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Spectroscopic Analysis of Age-Related Changes in the Brain Lateral Ventricles During Ageing

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Alzheimer's disease is the most common form of dementia and poses significant health and economic concerns. Currently, the disease has no cure, and it is expected that over 1 million people could be affected by 2058 in Australia alone. The content and distribution of metals such as Fe, Cu, Zn is known to change in the ageing brain and thus, increased understanding of the mechanistic role of metal dis-homeostasis may illuminate new therapeutic strategies. The brain lateral ventricles, which play a role in controlling metal and ion transport, have shown increasing levels of copper surrounding their walls with ageing. As a redox active metal, copper can induce oxidative stress which is a process that occurs during Alzheimer's disease onset and progression. Our research group has been interested in determining whether the age-related elevation of copper surrounding the lateral ventricles is inducing oxidative stress in that region. In this study, we have utilised X-Ray Absorption Spectroscopy (XAS) at the Stanford Synchrotron Radiation Lightsource to analyse different chemical forms of sulfur and measure oxidative stress by analysis of disulfides. Additionally, we used the infrared microscopy beamline at the Australian Synchrotron to identify whether any other markers of oxidative stress were present around the ventricles. Further insights into metal dis-homeostasis and its influence on other biochemical pathways, may help to reveal some of the neurochemical mechanisms involved in progression of Alzheimer's disease. In turn, this may help pave the way for potential preventative or therapeutic models.

Level of Expertise

Student

Presenter Gender

Woman

Pronouns

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

Yes

Condition of submission

Yes

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