

Revolutionary project will obtain entire genome sequences in fight against Alzheimer's

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Since 2004, UCLA's Laboratory of Neuro Imaging (LONI) has been responsible for receiving, organizing, archiving and disseminating the stream of data generated by the Alzheimer's Disease Neuroimaging Initiative (ADNI), an ambitious, worldwide effort by scientists to define the progression of Alzheimer's disease.

That stream of data will now turn into a [flood](#), as LONI partners with an ambitious public-private effort to dig deeper into the causes of this devastating [disease](#) by obtaining the whole-genome sequencing of the more than 800 people enrolled in ADNI — the largest cohort of individuals related to a single disease.

This work is expected to generate at least 165 terabytes of new genetic data, an amount roughly equivalent to the information contained in 165,000 entire copies of the Encyclopedia Britannica.

"This effort, involving almost 60 sites around the country, is the best chance we have for understanding this brutal disease," said LONI director Arthur Toga, a UCLA professor of neurology and one of the collaborators on the management of the sequencing efforts. "We collect vast amounts of imaging, cognitive and biosample data from hundreds of subjects with [Alzheimer's](#) disease, those at risk, and controls. One of the more unique aspects of this study is that all data are shared with any scientist, without embargo. We have already engaged many scientists

around the world with this open access."

The new genome project is a significant extension of ADNI, which now enrolls people with Alzheimer's disease, mild cognitive impairment and normal cognition who have agreed to be studied in great detail over time. The goal is to identify and understand markers of the disease with the hope of improving early diagnosis and accelerating the discovery of new treatments.

All of the ADNI data continues to flow into UCLA's LONI, including detailed, long-term assessments of neuropsychological measures, standardized structural and functional imaging, and precise biomarker measures from blood and spinal fluid. Now, added to this wealth of information will be the ADNI participants' entire genome sequences, which determine all 6 billion letters in an individual's DNA in one comprehensive analysis.

Once the sequences are completed — approximately 16 weeks after the sequencing project starts — the raw data will rapidly be made available to qualified scientists around the globe to mine for novel targets for risk-assessment, new therapies and much-needed insights into the causes of Alzheimer's.

All of the information from ADNI has always been made freely available, without delay, to scientists; to date, this has resulted in more than 500 scientific manuscripts.

ADNI is a public–private research project led by the National Institutes of Health with private sector support through the Foundation for NIH. Launched in 2004, ADNI's public–private funding consortium includes pharmaceutical companies, science-related businesses and nonprofit organizations, including the Alzheimer's Association and the Northern California Institute for Research and Education.

The ADNI whole-genome sequencing is being funded through a partnership between the Alzheimer's Association and the nonprofit Brin Wojcicki Foundation, a charitable organization created by Anne Wojcicki, founder of the online genetics firm 23andMe, and her husband, Sergey Brin, co-founder of Google.

"Sequencing the ADNI participants and making the genetic data immediately available to researchers around the world will significantly improve our understanding and approach to Alzheimer's disease," Anne Wojcicki said. "The ADNI team and the Alzheimer's Association are impressive in their ability to quickly make decisions that are truly in the best interest of people with Alzheimer's."

"Linking these deep-sequencing data with imaging and other data may help solve the puzzles in Alzheimer's that still vex us," Toga said.

"Certainly, a more complete picture will emerge, hopefully leading to effective therapies."

Provided by University of California, Los Angeles

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