



EXERCISE BUILDS BRAIN HEALTH

Carl W. Cotman, PhD

Within the past few decades, it has become clear that exercise directly impacts the brain. It builds brain health. In the mid-1990s, our group at UCI first demonstrated that exercise increases a protein called brain derived neurotrophic factor (BDNF). This molecule protects brain cells from injury and improves learning and memory. With age, BDNF levels fall. Exercise counteracts this decline and restores young levels of BDNF in the aged brain.

We now know that exercise acts at multiple levels to build the brain and enhance its function. In addition to stimulating connections between brain cells that are lost with age, exercise stimulates the brain to generate more brain cells, or "neurogenesis." Exercise may increase neurogenesis in the human hippocampus, a critical region in learning and memory that is significantly implicated in Alzheimer's disease (AD).



Dr. Carl Cotman, UCI
MIND Founding Director

At a biological level, human studies have also demonstrated that exercise prevents age-related declines in brain blood flow, particularly in the vulnerable cortex and hippocampus. In addition, exercise prevents atrophy that occurs in certain brain regions with age. For example, one study found that 40 min/day of moderate walking, three times per week for one year, increased the volume of the hippocampus in older adults with normal cognition. Further, exercise can reduce the accumulation of pathology in the brain that may trigger AD. Recent studies have revealed that less brain amyloid (one of the hallmarks of AD) accumulates in individuals who are active and fit than those who are sedentary.



Studies in humans also show that exercise benefits cognitive function, based on both population surveys as well as clinical trials. In one study, walking three or more times per week was found to correlate with a 32% reduced risk for AD. In another study, moderate physical activity was associated with slower cognitive decline in aging, equivalent to staying

2-3 years younger. Clinical trials have validated these observations, demonstrating that older people who engage in moderate aerobic exercise (vigorous walking) show improved cognitive function, particularly on "executive function," which is essential for multi-tasking and working memory.

It appears that exercise could improve cognitive function even in those with some level of impairment and brain pathology (e.g., people with mild cognitive impairment (MCI) or AD). To test this hypothesis, the National Institutes of Health awarded funding to undertake the first clinical trial of exercise as an intervention in MCI. This newly funded randomized, controlled clinical trial, led by Laura Baker, PhD, at the Wake Forest School of Medicine, and myself at UCI MIND, will investigate if supervised aerobic exercise can improve cognition, slow brain atrophy, or reduce risk for AD in older adults with MCI. We are currently enrolling individuals in this study and would welcome those interested who meet the entry criteria to participate. To learn more about this study, contact our research coordinator at **949.824.0008** or research@mind.uci.edu or visit our website: www.mind.uci.edu/research-studies/



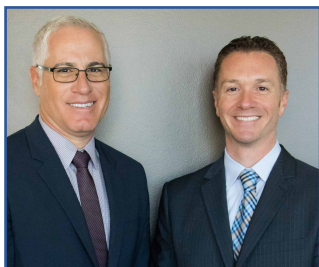
Photo credit: Steve Zylus / UCI

Dr. Claudia Kawas Awarded \$100,000 Potamkin Prize

Two California researchers, Dr. Kristine Yaffe of UCSF and UCI MIND's Dr. Claudia Kawas, are recipients of the 2017 American Academy of Neurology Potamkin Prize, an internationally recognized accolade referred to as the Nobel Prize of Alzheimer's disease research. Dr. Kawas, Professor of Neurology and Neurobiology and Behavior, is recognized for her work on *The 90+ Study*, a research project initiated in 2003 to study brain aging and dementia in the oldest-old. Under the leadership of Dr. Kawas, The 90+ Study has grown into one of the largest studies of the oldest-old in the world, enrolling over 1,700 volunteers since inception. To learn more about the important work of Dr. Kawas and her team, visit www.90study.org.

FROM THE CO-DIRECTORS

Frank M. LaFerla, PhD & Joshua D. Grill, PhD



Dear Friends,

Compared to other diseases, Alzheimer's disease (AD) research has been historically underfunded. Through diligent advocacy efforts, including those by UCI MIND faculty, Congress has approved a \$2 billion increase to the National Institutes of Health (NIH) budget and a \$400 million increase in AD research funding for this fiscal year. If signed by President Trump, this will achieve nearly \$1.4 billion in total NIH funding for AD research.

What will happen in 2018 remains unclear. And even with these increases, AD funding remains billions of dollars behind other conditions like cancer and HIV. Research funding is desperately needed as we strive to better understand the causes and effects of AD. And the faculty of UCI MIND are poised to capitalize on these new opportunities to continue their outstanding work.

In this issue of *MIND Matters*, we highlight Dr. Carl Cotman's national study of exercise as a potential therapy for Mild Cognitive Impairment and Dr. Claudia Kawas for receiving the very prestigious Potamkin Prize for dementia research (p 1). Both of these faculty members, along with Dr. Marcelo Wood, were invited to participate in an important NIH Summit on cognitive resilience in April. We're also very impressed by the innovative work our trainees presented at the REMIND symposium in February (below). Lastly, our work could not succeed without the partnership of community members who volunteer for our research studies. We highlight two exemplary participants, Marsha and Lionel Grove, in this issue as well (p 3).

REMIND Highlights

At the 8th Annual Emerging Scientists Symposium, graduate students and postdoctoral fellows had the opportunity to present their work in neurodegenerative disease research. The event, organized by REMIND co-chairs, included a poster competition, six invited trainee presentations, and a keynote lecture on the role of tau prion strains in neurodegeneration by Dr. Marc Diamond of University of Texas Southwestern. UCI MIND congratulates invited graduate student speakers Michael Hernandez, Alexa Roemmich, and Joannee Zumkehr, postdoctoral speakers Drs. Stefania Forner, Janine Kwapis, and Ryan Lim, and poster award recipients, Matthew Mahavongtrakul and Dr. Alessandra Martini.



