

ALZHEIMER'S DISEASE & DOWN SYNDROME RESEARCH INITIATIVE

*To Establish a World-Class Alzheimer's Disease Research & Medical Care Center
with a Sub-Specialty in Down Syndrome in Colorado*



National Institute on Aging – designated Alzheimer's Disease Centers in the United States 2013

There are 27 National Institute on Aging (NIA)-designated Alzheimer's Disease Centers in the United States, but not one within a 600 mile radius of Denver or with a sub-specialty in Down syndrome.

One key benefit to the NIA designation is federal funding of \$1 million dollars a year for five years – a total of \$5 million. A key expectation for NIA designation and funding is matching local funds equivalent to or exceeding the NIA funding.

Global Down Syndrome Foundation's Alzheimer's Disease & Down Syndrome Research Initiative aims to raise \$5 million in order to apply for and leverage matching federal funds. Global has partnered with the University of Colorado's Department of Neurology at Anschutz Medical Campus on this important initiative.

For more information on how you can help, contact Global's development team at development@globaldownsyndrome.org or (303) 468-6669

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Global Down Syndrome Foundation's three focus areas:

1. Local/Regional - Raise \$5 million to establish a world-class Alzheimer's Disease Center with a subspecialty in Down syndrome at the University of Colorado Anschutz Medical Campus.
2. National/International - Raise up to \$500,000 a year in conjunction with the national Alzheimer's Association to fund world-class research specific to the AD-DS connection through a joint national and international competitive grant program.
3. Local/National/International Outreach – Raise awareness about the comorbidity of the two conditions and how people can help by participating in clinical trials, volunteering or donating.

Important questions and answers regarding why this is a priority for Global:

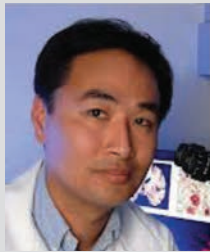
1. Why Alzheimer's Disease?
 - One in eight older Americans suffer from Alzheimer's disease.
 - One in two will suffer from Alzheimer's after 80 years of age.
 - 5.4 million Americans have Alzheimer's disease today with an estimated 13 million by 2050.
 - The devastating effects on the individual and their families.
2. Why Colorado?
 - An estimated 200,000 people in Colorado and adjacent states have Alzheimer's disease.
 - Colorado has the fastest growing number of people with Alzheimer's disease in the lower 48 states.
 - The current societal cost to Colorado and the environs is an estimated \$17 billion per year.
 - University of Colorado has a world-class medical school with a track record of establishing other National Institutes of Health-designated centers. This center is a top priority for the University of Colorado.
3. Why a sub-specialty in Down Syndrome?
 - 100% of people with Down syndrome have the brain pathology of the Alzheimer's disease and an 50% will develop the symptoms before age 50.
 - Down syndrome occurs when a person has three copies of chromosome 21 instead of two copies. People with Alzheimer's disease have three copies of the amyloid precursor Protein gene (APP) and that gene is on chromosome 21.
 - Because there is no other National Institute on Aging-designated Alzheimer's Disease Center with a sub-specialty in Down syndrome, this may contribute to a successful application.
 - **Scientists believe studying people with Down syndrome will lead to better treatments for people with Alzheimer's disease.**



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NEW DOWN SYNDROME-ALZHEIMER'S DISEASE INVESTIGATOR PROGRAM

In 2013, the Global Down Syndrome Foundation, Linda Crnic Institute for Down Syndrome and the national Alzheimer's Association created the Down Syndrome-Alzheimer's Disease Investigator Program. The program has awarded \$1.2 million in grants to 5 scientists to fund groundbreaking research exploring the development of Alzheimer's disease in individuals with Down syndrome. The program aims to translate the research into improved treatments for all people at risk for Alzheimer's.



Huaxi Xu, PhD
Roles of miR-155/C/EBPB/SNX27 pathway in Alzheimer's disease/Down syndrome

Sanford-Burnham Medical Research Institute
La Jolla, CA

One chromosome 21 gene reduces the levels of the SNX27 protein. This protein is low in the brains of people with Down syndrome. Dr. Xu's new studies will determine how SNX27 is involved in Alzheimer's disease accompanying Down syndrome using mice that have been genetically altered to have Alzheimer's-like disease. These studies will help reveal how proteins associated with Down syndrome also promote Alzheimer's-like changes in the brain.



