Characterization of Microglia in the Hippocampus and Amygdala in Response to a Peripheral Immune Challenge

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Microglia are key support cells in the central nervous system, which can become activated following a peripheral immune response. Both the amygdala and hippocampus are vital to brain structures involved in emotion, fear, aggression, memory, and learning. Microglia are also implicated in neurogenesis, brain repair, and synaptic alterations. However, there is little research on the microglial interplay between these brain regions and vulnerability to immune reactivity. Our objective was to compare microglia morphology after in vivo lipopolysaccharide (LPS) challenge relative to saline controls. Immunohistochemistry was used to tag IBA-1, a protein marker exclusive to microglia, with a fluorescent antibody. Microglia were then visualized using widefield and confocal microscopes. Data on cell counts, proportional area, cell body area, and process length were collected to assess morphology. No significant difference was found in the amygdala microglia following LPS administration. Despite a reduction in process length for hippocampal microglia, all other morphological measures showed no difference relative to saline control. This suggests that the hippocampus may be more sensitive to LPS compared to the amygdala. Overall, neither the hippocampus nor amygdala showed significant microglia morphological change, indicating a delay between peripheral immune response and microglial alterations.