally available, may be part of a "game changer" in the outcomes for people with brain diseases that are poorly diagnosed and treated, at best, using today's tools.

"This basic biological investigation opens new pathways toward innovative therapeutic solutions for intractable diseases such as Alzheimer's disease or brain tumors," said Pierre Lafaye, Ph.D., a researcher involved in the work from the Institut Pasteur, PF: Production de Protéines Recombinantes et d'Anticorps –Proteopole in Paris, France. "The importance of this study is the hope that this novel approach may be a useful tool in crossing the blood brain barrier for diagnostic and therapeutic purposes," added Babette Weksler, MD, Professor of Medicine, Weill Cornell Medical College, New York, NY, another author of the study and editorial board member of The FASEB Journal.

Lafaye and colleagues studied alpacas, a member of the camelid family, and discovered an antibody naturally able to cross the blood brain barrier without chemical modification. Then, additional research showed that after these antibodies entered the brain successfully, they diffused into the brain tissue to reach a target, which in this study was astrocytes. This study shows, for the first time, an antibody penetrated into the brain in vivo, under normal physiological conditions. In addition to the obvious clinical applications of this finding, it opens the doors to new research involving the body's systems for recognizing self v. "nonself."

"Camels may be most famous for helping people travel to the outermost reaches of the desert, but soon they could be also known for helping us reach the innermost parts of our brains," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "It appears that these prized animals are far more capable of helping get to hard-to-reach places than we ever could have imagined."

Contact: Cody Mooneyhan
cmooneyhan@faseb.org
301-634-7104
Federation of American Societies for Experimental Biology

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How Caregivers Can Use Pet Therapy to Care for Their Loved One

By Sherri Snelling

My favorite cartoonist, the late Charles Schulz of *Peanuts* fame, wrote that, “Happiness is a warm puppy.” I wonder if he knew that happiness is just the start when it comes to enhancing the lives of older loved ones in nursing homes or assisted living, terminal patients such as those suffering from AIDS, children with special needs and even caregivers looking to improve their own health. Known as Animal-Assisted Therapy (AAT), there is a growing movement to increase animal/patient interactions for health and wellness benefits.

The notion of pet therapy all began in the 1860s although most of the studies were conducted in the 1980s. While the medical community is still waiting for scientific data that shows pet therapy can have long-term or behavioral change benefits, even famous nurse Florence Nightingale recognized that animals provided a level of social support in the institutional care of the mentally ill over 150 years ago. In an effort to prove the therapeutic benefits of pet therapy, the National Institutes of Health has funded grants to study scientific evidence-based research in therapeutic effects on children.

You may have read about the dogs that can smell cancer in their owner long before a formal diagnosis is made, help calm children who have an epileptic seizure or even bring people out of comas. One story from Pet Partners (formerly known as the Delta Society) is that they were called to visit a terminally ill patient. When the handler arrived with her cat, the patient had slipped into a coma. As the handler put the cat into the bed, the patient suddenly awoke, removed his arms from under the sheets and started to pet the cat. I truly believe animals have special healing powers and a sixth sense. To back up my notion, I read that Dr. Edward Creagan of the Mayo Clinic Medical School observed, “If pet ownership was a medication, it would be patented tomorrow.”

While dogs, cats and rabbits are most commonly used with older patients, dolphins and horses have also proved effective with children with mental health issues, epilepsy, physical disabilities or autism. The biggest benefits of cozying up to a “warm puppy” are:

**Socialization**
Older loved ones often feel isolated whether living alone at home or in a facility such as a nursing home or assisted living. In fact, Human-Animal Interactions published a study of elderly dog owners revealing 75 percent of men and 67 percent of women considered their dog their only friend. Some studies have found that just a few minutes a day petting or visiting with an animal lowers the stress hormone of cortisol and increases the feel-good hormone of serotonin. The results can range from lowered heart rates and blood pressure to decreased depression. For older loved ones still living at home, if they can manage the daily needs of a pet (feeding, walking), some surveys have found that the interaction and companionship of a pet can improve your loved one’s health through increased physical activity and even lower pain levels in some arthritis patients.

