New Technique, revised from page 2

"We adapted it into a five-micron fiber, which is way thinner than a human hair, so it could be implanted into the brain."

The experiment revealed something surprising: One clearance pathway rapidly cleared amyloid beta at higher volumes, resulting in a faster clearance of the molecule, while the other pathway took longer to clear the molecule. However, neither pathway alone cleared the molecule entirely, which suggested that the clearance rates of the molecules were not dependent on the amyloid beta concentration.

"This is important if you’re designing a therapeutic strategy to target the brain, so you would need to consider both pathways.," said Dr. Morris.

Author for Knight ADRC

New Technique Clarifies Methods of Protein Clearance

When you visualize the research, it is like planning a meal, remembering the route to the store – you’re researching a molecule known as amyloid beta, which is a byproduct of their normal functioning. In healthy people, the protein fragment is cleared before it can do any damage. In people with Alzheimer disease, clearance is impaired, and amyloid beta builds up into clumps, known as plaques.

Many of the treatments being studied for Alzheimer’s are designed to reduce amyloid beta in the brain. John Cirrito, PhD, an associate professor of neurology, and Andrea Denny, JD, MSSW, a program coordinator for the Knight ADRC Alzheimer’s Disease Research Center (Knight ADRC), are working to develop a new technique that measures minute-by-minute changes in amyloid beta levels in the brain. Previous techniques allowed measurements only once an hour.

For the last 15 years we had a technique in which we would do something to the mouse – give it a drug, have it perform a certain behavior – and we’d wait for what happened to its amyloid beta levels an hour later,” said Cirrito. “Waiting that long wasn’t good enough. Neural activity happens on a rapid time scale, and we need to see a direct connection between the intervention and the amyloid beta levels.”

The researchers attached antibodies that specifically detect amyloid beta onto a cranial window, dip it with a small amount of collagen and measured the resulting current.

"People have used this approach for other molecules, but the detectors were too small and didn’t work well. Now we have a cranial window, dip it with a small amount of collagen and measure the resulting current.

The experiment revealed something surprising: One clearance pathway rapidly cleared amyloid beta at higher volumes, resulting in a faster clearance of the molecule, while the other pathway took longer to clear the molecule. However, neither pathway alone cleared the molecule entirely, which suggested that the clearance rates of the molecules were not dependent on the amyloid beta concentration.

"This is important if you’re designing a therapeutic strategy to target the brain, so you would need to consider both pathways.," said Dr. Morris.

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To receive a formal Alz-heimer disease diagnosis, [physicians] must meet certain criteria and ask physicians to a neurologist for additional testing and diagnosis. The app replaces the 45 minutes of time spent by the patient with the doctor, usually by asking the patient to try a solution and note the caregiver's questions, and it identifies the plan of action for reducing the risk of the disease.}

In addition to the mobile app, the study is also using an objective cognitive test battery that includes a new test for Alz-

heimer disease research, Center of the Alzheimer’s Association, on aspects of its work and is preparing for a future clinical trial.

The Journal of Alzheimer’s Disease applied bibliometric analysis to identify 100 leading contributors to AD research, published in the last 5 years. Members were rated as a 0 for not an author, 1 for an appointed author, and 2 for a co-principal investigator in the last 5 years, and on to comment on why they arrested an urgent need for new AD treatments and could rapidly recruit AD trial participants. The Johns Hopkins AD investiga-
tors who were recognized: Drs. Maria Carrasco-Fando, MD, PhD, Johns Hopkins University, and Jiri Hanus, MD, PhD, The Scripps Research Institute.

Pastor Douglass Peterson, PhD has been appointed Chair of the American Alzheimer’s Association (AAGA). Beverley C. Black, MD, PhD, will serve as President-Elect of the AAGA, and Richard Harper Thomas and Mary Betty Pollock Polk received grant funding from the Alzheimer’s Association Research Award for their project: Fixing the Broken Clock: Optogene and Brain.”

Dr. John Cirrito, PhD received the 2016 MetLife Promising Investigator Award in Alzheimer Disease, presented July 20, 2016 at the Alzheimer’s Association’s annual conference in Seattle.