Ann-Charlotte Granholm, PhD
Brain-derived neurotropic factor and executive dysfunction in Down syndrome

Medical University of South Carolina
Charleston, SC

Dr. Granholm will perform experiments to clarify the role of neuron damage in people who have both Down syndrome and Alzheimer's using a Down syndrome mouse model. They will assess how varying activity levels in some neurons affect the production of a hormone-like molecule known to protect brain health and promote memory. The researchers will determine whether this treatment rescues the learning and memory deficits in these mice.



Karen Chang, PhD
Functional protein interactions in Alzheimer's disease and Down syndrome

University of Southern California
Los Angeles, CA

A significant number of individuals with Down syndrome do not develop dementia. Overproduction of one chromosome 21 gene has been shown to promote the creation of toxic beta-amyloid, a key suspect in Alzheimer's disease, but a similarly overproduced protein helps protect against the beta-amyloid. Dr. Chang is working to clarify the mechanism by which this protein protects in fruit flies and in mouse neurons.



Donna Wilcock, PhD
Inflammatory biomarkers to predict transition to dementia in Down syndrome

University of Kentucky Research Foundation
Lexington, KY

Dr. Wilcock has been studying biomarkers of brain inflammation and how they relate to the development of Alzheimer's. She will study the blood of people with Down syndrome to determine if specific protein levels change at the onset of Alzheimer's, and whether these changes correlate with changes in the brain. This may help to identify biomarkers indicating the presence of brain inflammation associated with the onset of Alzheimer's in people with Down syndrome.



Eitan Okun, PhD
Developing a DNA vaccine for Alzheimer's disease in people with Down syndrome

Bar-Ilan University
Ramat-Gan, Israel

Clinical trials have attempted to find a vaccine to slow or prevent Alzheimer's disease, but to date none were successful. Eitan Okun is working to develop a new type of vaccine to remove beta-amyloid, which is a protein fragment that is toxic to nerve cells and forms amyloid plaques, one of the characteristic features of Alzheimer's. His lab will also test mice that have a condition resembling Down syndrome and Alzheimer's to determine if the vaccine restores memory.

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HUNTINGTON POTTER, PhD
**Director of Alzheimer's Disease Research, Linda Crnic Institute
for Down Syndrome, University of Colorado Denver**

In July 2012, the Global Down Syndrome Foundation and the Linda Crnic Institute for Down Syndrome joined forces with the University of Colorado's Neurology Department to recruit **Dr. Huntington Potter** to begin the process of establishing a world-class Alzheimer's disease research and medical care center.

Dr. Potter is a renowned Alzheimer's disease researcher who discovered and is devoted to studying the mechanistic relationship between Alzheimer's and Down syndrome. Recognizing that these conditions are two sides of the same coin and studying them together will hasten the development of new treatments for both.

Prior to joining UC Denver, Dr. Potter studied, researched and taught for 30 years at Harvard University. He received his AB Cum Laude in Physics and Chemistry and his MA and PhD in Biochemistry and Molecular Biology before spending 13 years on the faculty of the Neurobiology Department.

In 1998, he joined the Faculty at the University of South Florida as the Eric Pfeiffer Chair for Research on Alzheimer's Disease. He designed and directed the National Institute on Aging-designated Florida Alzheimer's Disease Research Center at USF and was elected President of the Faculty at the College of Medicine, and President of the USF Tampa Faculty Senate. From 2004-2008, he was CEO and Scientific Director of the Johnnie B. Byrd Sr. Alzheimer's Center & Research Institute, during which time the Institute built the largest free-standing Alzheimer's disease research institute in the world and developed 7 new treatments for Alzheimer's disease in preparation for human trials, before joining USF.

Dr. Potter is credited with the first demonstration of the Holliday intermediate in genetic recombination, the perfection of electroporation for gene transfer, and the discovery of the essential role of inflammation and the amyloid-promoting activity of the apoE-4 protein in Alzheimer's disease. He also discovered that Alzheimer's disease and Down syndrome, which invariably leads to Alzheimer's by age 30-40, are mechanistically related to each other and to cancer through the development of cells with abnormal numbers of chromosomes, which is the focus of his research at UC Denver.

He is author of over 100 scientific articles and books, is the holder of 15 U.S. and foreign patents, has sat on scientific advisory and review committees in academia, industry and government, and has received numerous awards for his work. In 2010, Dr. Potter was elected a Fellow of the American Association for the Advancement of Science. In 2013, Dr. Potter was named a charter fellow of the National Academy of Inventors. His electron micrographs of DNA are on permanent exhibit in the National American History Museum of the Smithsonian Institute in Washington D.C.

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