*Continued on next page...*
Emotional
Depression in older patients can be common, especially if they recently lost a spouse, received a terminal diagnosis or had to move from the comforts of home. Pet therapy or even a new pet can provide unconditional love, comfort and helps reduce anxiety, particularly noted in nursing home patients.

Many assisted living facilities now have a Pet Care Coordinator to help seniors care for their own pet. If an owner forgets to feed the pet or it becomes too difficult to walk them frequently, the Pet Care Coordinator can help keep pets up-to-date on veterinary visits, grooming and vaccinations. Silverado Senior Living, which includes memory care facilities for Alzheimer’s and dementia care residents, encourages pets in the facility – both privately owned pets and visits from pet therapy organizations. Pet therapy for those with Alzheimer’s or dementia has also proven to be a powerful tool for what is known as “sundowners,” the evening periods where patients become agitated or confused.

Animals have even proven to be valuable members of the hospice team for a terminally ill loved one. There is a famous cat in Providence, Rhode Island known as Oscar who is one of the critical members of the hospice team in the local nursing home. Patients and family members have reported that when Oscar would enter the room, there was a sense of calm—even though Oscar was known by residents as visiting a room when someone was dying. As opposed to a bad omen, Oscar brought comfort and peace to both the patient and their family members. Oscar stays with the patient, sitting quietly in their lap or on their bed where he remains until the loved one has passed.

For children with autism, pets can improve their communication skills, which can often be stressful. Because animals are non-judgmental, special needs kids relax and are able to absorb other benefits during their pet therapy sessions. Animals’ nonverbal communication and profound acceptance can be soothing for those with difficulty using language. Hippotherapy, which is therapeutic horseback riding, is practiced in 24 countries and benefits those with physical, psychological, cognitive, social, and behavioral problems. In fact, the American Speech and Hearing Association now recognize hippotherapy as a treatment method for individuals with speech disorders. While some benefit from the connection and the relationship built with the horse, other riders benefit physically from the movements that help build core strength, body awareness and muscle memory.

Pets can also benefit the caregivers. Caregiving can make you feel like you are all alone. While adding a pet to the list of loved ones you have to care for may seem like overload, having that happy face and wagging tail ready to give you some unconditional love when you return home can benefit caregivers as well. Studies have found that caregivers are twice as likely as the general public to develop chronic illness due to the prolonged stress of caring for a loved one. If having a pet can increase your exercise, lower your blood pressure and bring a smile to your face – maybe finding a Lassie, swimming with Flipper, holding Thumper or riding Mr. Ed is just what the doctor has ordered.

Pet therapy organizations
Following are organizations where you can find pet therapy handlers/animals or participate in caregiving pet events:

Pet Partners (formerly Delta Society) Therapy Animal Program trains and screens volunteers with their pets so they can visit patients/clients in hospitals, nursing homes, hospice and physical therapy centers, schools, libraries and many other facilities. The Pet Partners Service Animal Program provides information and resources for people with disabilities, as well as their friends and family, who are considering getting a service animal or who are currently partnered with a service animal.

Continued on next page...
How Caregivers Can Use Pet Therapy to Care for Their Loved One continued...

Pets for the Elderly Foundation matches seniors with cats and dogs by underwriting the pets’ adoptions.

Therapy Dogs Inc. is a national registrar with a listing of more than 12,000 handler/dog teams in U.S. and Canada. The organization provides registration, support and insurance for volunteers who want to provide pet therapy services.

Numerous organizations in local communities, including Pet Therapy, a non-profit organization in Southwest Florida, bring pets into nursing homes for weekly visits with puppies and dogs brought by adult and even child volunteers.

"Reprinted with permission of Sherri Snelling/Caregiving Club

About Blog Author Sherri Snelling

Sherri Snelling, CEO and founder of the Caregiving Club, is a nationally recognized expert on America’s 65 million family caregivers with special emphasis on how to help caregivers balance “self care” while caring for a loved one. She is the former chairman of the National Alliance for Caregiving and her book, A Cast of Caregivers – Celebrity Stories to Help You Prepare to Care will be published by Balboa Press, division of Hay House Publishing in February, 2013. You can find more information at: www.caregivingclub.com.