Andrea Demm, MD, MSc received a $140K grant from the Alzheimer’s Association for her project: Identification of cell surface TREM-2 ligands involved in Alzheimer’s Disease.

Catherine Rose, PhD was awarded $250K for her project Evaluation of Global Positioning System Data Acquisition at As-

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John C. Morris, MD was appointed as 2016 Hope Center Pilot Award for their project: “Fixing the Broken Clock: Optogene and Brain.”

Sarah Hartz, MD, PhD, the Alzheimer’s Association 2016 Hope Center Pilot Award for their project: “Fixing the Broken Clock: Optogene and Brain.”

Catherine L. Gipson, PhD, DNP, and Dr. H. Ross Horrez, PhD received a 2016 Hope Center Pilot Award for their project: “Fixing the Broken Clock: Optogene and Brain.”

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The Knight ADRC mourns the passing of two key personnel. Bridget Blaes, Research Nurse Coordinator, passed away on July 16, 2016. We are deeply saddened by her loss and will continue to build on her legacy. We extend our deepest condolences to her family, friends, and the Knight ADRC community.

Dr. Michelle Randall, African American Advisory Board Chair, also passed away on July 16, 2016. She was a true leader and inspiration, a supporter, a par excellence in Service to Older Adults from the Friedman Foundation.
To receive a formal Alzheimer disease diagnosis, patients must: (a) be referred to a physician; (b) be evaluated by a caregiver; (c) require ongoing care; (d) have trouble performing daily activities; (e) have cognitive problems; and (f) have a qualified physician diagnose the condition. This is critical because two-thirds of families may wait from several months to one year for an appointment, during which time a patient’s disease can progress. To help shorten this process, the WashU team developed an online assessment tool that is expected to be a valuable resource to help a primary care provider determine if a patient needs to refer the patient for further evaluation. 

All of our research costs are extremely valuable to the work of the Knight Ad- dienzer Disease Research Center. Building on a theme first discussed at our annual Participants’ Breakfast, in June, we now to emphasize the importance of each participant remaining involved over time. It is only when we are also able to change our view (such as in our clinical assessments, cognitive testing, imaging, and analysis of biospecimens such as cerebrospinal fluid) that we can capture the true incidence of Alzheimer disease (AD). We want to detect AD when it first appears, such that initiating interventions at that point, before there is substantial brain damage, holds the promise of delaying or even preventing Alzheimer dementia. Following healthy individuals over time also provides us with the opportunity to note what is “normal” as we age, to underscore the immense value of your partnership in our studies over time.

I appreciate that we ask a great deal from you. I also appreciate that life brings conditions such as an illness or death in the family that has the potential to interfere with our research studies. Most important, I want you to know that I make every effort to understand and accommodate these situations, to help you and your family plan ahead. If you or a family member are facing a medical emergency, please contact us immediately, and we will do our best to accommodate your needs. I am always available to discuss these issues, and will do my best to arrange assessments when you are available to schedule and complete your assessments. In the past year, we will meet more closely to finally defeat this terrible disease.

Many thanks,

John C. Morris, MD
Fayez Sarofim Distinguished Professor of Neurology

WW Students Win $10,000 Award for AD Diagnostic Tool

Mementos, an interdisciplinary team of Washington Uni-
versity students, won $10,000 in a national competition for their mobile app designed to help diagnose Alzheimer’s disease.

The team is one of 10 finalists for the Student Technol-
gy Prize for Primary Healthcare, awarded by the Mas-
sachusetts Institute of Technology. The prize is part of the “Mentorships” competition, which has the goal of encouraging graduating students to develop technologies that will improve the health-care system. The app, named Alzheimer's Memento, uses facial recognition technology to detect signs of Alzheimer’s disease.

The app replaces the 45 minutes of time spent by the current process into which the patient is asked to try to recall a list of words and their corresponding definitions, and so on. The app is designed to make the process shorter and easier for the patient.

The team was founded by members of the Knight Ad- dienzer Disease Research Center, and the development of the app is part of a larger project in the Alzheimer’s Center of Washington University.

