## Summary

My area of research is into Alzheimer’s disease (AD), and the way in which it spreads on a microscopic level. I am doing this because Alzheimer’s is one of the top causes of death within the UK today. In fact, in 2020, it was the top cause of death (11.5% of all deaths) second only to COVID-19 (12.1% of all deaths)1. To date, there is no cure for Alzheimer’s, and the prevalence of Alzheimer’s is only predicted to go up in time, with predictions that worldwide cases will increase triple-fold by 20502,3. AD has been extremely hard to characterise owing to its multi-faceted nature and numerous complex processes that take place. In order to study AD, I will be looking one of the major mechanisms in AD (explained in outreach webpage). To this end, I am utilising an animal model (fruit fly; a well-established model for neurodegeneration allowing for more ethical studies on shorter timescales yielding applicable and extrapolatable results to humans4) to model how AD spreads in a brain. I will then add 2 substances which are known to reduce a toxic aspect of Alzheimer’s (tau phosphorylation (deformation/misfolding), further explained on outreach webpage). Using these, I will then look to see if neurons (nerve cells) can be saved using these compounds. This has direct implications on one of the major disease processes in AD and will hopefully provide insight and a possible time window (based on spread of disease) as to when treatment is effective, and beyond which point it is trivial.

My desired population for my outreach project is the middle-aged group (~30-40 years old). The reason I have chosen this is because there is an increasingly ageing population (due to falling fertility rates and falling mortality rates; fewer people being born and older people living longer3) and Alzheimer’s is a disease of the elderly. I excluded younger populations because technology and research will have advanced by the time they are nearing older ages, but awareness will also be stronger as there will be a higher prevalence by the time they are ageing. Furthermore, the younger population statistics in the UK are actually in decline3 and so this group of people is likely to be lower in number, thus a smaller target audience. I excluded older populations as I felt that the middle-aged population would be better targeted in terms of teaching people about Alzheimer’s, as the people of tomorrow that are most likely to be affected by it. Furthermore, current research is likely to benefit them the most, as it will take time for current research to make its way into routine hospital practice or treatment, something which will most likely not be possible for the elderly population of today, as rigorous testing is needed before a treatment can be offered with confidence. Moreover, we are still discovering new disease mechanisms every day, and so it will take quite a while to characterise AD fully before we can think of developing medications, testing them in models and then clinical trials before clinical use.

The format I have opted for is a web resource, with a linked VR app. The reason I have chosen this is because it is an effective method in portraying information to a group of people who are fairly familiar with technology but may not find reading a poster or brochure interesting. I have included a summary on Alzheimer’s, but also why it is so important to be aware of its burden and how I will be doing my research and its benefits. I feel as if a web resource format is also serious enough to be able to explain Alzheimer’s and why its awareness is so important in a way that can be easily navigated and painting a story, from the background of the disease right up to the context and impact of the study. Throughout, I have used several analogies to explain AD and what goes wrong on a microscopic level. I have also added a link for a VR app, which allows for a first-person experience of what it would feel like to have Alzheimer’s. This is a great tool to allow people to understand the symptoms of Alzheimer’s beyond just memory loss, and what it means to live with Alzheimer’s and its effect on a day-to-day basis, and its burden to oneself and loved ones. I feel this VR app would be well served to round off the reasons as to why I have chosen to research into Alzheimer’s.

Word count: 749

## References:

1. Alzheimer's Society. 2021. Biggest killer in the UK is now COVID-19, but deaths from dementia remain high. [online] Available at: <https://www.alzheimers.org.uk/blog/research-UK-biggest-killer-high-dementia-deaths>
2. Alzheimer's Research UK. 2021. Worldwide dementia cases to triple by 2050. [online] Available at: <https://www.alzheimersresearchuk.org/worldwide-dementia-cases-to-triple-by-2050/>
3. Government Office for Science. 2016. Future of an ageing population. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/816458/future-of-an-ageing-population.pdf>
4. Lu, B. and Vogel, H., 2009. Drosophila Models of Neurodegenerative Diseases. Annual Review of Pathology: Mechanisms of Disease, 4(1), pp.315-342.