

# ALZHEIMER'S SCIENCE NEWS

WINTER 2022



## CHANGES IN DRIVING BEHAVIOR CAN PREDICT COGNITIVE DECLINE

Researchers are looking for early indicators of Alzheimer's, called biomarkers, that can be used to detect changes in behavior or other physiological processes before overt cognitive deficits appear. Research has shown that elevated levels of tau protein and widespread amyloid plaques are associated with more driving errors on a road test but may not yet reveal itself with poorer performance in traditional tests of cognitive function.

Alzheimer's Disease Research grantee, Ganesh Babulal, PhD, of Washington University in St. Louis, developed a new way to evaluate driving behavior that could help detect subtle preclinical cognitive changes that might be missed by traditional testing.

Between 2015 and 2019, his team studied 131 adults over age 65 who received traditional cognitive assessments, as well as other tests measuring tau protein levels and amyloid plaques.

They also installed GPS devices in participants' vehicles. Using a technology they developed, Driving Real-World In-Vehicle Evaluation System (DRIVES), they collected information about people's driving, including how often they braked hard, accelerated suddenly, and drove above the speed limit.

The driving assessment alone predicted preclinical Alzheimer's, according to their results published in



**New technology could alert older adults to unsafe driving and help save lives.**

the *Journal of Alzheimer's Disease*. Their accuracy increased even more when they considered the subject's age, their score on traditional cognitive tests, and whether they had a specific gene predisposing them to the disease.

With your support, Dr. Babulal's team plans to further develop the DRIVES system and combine it with other biomedical information to predict the onset of Alzheimer's. Few people want to give up driving, yet older adults account for 19% of motor vehicle fatalities in the U.S. A technology that alerts people or their families to unsafe driving could help them make adjustments to reduce the risk of traffic-related injuries and deaths.

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## PRESIDENT'S CORNER



As we begin the new year, I am more hopeful than ever about the progress scientists are making toward prevention and a cure for Alzheimer's.

This is an exciting time for science.

Thanks to you, researchers we fund are identifying methods to detect this mind-stealing disease earlier, exploring possible new treatments, and finding ways to ease the burden on those who are living with it. Every discovery expands our understanding and brings us closer to the day when we find a cure.

Thank you for standing with us in the fight against Alzheimer's. We are deeply grateful for your support.

Stacy Pagos Haller

## RESEARCHER SPOTLIGHT: CHRISTELLE ANACLET, PHD

As a child, Christelle Anaclet, PhD, suffered from insomnia. This led to her interest in the study of sleep, including how it relates to Alzheimer's. That's because sleep affects cognition, and sleep disruption and cognitive deficits are two major symptoms of this disease.

Dr. Anaclet, of the University of Massachusetts, is using her Alzheimer's Disease Research grant to test sleep enhancement as a way to reduce cognitive deficits. "Understanding the mechanisms underlying the role of sleep in Alzheimer's disease has the potential to provide new targets" for effective treatments, she stated.

Her team is using a new mouse model they developed to study the impact of deep sleep in physiological functions and diseases. Her previous research showed that slow-wave sleep, the deepest stage of sleep, can be induced and maintained by activating a specific neuronal population. This has opened up numerous lines of investigation on the role of sleep in physiology and disease.

Dr. Anaclet is deeply grateful to donors who support Alzheimer's Disease Research. "Their generosity is giving me the opportunity to apply my expertise in sleep science to one of the most devastating diseases and to investigate alternatives to reduce its burden."



Christelle Anaclet, PhD

## IS IT ALZHEIMER'S? WHAT'S NORMAL, WHAT'S NOT

As we age, many adults experience slowed processing speed. That "tip of the tongue" inability to recall a familiar name begins as early as our 30s. Multitasking takes more attention. It's also common to misplace objects of minor significance or forget the reason for walking into another room.

On the positive side, vocabulary often improves with age. The ability to solve current problems based on prior similar experiences continues until late in life.

By contrast, unlike normal cognitive aging, Alzheimer's reflects a severe destruction of specific brain cells, with symptoms that are more frequent and severe:

### Early Symptoms

- Forgetting significant events
- Trouble learning new things, such as how to use your new phone
- Struggling to find the right word to express yourself
- Having trouble handling money and paying bills

## EARLY SUCCESS FOR PROPOSED NEW METHOD OF CLEARING TOXIC TAU

Alzheimer's Disease Research-funded scientists have proposed a new way to treat Alzheimer's by clearing toxic tau from the synapses, or connections, between brain cells.