The Alzheimer’s Journal of Alzheimer’s disease applied bibliometric analysis to identify 300 highly cited papers relevant to AD research, published in the first 20 years of the field’s existence. The 300 papers were identified as the most influential in the field, and are likely to have significant impact in future research.

The team is composed of WashU medical student Mary Morgan Scott, a computer science; Mary Morgan Sco-
t, a medical student; Hannah Bucklin, a biology major; and King E. Harris, a computer science; and WashU undergraduate Jacob O’Conor, a computer science.

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New Technique, continued from page 1

“The experiment revealed something surprising: One clearance pathway rapidly cleared amyloid beta at higher levels, but a different, slower one became dominant later as the levels dropped. These results contradicted research that Cirrito himself, among others, had published that suggested that the rate of clearance and the relative importance of the different pathways did not depend on the amyloid beta concentration.

“This is important if you’re devising a therapeutic strategy to clear amyloid beta,” said Cirrito.

Participants coming from East will not be in the direct path of construction but should anticipate delays. As always, please allow plenty of time for travel, and drive safely!”

Get the Latest Knight ADRC News!

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Follow us on Twitter: @WUADRC
Find the current list of Knight ADRC weekly seminars online at http://alzheimer.wustl.edu/Education/Seminar.htm

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\[[Image: Horizon2.jpg] \]

Construction Notice: Kingshighway / Forest Park Avenue Intersection Remake

The construction on both the Kingshighway exit ramp and the Forest Park Parkway will be closed for the entire construction period from December 5 and Kingshighway, there will also be traffic restrictions on Kingshighway. As this construction will affect many Memory and Aging Project participants, we have identified some alternate routes that will allow volunteers to access our center while avoiding construction delays. As always, please allow plenty of time for travel, and drive safely!

Options coming from the West:
• Take Forest Park Parkway to right on Skinker. Turn left onto Vandeventer. Turn left onto Forest Park Avenue and proceed to the intersection. Kingshighway exit. Turn left onto Kingshighway. Construction Notice:  Kingshighway / Forest Park Avenue Intersection Remake
• Take Interstate 64 exit at Vandeventer. Turn left onto Forest Park Avenue and proceed to the intersection. Kingshighway exit. Turn left onto Kingshighway

ACS Breakfast Welcomes Guests

The 2016 Adult Children Study (ACS) Breakfast, held at the University Club in St. Louis, included a talk by Knight ADRC faculty. The audience was treated to a very special update: a visit from Dr. Carla Yuede’s grandmother, who shared a bit of family history with the audience. Dr. Yuede is a neurologist at Washington University School of Medicine.

ACS Breakfast Welcomes Guests

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Faculty and Staff Updates
In-Memorial
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New Technique Clarifies Methods of Protein Clearance

When the body breaks down the protein alpha synuclein, it also forms a byproduct called alpha-synuclein. A team led by Dr. Krista Moulder has developed a new technique that measures minute-by-minute changes in brain levels of this damaging protein fragment, and insight into why mutations in a gene that controls alpha synuclein clearance is impaired, and alpha synuclein builds up into clumps known as Lewy bodies.

When you see your brain — as this team’s research did — materializing the route to the store your brain reaches a critical molecule known as amyloid beta, as a byproduct of their normal functioning. In healthy people, the protein fragment is cleared before it can do any damage. In people with Alzheimer disease, clearance is impaired, and amyloid beta builds up into clumps known as plaques.

Many of the treatments being studied for Alzheimer’s disease are designed to remove amyloid beta from the brain. The new measuring technique could lead to a better understanding of how amyloid beta, a key protein associated with Alzheimer disease, is produced in and removed from the brain, which would help scientists design treatments to limit the protein’s accumulation.

This is important if you’re devising a therapeutic strategy to clear amyloid beta,” said Cirrito. “You hit the first pathway, you might have an effect quickly, but you won’t be able to lower amyloid beta levels beyond a certain point.”

For the last 14 years we had a technique in which we would do something to the mouse – give it a drug, have it perform a certain behavior – and we’d find out long just wasn’t good enough. Neural activity happens on a rapid scale, and research methods that were available to us needed to see a direct connection between the intervention and the amyloid beta levels.

