

*“It (the lumbar puncture) was an easy procedure and required very little sacrifice on my part except to be there. It was painless and uneventful; it was over in 20 minutes. Everyone was pleasant, accommodating and reassuring.”*



Jan Carmichael, research participant

*“Instead of being a researcher, he’s a donor, part of a team. If there is no donor, there is no discovery, no betterment of science and then no cure. All of us are a part of the engine of progress and advancement of knowledge.”*



Chiau-Beng Ng, research participant, with his wife Boon-Yen

## Institute Mission

The mission of the Institute is to advance research in Alzheimer’s disease, with the goal of understanding and discovering its causes and the factors that affect its progression. The Institute seeks to bridge science-based discoveries to clinical practices. Our goals are to diagnose the disease, identify means for effectively treating and preventing it, and provide help to families and caregivers. We are researching ways to make memories last a lifetime.



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# UCI MIND

## Biomarkers for Alzheimer’s Disease



INSTITUTE *for* MEMORY IMPAIRMENTS  
*and* NEUROLOGICAL DISORDERS

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# UNDERSTANDING BIOMARKERS

## ***What are biomarkers?***

Biological markers, or biomarkers, are measurable physical characteristics used to diagnose and assess a disease process as well as monitor response to treatment. For example, cholesterol levels are a biomarker for heart disease. Today, we are searching for biomarkers that will allow us to identify, monitor, and treat Alzheimer's disease as it develops in the brain, long before memory and other thinking abilities are affected.

## ***What do we know about biomarkers for Alzheimer's disease?***

Promising research indicates that certain components of both blood and cerebral spinal fluid (CSF) have the potential to provide real-time "biological markers" of the presence and progression of Alzheimer's disease. For example, we know molecular changes in CSF may occur as many as 20 to 30 years before clinical symptoms.

## ***What are we learning from blood samples?***

Blood samples have been particularly useful in genetic studies. Genetic testing of DNA from blood has led to the identification of multiple genes that cause (e.g., presenilin) or increase risk (e.g., ApoE4) for Alzheimer's disease.

## ***What are we learning from CSF?***

Abnormal proteins in the CSF can indirectly tell us about the health

of brain cells and warn us that Alzheimer's disease may be developing. In particular, analyses of CSF can help us understand if the toxic beta-amyloid and tau proteins are accumulating in the brain.

As our memory and thinking abilities involve very complex brain processes, we will likely need several biological markers, such as in blood and spinal fluid, to best differentiate normal cognition, Mild Cognitive Impairment (MCI), and Alzheimer's disease.

## ***How can I help?***

As an Alzheimer's Disease Research Center (ADRC) participant, you can help scientists identify reliable biomarkers for Alzheimer's disease by contributing your blood, spinal fluid, and other biological samples (e.g., saliva, tears) as needed for our studies. Researchers urgently need blood and CSF samples from participants who are cognitively normal and those with MCI or Alzheimer's disease to help advance our knowledge about biomarkers in these conditions.

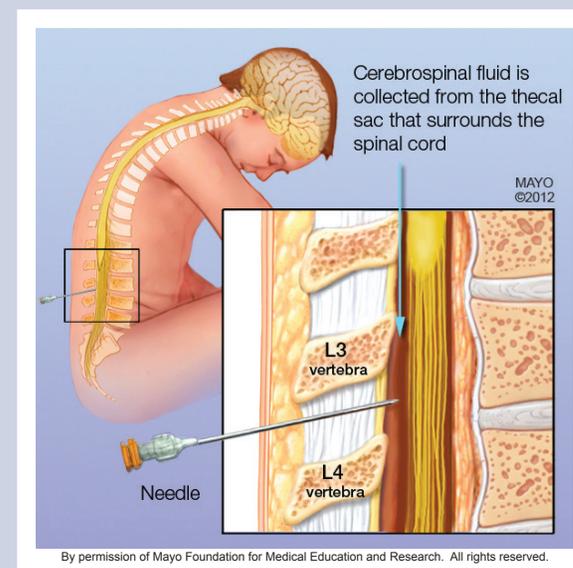
## ***What's involved in contributing CSF?***

If you agree to donate your CSF, our clinicians will first thoroughly review your medical history to identify any factors, such as prior back surgery, that might preclude your participation. If it is appropriate for you to participate, we will schedule a blood draw and, within 30 days thereafter, an appointment to collect your CSF.

CSF is collected from the lower lumbar region of the spine through a lumbar puncture, also known as a spinal tap. An experienced neurologist performs the procedure, and a nurse is present the entire time.

You will receive a local anesthetic, similar to that used in a dental office, to numb the skin. As shown in the illustration (below), a small needle is inserted between the vertebrae to collect the fluid, and you can expect only minimal discomfort. The most common side effect is a headache, which occurs in fewer than 1 in 10 persons. If a headache occurs, it is usually easily treated.

Within approximately 1 hour after the procedure, your body will naturally regenerate the amount of CSF drawn for the study.



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