Find a Clinical Trial

More than 100 research studies pertaining to Alzheimer's and dementias are underway. Alzheimer's Association TrialMatch lets you search these trials quickly and easily. Find a trial.

http://www.alz.org/research/clinical_trials/find_clinical_trials_trialmatch.asp
November is National Alzheimer’s Disease Awareness Month and National Family Caregivers Month

Alzheimer’s Care Team Calendar

“What can I do to help?”

Lotsa Helping Hands powers online caring Communities that help restore health and balance to caregivers’ lives. The service brings together caregivers and volunteers through online Communities that organize daily life during times of medical crisis or caregiver exhaustion in neighborhoods and communities worldwide.

The hallmark of the service is the caregiver-focused Help Calendar, which enables members to schedule and sign up for tasks that provide respite for the caregiver including meals for the family, rides to medical appointments, and visits. Members can also communicate with one another through message boards, post personal blogs, share photos, and send well wishes to the family. And Coordinators can safely store and retrieve vital information for the family – from medical and health records to financial and legal documents.

Now, when someone asks “what can I do to help?” the answer is “give me your name and email address” – the system takes over and allows people to sign up and start helping.

Funding for this Community web site has been underwritten by the Alzheimer’s Immunotherapy Program (AIP) of Janssen Alzheimer Immunotherapy and Pfizer Inc. The content was planned and developed by the Alzheimer’s Association and Lotsa Helping Hands. http://alzheimers.lotsahelpinghands.com/caregiving/home/
New Online Tip Sheets for Alzheimer’s Caregivers

Every day can bring a new change or challenge for caregivers of people with Alzheimer’s disease. Now, practical information and advice is at hand with a new series of online tip sheets from the Alzheimer’s Disease Education and Referral (ADEAR) Center, a service of the National Institute on Aging (NIA).

Based the NIA publication called Caring for a Person with Alzheimer’s Disease: Your Easy-to-Use Guide from the National Institute on Aging, the tip sheets offer reliable, easy-to-understand information on a range of issues. They can help caregivers of people at any stage of the disease—mild, moderate or severe.

Topics include managing personality and behavior changes, coping with agitation and aggression, daily activities, managing medicines, helping family and friends understand Alzheimer’s, and many more.

To read the tip sheets, visit www.nia.nih.gov/alzheimers/topics/caregiving.

Alzheimer’s Association 24/7 Helpline

The Alzheimer’s Association Helpline, 1.800.272.3900, provides reliable information and support to people with memory loss, caregivers, health care professionals and all others in need of assistance. Trained and knowledgeable staff members answer questions and concerns regarding memory loss, dementia and Alzheimer’s, medications and other treatment options, general information about aging and brain health as well as guide individuals on how to provide quality care and find the best care from professionals. Callers can also seek help with legal, financial and living-arrangement decisions in addition to referrals to local community programs, services and ongoing support.

The Helpline also features confidential care consultation provided by master’s level clinicians who can help with decision-making support, crisis assistance and education. A translation service can accommodate calls in 170 languages and dialects.

Call us for reliable information and support anytime—day or night!
ADNI II Study

The goal of the Alzheimer's Disease Neuroimaging Initiative Study is to learn how to stop the progression of mild cognitive impairment (MCI) and Alzheimer's disease in future generations. Information from the study might, in the future, lead to new treatments.  http://adcs.org/Studies/ImagineADNI.aspx.

Resveratrol for Alzheimer’s is Recruiting

http://www.adcs.org/Studies/RES.aspx

Resveratrol for Alzheimer’s Disease

Nerve Growth Factor Study (NGF)

http://adcs.org/Studies/NGF.aspx

The NGF is a Phase II clinical study of Ceregene's CERE-110, a gene therapy product designed to deliver nerve growth factor (NGF) to the brain for the treatment of Alzheimer's disease (AD) is currently underway. This study is a randomized, double-blind, placebo-controlled trial and employs gene therapy to deliver nerve growth factor (NGF) directly into the brain.

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