The researchers attached antibodies that specifically detect amyloid beta onto a microscope slide, coated it with a small amount of collagen and measured the resulting current.

People have used this approach for other molecules, but the detectors were the size of a microscope slide,” Cirrito said. “Like” us on Facebook: www.facebook.com/KnightADRC
Follow us on Twitter: @WUADRC
New information posted weekly on our website: http://alzheimer.wustl.edu/Email phillipsj@wustl.edu to be added to our information-distribution list.
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HORIZONS is the newsletter of the Charles F. and Virginia B. Knight Alzheimer Disease Research Center (Knight ADRC) — a research program in the Department of Neurology, Washington University School of Medicine, funded by grants from the National Institute on Aging and private donations. The Knight ADRC supports and promotes interdisciplinary research on Alzheimer Disease. The Memory & Aging Project (MAP) — the clinical research office of the Knight ADRC — provides expert clinical assessments of cognitive functioning in normal aging and dementia. Knight ADRC leadership: John C. Morris, MD, Director, Knight ADRC; Director, MAP; Administration and Clinical Core Leader. Eugene M. Johnson, PhD, Associate Director. David M. Holtzman, MD, Associate Director. Virginia Buckles, PhD, Executive Director. Krista Moulder, PhD, Associate Executive Director. Carlos Cruchaga, PhD, Genomics Core Leader. Jason Hassenstab, PhD, Psychosocial Core Leader. Nigel J. Cairns, PhD, FRCPath, Neuropathology Core Leader. Tara Vinh-Benninger, MD, PhD, Neuroimaging Core Leader. Chengjie Xiong, PhD, Data Management and Biostatistics Core Leader. Arne Fagan, PhD, Biomarker Core Leader. Andrea Dennis, JD, MSW, Outreach, Recruitment, and Education Core Leader. John C. Morris, MD, Interim African American Outreach Core Leader.

New Technique Clariﬁes Alzheimer Disease Research Details a technique that speedily measures levels in the brain of a damaging protein fragment, and insight into why mutations in a speciﬁc gene increase the risk of developing the disease.

When you use your brain – planning a meal, remembering the route to the store – your neurons release a sticky molecule. In healthy people, the protein fragment is cleared before it can do any damage. In people with Alzheimer disease, clearance is impaired.

Many of the treatments being studied for the mouse – give it a drug, have it perform a certain behavior – and we'd wait that long just wasn't good enough. Neural activity changes rapidly, and we needed to see a direct connection of any change quickly, but you may not be able to lower amyloid beta levels beyond a certain point. You'd have to consider targeting other pathways.

To develop a more sensitive measure of amyloid beta concentration, they used to measure the damaging protein. They attached an electrode, zapped it with a small amount of voltage and measured the result.

By Tamara Bhandari for Washington University School of Medicine

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• Take Interstate 64 east and exit at Vandeventer. Turn there also will be traffic restrictions on Kingshighway.

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Washington University in St. Louis School of Medicine

ACE Breakfast Welcomes Guests

The 2016 Adult Children Study (ACS) Breakfast and Research Update was held in September at the St. Louis Zoo Rivercamp. In addition to hearing updates on the latest news at the Knight ADRC, the audience was treated to a very special update: a visit from Dr. Morris’ grandson Jack, shown left. (Photo: Robert Boston)

The ACS is designed to increase public awareness for Alzheimer’s disease and related disorders. The next ACS Breakfast and Research Update will be held on October 17th. For more information, visit the website at www.acsresearch.org. For more information about the Knight ADRC, visit the website at www.wustl.edu/ACR. To reach the Knight ADRC leadership: 635 East Boundary Drive, Saint Louis, MO 63110. Phone (314) 362-7950, Fax (314) 362-7971, Email phillipsj@wustl.edu to schedule an appointment or to join the Knight ADRC mailing list.

Funding for this program is provided by the Charles F. and Virginia B. Knight Alzheimer Disease Research Foundation and others through the Washington University Alzheimer’s Alzheimer’s Disease Research Center Award (P30AG28342).

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