Co-chairs with Dr. Marc Diamond

STEAM outreach visit

REMIND is also an active member of the UCI STEAM Outreach Council, an initiative led by the Beall Center for Art + Technology that aims to engage K-12 students from local under-resourced public schools in science, technology, engineering, art, and mathematics. So far this year, REMIND trainees Sarah Royer, Freddie Marquez, Jessica Yaros, Stefania Forner, and Alessandra Martini have led brain education workshops for over 100 middle and high school students in Orange County.

Senator Bates Hosts ASK THE DOC

Senator Pat Bates and Assemblyman Bill Brough invited UCI MIND to deliver its quarterly ASK THE DOC program as part of their annual South Orange County Senior Day in March. Moderated by co-director Dr. Joshua Grill, faculty members Dr. Aimee Pierce, Assistant Clinical Professor of Neurology, Dr. Mark Mapstone, Professor of Neurology, and Dr. Kim Green, Associate Professor of Neurobiology and Behavior, responded to over 500 Orange County seniors' important and thoughtful questions on brain aging and Alzheimer's disease research. Attendees also had the opportunity to participate in breakout sessions on self-defense, fraud prevention, and tablet training, receive free medical screenings from UCI Nursing, and visit resource tables of local senior service organizations such as Age Well and Alzheimer's Orange County. If you missed it this year, plan to attend South OC Senior Day next Spring and check the UCI MIND calendar for upcoming ASK THE DOC panels:

www.mind.uci.edu/community/calendar/



Josh Grill, Senator Bates, Mark Mapstone, Aimee Pierce, Kim Green

RESEARCH PARTICIPANT HIGHLIGHT

Meet research participants, Marsha and Lionel Grove. The Groves have both been enrolled in the A4 Study, an Alzheimer's disease prevention clinical trial, for two years and the UCI MIND Longitudinal Study for one year.

What motivated you to participate in Alzheimer's disease research at UCI MIND?



Marsha: My sister and my mother both died with Alzheimer's disease and Lionel has it in his family as well. We want a cure to be found because we know just how horrible the disease is. We're confident that if we keep participating in research, it will lead to something eventually.

Lionel: Yes, even if it doesn't help us, we hope it will help our kids, our grandkids, and their families in the future.

What is involved in a typical research study visit?

Marsha: For the A4 study, most visits are short. We get set up for an infusion and have our blood pressure and temperature taken. They ask us whether we've had any changes in our health. Then, we receive the infusion in our arm for about 20 minutes while we read or listen to music. Some visits are a little longer because they include additional tests like cognitive testing, blood draws, and lumbar punctures (which are optional, but we decided to go for it).

Lionel: And with the infusion, we don't know whether we're getting the drug or placebo. But we do know that if we're getting placebo, we can take the drug at the end of the study if the research shows it's working.

What have been the most challenging and the most rewarding aspects of participating in research?

Marsha: It's not that challenging. The frequency can be a little bit challenging, but the study team works around our schedule. We have a trip to Alaska coming up and they were able to work around that. The most rewarding part is the fact that we might be doing some good and the people we get to interact with. They've become our friends – the research team and the people we meet at the participant appreciation events.

Lionel: And the opportunity to hear updates from researchers, to learn about the latest happenings. We also stay in touch on the Internet and get notifications about Alzheimer's disease research and upcoming events.

What is one piece of advice you would give to someone considering volunteering for Alzheimer's disease research?

Marsha: I think a lot of people are scared. Alzheimer's is a scary thing. It's definitely something Lionel and I are concerned about. But, I would tell people who are considering joining us in research to go for it. Every single person can make a difference.



The Groves with Dr. Aimee Pierce

Online Resources

In addition to the quarterly *MIND Matters* newsletter, there are several online resources available to stay informed of the latest research, education, and care in Alzheimer's disease and related disorders. To learn more about local research and read posts from UCI MIND researchers, visit the new UCI MIND website and follow our Blog (www.mind.uci.edu/blog/), Facebook (www.mind.uci.edu/facebook/), and Twitter (www.mind.uci.edu/twitter/). For example, recent posts address the implications of direct-to-consumer genetic risk testing for Alzheimer's disease and how UCI MIND investigators have discovered a way to generate microglial brain cells using human skin cells. Stay connected with local care and support organizations, such as the Alzheimer's Association and Alzheimer's Orange County (www.mind.uci.edu/resources/). For families learning to navigate the disease, visit *A New Path for Mom* (www.anewpathformom.com), a reflective Blog and compilation of resources authored by Virginia Naeve, UCI MIND leadership councilmember and Alzheimer's disease caregiver. Lastly, an array of educational resources are available at the Alzheimer's Disease Education and Referral Center of the National Institute on Aging (www.nia.nih.gov/alzheimers).

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28th Annual Southern California Alzheimer's Disease Research Conference

UCI MIND Institute for Memory Impairments
and Neurological Disorders

Alzheimer's | ORANGE COUNTY

The Elephant in the Room

Sensitive Subjects in Dementia Care



End
of Life



Elder
Abuse



Psychiatric
Symptoms



Driving
Risk



Intimacy



Physician
Aid in Dying

September 22, 2017 Irvine Marriott Hotel

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www.mind.uci.edu/events/conference/

SAVE THE DATE

8TH ANNUAL UCI MIND
A DECEMBER
TO REMEMBER

Please join us for a
memorable evening of
fun and philanthropy
benefiting Alzheimer's
disease research
at UC Irvine.

December 2, 2017
Balboa Bay Resort
Newport Beach

Event Information
gala.mind.uci.edu

UCI MIND
NIH Designated Alzheimer's
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