In early-stage Alzheimer's, tau becomes misshapen and collects in tangles in the synapses. At the same time, the molecular machinery that could remove the misplaced tau is disrupted. This machinery, called the ubiquitin-proteasome system (UPS), is crucial to memory formation and the ability to adapt to changing conditions.

Karen Duff, PhD, of University College of London, and Natura Myeku, PhD, of Columbia University, found that restoring the disrupted function of the UPS system decreased the severity of cognitive decline in mouse models with early Alzheimer's. Results of their study were published in *Science Translational Medicine*.

This builds on their previous research by pinpointing where the tau buildup occurs: in the specific part of neurons that receive signals from neighboring cells.

Drs. Duff and Myeku used a binding protein to stimulate receptors on neurons next to the toxic tau buildup, which helped clear away the tangles. They then tested learning and episodic memory in mouse models of Alzheimer's disease, who showed improved cognitive performance and reduced signs of disease.

These findings offer hope that stimulating specific receptors to clear toxic tau could be a viable treatment that improves cognitive performance in people with this mind-stealing disease.

- Making misguided decisions, such as falling victim to scams
- Loved ones expressing concerns about personality changes, such as increased anxiety or irritability

### Later Stages

- Shorter attention span
- Inappropriate anger outbursts
- Trouble recognizing friends or family members
- Difficulty carrying out activities that involve multiple steps, like following a recipe
- Trouble coping with unexpected situations

It's important to pay attention to signs of possible cognitive decline and seek evaluation. A thorough assessment includes a physical exam, taking a detailed medical history, blood and possibly cerebrospinal fluid testing, and neuroimaging.

Some 9% of apparent dementias are actually reversible disorders. Even in irreversible dementias, an accurate diagnosis can guide the best way to reduce cognitive and behavioral symptoms.



### HEALTHY RECIPE:

## Delicious Curried Pumpkin Soup

**Special Tip:** Replace evaporated milk with coconut milk for a healthier and vegan option.

### Ingredients:

- 2½ cups sliced mushrooms
- ½ cup diced onions
- 2 tablespoons butter
- 2 tablespoons flour
- ½ to 1 teaspoon curry powder
- 3 cups vegetable broth
- 1 15-ounce can pumpkin puree
- 1 12-ounce can evaporated milk
- 1 tablespoon honey
- ¼ to ½ teaspoon salt
- ¼ teaspoon pepper
- ¼ teaspoon ground nutmeg

*See reverse side for directions.*



## Delicious Curried Pumpkin Soup

*(Continued from front)*

### Directions:

1. In a large pot, melt the butter and sauté the mushrooms and onions until tender.
2. Add the flour and curry powder, and stir until well blended.
3. Gradually add the vegetable broth. Bring to a boil and stir for 2 minutes or until thickened.
4. Reduce heat to a simmer. Add the milk, pumpkin puree, honey, salt, pepper, and nutmeg, and continue stirring until thoroughly heated.

*Yield: 7 servings*



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Help fight Alzheimer's disease while enjoying tax benefits.

## 3 WAYS TO HELP THIS YEAR MAKE A DIFFERENCE WITH TAX-SMART GIFTS

Start planning now to make an impact this year. Beyond your current financial gifts, here are three additional ways to support our mind-saving work, which can offer you some attractive benefits as well.

**Donate appreciated stock.** You'll eliminate all the capital gains tax you would have paid had you sold the stock yourself. Your gift will be deductible at the day of delivery's full fair market value (assuming you've held it for more than one year).

**Donate an insurance policy.** For most policies, your tax deduction is usually the cost basis or the fair market value of the policy, whichever is less.

**Make a gift from your IRA.** If you are 70½ or older, you can transfer up to \$100,000 annually directly from your IRA. The transfer doesn't generate taxable income or a tax deduction, so you benefit even if you do not itemize your tax deductions.

To learn more, contact Charles Thomas, our Planned Giving Manager, at [plannedgiving@brightfocus.org](mailto:plannedgiving@brightfocus.org) or by calling 301-556-9362.

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Please share this newsletter with someone you know who might be interested in learning about some of the latest advancements in research to diagnose, prevent, treat, and cure Alzheimer's disease. This newsletter is published by Alzheimer's Disease Research, a program of BrightFocus Foundation.

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Alzheimer's Disease Research is a BrightFocus Foundation Program  
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