

## *Celebrating Women in Science*

### **Karyn Frick, Ph.D., University of Wisconsin-Milwaukee**

Dr. Frick is a neuroscientist and has managed an independent lab for over 20 years – more than 10 years at the University of Wisconsin-Milwaukee and previously 10 years at Yale University. “I have always been fascinated by the complexity of Alzheimer’s disease and the way in which it seemed to preferentially target women,” Dr. Frick shared. “As such, I’ve devoted my career to understanding how hormones regulate memory formation and brain function in young and aging females and males.”

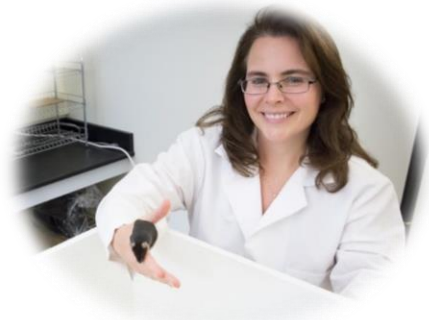


Dr. Frick lost her Aunt to Alzheimer’s disease in 2017. “It’s an insidious disease and the toll it has taken on my family has been enormous. There wasn’t anything we could do, except plan for her care as it progressed.”

### **Laboratory Research**

Dementia research takes many forms, including work with human subjects, animal models, cells in a petri dish, and computer models, to name a few. The ultimate goal for any research model is two-fold:

1. Understanding the phenomenon of the disease, its symptoms and what is happening to the brain
2. Trying to figure out how to reverse and alleviate symptoms



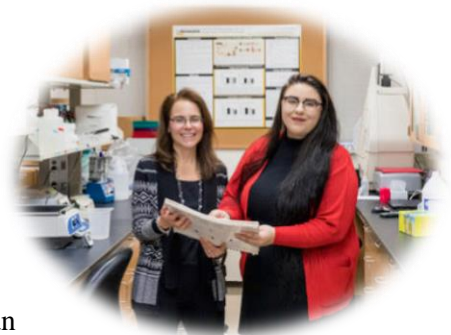
“Animal research makes up a large percentage of research in the study of Alzheimer’s,” Dr. Frick shared. “Doing work in animal models – mice, rats, non-human primates – allows us to examine the brain in ways we cannot do in humans. In the lab, we’re able to model the disease by introducing various human genes we know are involved in early or late onset Alzheimer’s, and then understand how those genes affect the brain and behavior. This process of understanding how human genes influence brain function gives us clues as to what might be wrong in the human brain. Then we can work with chemists to develop new treatments to try to prevent or reverse symptoms.”

The tools for Alzheimer’s diagnosis have begun to improve in last decade. “Prior to 15-20 years ago, the only way to diagnose Alzheimer’s was on autopsy,” Dr. Frick said. “In the last 15 years, new brain scanning methods have allowed scientists to see brain changes in living Alzheimer’s patients, and blood tests are on the horizon. But while we’re getting closer to having better diagnostic tools, we still don’t know what’s causing the disease. By examining the brains of Alzheimer’s animal models, we can try to figure out what goes wrong in the Alzheimer’s brain and test whether new treatments can prevent or reverse the devastating effects of the disease on the brain and behavior.”

### **Women in Science**

Dr. Frick would like to increase awareness of the significant role women play in science. “There are so many women in the field, but there is a perception that scientists are more often men,” Dr. Frick shared. “Thus, it can be hard for young women to see themselves as scientists. Increasing the visibility of women’s impact on science will encourage more girls and young women go into the field.”

Dr. Frick shared that keeping women in the field of science can be a challenge. “Many women go into research at an undergrad and graduate level. However, ultimately securing a faculty position to conduct one’s own independent research can



be extremely difficult, and so many talented women leave the field. Nevertheless, there are many other valuable ways in which women can make a significant impact on science outside of the research lab. Great opportunities are available in public policy, association/institution/non-profit leadership roles, advocacy to create funding, and K-12 teaching which makes science real to students.

#### **Grant for Gender Research and Alzheimer's Disease**

Frick has received grants from the Alzheimer's Association on two occasions. Her most recent grant looks at the impact of sex and gender in Alzheimer's disease. "I hope this research will help us better understand why women are at greater risk of Alzheimer's than men and will ultimately lead to new treatments for both women and men," Dr. Frick shared.



The decline of estrogens and progesterone during menopause is thought to increase the risk to women of memory loss and dementia, and contributes to the fact that almost two-thirds of Americans with Alzheimer's are women. In addition, women who carry the E4 variant of the gene for the molecule apolipoprotein E (also called ApoE) are at substantially higher risk of developing Alzheimer's than women who carry other ApoE gene variants or than men who carry any ApoE variant. Dr. Frick is leading a series of studies on the UWM campus that will examine the effects of estrogen treatment, sex, and ApoE genotype on memory and brain function in a mouse model of Alzheimer's disease. The hope is that this work will lead to new treatments for the disease. Indeed, Frick and her collaborators have developed a new estrogen-based drug that promotes memory and reduces hot flashes in a mouse model of menopause, and her team will be testing the effects of this drug in her Alzheimer's mouse model later this year.

We salute Dr. Frick and the role model she is for so many women in the field of science.