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MURDOCK Study, brain banks help battle Alzheimer's disease

Duke University offers unique tools for investigators searching for clues to the devastation of memory loss

KANNAPOLIS, N.C.—Nov. 24, 2014—In 1983, President Ronald Reagan designated November as National Alzheimer's Disease Awareness Month. At that time, fewer than two million Americans had Alzheimer's.

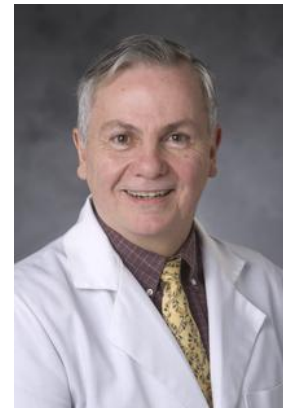
Today, the number of people with this disease, which diminishes the brain's ability to create and recall memories, has soared to nearly 5.4 million.

It's been more than a century since the German physician Alois Alzheimer described this disease in 1906, and progress toward a cure has been slow.

"People often don't realize that Alzheimer's has been difficult to develop treatment for because there are no totally faithful animal models," said James Burke, MD, PhD, professor of Neurology and Medicine at Duke. "Alzheimer's is a uniquely human disease."

Researchers at Duke, however, have access to two unique resources to study dementia: A study cohort of more than 1,500 healthy adults who are willing to have their mental processes studied over time through the MURDOCK Study, and a brain bank of more than 1,200 human brains donated to Duke during the past 25 years.

"These are vital resources for studying Alzheimer's disease because dementia develops so slowly," said Richard O'Brien, MD, chair of Duke's Neurology Department. "These resources give us the opportunity to look at the disease



James Burke, MD, PhD



Richard O'Brien, MD



longitudinally.”

Looking at Dementia Through Time

Duke investigators can study brain functions by tapping into the MURDOCK Study—a long-term medical research project based at the North Carolina Research Campus in Kannapolis. The study has enrolled nearly 11,000 community members in the Cabarrus County/Kannapolis region.

The MURDOCK Study includes a sub-study of about 1,500 enrolled participants with no documented dementia or cognitive decline. These volunteers have agreed to take cognitive tests and give blood samples periodically, providing a time-lapse view of cognitive functioning as well as changes to the body.

“Of all the tools we have at Duke, the MURDOCK Study is the number one asset in our war chest for studying a disease like Alzheimer’s,” O’Brien said. “To learn to cure dementia, we have to learn what is happening before the symptoms become obvious.”

The MURDOCK Study team is also partnering with a local health system to recruit for the TOMMOROW Study—a global clinical trial to determine whether a new medication will delay or prevent the onset of Alzheimer’s in cognitively normal volunteers at high risk for the disease. Duke is one of the largest centers involved in this global study.

Burke and Kathleen Welsh-Bohmer, PhD, director of the Bryan Alzheimer’s Disease Research Center at Duke, have been instrumental in designing the trial and obtaining approval from the FDA.

The investigators have taken advantage of MURDOCK Study personnel’s rigorous quality assurance and data capture methods to compare the results of cognitive screening in Kannapolis and Cabarrus County with the results of similar screening in Tomsk, Russia. This research examines the effects of cultural and environmental differences on test results that try to predict future risk for Alzheimer’s disease. Results will be published later this year.

Banking Brains

In addition to studying brain function over time in living people, Duke investigators have the ability to examine brain tissue after death. The Brain Bank and Biorepository at Duke’s Bryan Alzheimer’s Disease Research Center has been accepting donations of healthy and diseased brains since the 1980s.

Welsh-Bohmer says the ability to combine multiple tools for studying Alzheimer’s is helping move the needle on translational research.



Kathleen Welsh-Bohmer, PhD



Diane Uzarski, RN, MPH



“We continue to accrue new tissues on a monthly basis at the ADRC,” she says. “With this human tissue bank, along with the cohort available through MURDOCK, our progress shows promise for managing Alzheimer’s Disease.”

Before death, many donors participated in tests of memory and other brain functions. This data accompanies the tissue samples, giving investigators a unique glimpse into how the brains functioned before being preserved as fixed and frozen hemispheres, paraffin blocks, or histological slides.

With funding from the School of Medicine and project management assistance from the Duke Translational Research Institute (part of DTMI), the Brain Bank is now a shared resource at Duke, with specimens available to any investigator. As a shared resource, the Brain Bank has a sustainable business plan to protect it from the vagaries of federal funding and support access for researchers at Duke and around the world.

“The effort and resources put into designating the Brain Bank as a core resource reflects the value the School of Medicine places on this incredible collection,” said Diane Uzarski, RN, MPH, associate director of the DTRI Biobanking Program, who shepherded the project to completion.

The MURDOCK Study stands for the Measurement to Understand the Reclassification Of Disease in Cabarrus/Kannapolis. Duke launched the study in 2007 with a \$35 million gift from David H. Murdock, founder and developer of the North Carolina Research Campus and chairman of Dole Foods. To learn more or start the enrollment process for the Community Registry, call 704-250-5861 or visit www.murdock-study.org.