

## Jasper Crockford – University of Calgary

### Project: Menopause and the mind: Links between postmenopausal estradiol decline, hormone therapy, and Alzheimer's disease risk markers

#### Background:



By 2050, an estimated 1.7 million Canadians may live with Alzheimer's disease (AD) and/or other forms of dementia, with females (i.e., based on biological and physiological characteristics) disproportionately affected. This disparity is often attributed to the longer lifespans in females, as age is the greatest risk factor for dementia. However, emerging evidence suggests that the menopause-related decline in estradiol, a hormone proposed to protect against later neurodegeneration, may also confer its own risk. During menopause, females may be prescribed estrogen-based hormone therapies (HT), to supplement estradiol levels in the body, however, the long-term impacts of HT in dementia risk remains inconclusive. Furthermore, the connection between estradiol levels and other risk markers for dementia including changes in cognition, behaviour, function, and AD biological markers (i.e., amyloid

beta [ $A\beta$ ] and phosphorylated tau [ $p$ -au]) post-menopause is poorly understood. Identifying at-risk females following menopause and before clinical AD symptoms fully emerge may be a crucial timepoint to implement prevention strategies.

This project aims to determine how postmenopausal changes in estradiol level are related to clinical markers of dementia, including cognition, behaviour, function, and AD biomarkers ( $A\beta$ ,  $p$ -tau). We will also determine how HT use is related to later quality of life (QoL). Over the term of this award, we will recruit 100 Albertan postmenopausal females from partnered women's health clinics, clinical networks, and cohort studies. Blood samples will be drawn for estradiol,  $A\beta$ , and  $p$ -tau levels. Participants will complete cognitive, behavioural, functional, QoL, medical, and reproductive health assessments. Models will separately explore the associations between estradiol level

and each risk marker of dementia.

The project anticipates identifying whether menopause-related estradiol changes represent a critical window for dementia prevention. Study findings may inform personalized risk profiles for women enhancing early intervention approaches in those identified at greater risk and may guide decision-making for HT use in postmenopausal women.

## **Bio**

Jasper is a Medical Sciences MSc student at the University of Calgary, supervised by Dr. Zahinoor Ismail. She completed her BSc with an honours specialization in psychology at the University of Western Ontario and worked as a research associate in Dr. Ismail's lab before beginning her MSc. Jasper's research focuses on promoting women's health in dementia research, with a particular interest in understanding the underlying mechanisms that shape risk and resilience. She is committed to grounding her research in the lived experiences of those directly impacted, ensuring her work translates into meaningful care and prevention strategies. Beyond research, she volunteers at the Maud Medical Clinic, a women's health centre, and cares for clients living with dementia at the Alzheimer Society of Calgary. These experiences continually shape her approach to research and inspire her pursuit to become a physician-scientist dedicated to bridging the gap between research and patient care.