Effects of peripheral inflammation on microglial activation in the substantia nigra and hippocampus of male MMTV-PyMT carrier mice

Caroline Hinesley, Anabella Santos

Pro-inflammatory microglial activity in the presence of a peripheral immune challenge can cause neuroinflammation leading to neurodegeneration. The concentration of microglia varies in different brain regions, making some areas more susceptible to inflammation (Grabert et al., 2016). In previous research, microglial activation in female breast cancer patients due to a peripheral immune challenge resulted in decreased cognitive functioning (Emmer et al., 2019). However, our understanding of the effects in male breast cancer patients is limited. Our study used transgenic male MMTV-PyMT carrier mice as a model and compared microglial activation in response to a peripheral immune challenge in the substantia nigra and hippocampus. We aimed to understand if cognitive decline may be, in part, due to evidence of hyper-vigilant hippocampal microglia.

We evaluated the effects of peripheral stressors through LPS-induced inflammation and expected to see an increase in microglial activation. Based on preliminary quantitative data from Iba-1 stainings, the hippocampus is more vulnerable to neuroinflammation than the substantia nigra. The results from this research indicate differences in microglial activation patterns providing data for future experiments studying the relationship between genetics and regional vulnerability. This study also provides a better understanding of the neurological effects of breast cancer in males.