How are inflammasomes activated in Multiple Sclerosis? I aim to research inflammasome activation in Multiple Sclerosis (MS) by looking into mutations in inflammasomes. My objective is to develop information surrounding the inflammatory response in MS to further our understanding of the aetiology of the disease. Currently, the cause of MS is unclear, highlighting the urgent need in researching into this which could help with progression in therapeutics and prognosis. This links to the university's key theme of health and wellbeing – underpinning processes and systems - and how the fundamental understanding of health and disease is a crucial part of the university's research excellence.

This topic provides me with the opportunity to explore immunology and neuroscience, areas that I am interested in for a PhD or in pursuing on the NHS Scientist Training Programmes. This research project would give me the experience and skills development that I could apply in either of my future career plans. Personally, I chose the topic as I do not want to see others go through the struggles that my auntie has with MS. By researching into this area, I would feel satisfaction that I am trying my best to help others, helping others is one of my key values.

Ensuring my project is successful requires balancing my degree studies and scholarship work by having weekly targets and noting key dates and goals. During my Extended Project Qualification, I used this planning and it worked successfully so I would recreate something similar. With the help of Dr Boucher, we planned this project and we will schedule weekly meetings to ensure the continuous success. I will consistently ask for feedback at my meetings to develop my project and I will use the meetings to structure timescales. I am in contact with a Laidlaw scholar from last year so I can access advice about how her project was successful and perhaps apply similar techniques in my own project planning.

After a thorough literature and database search, we will identify key mutations in inflammasome components (ASC, NLRP1, NLRP3) that are associated with MS. Over the 5 to 6 weeks in the summer, using molecular biology, we will introduce mutations in those inflammasome proteins and assess their impact on inflammatory responses in various human cell lines (THP-1, Hela, HEK293). Various immunology techniques (cell death assay, ELISA for cytokines, immunoblotting) will be used to measure and compare inflammasome activation associated with MS mutations.

The proposed research method has been discussed and evaluated by my mentor. Dr. Boucher is a specialist in inflammasome signaling and the impact of this in human health and diseases. We carefully planned a project to maximize my learning, research, and discovery outcomes.

If COVID-19 prevents access to the labs, my project would become evaluative and predictive of data and articles created by others. For example, we will evaluate the impact of the mutations identified and assess the potential biochemical impact on inflammasomes components.