

Hippocampal Microglial Activation and TNF- α Expression in Response to Stress

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Abstract

This study investigates the effects of acute stress on hippocampal microglial activation and tumor necrosis factor-alpha (TNF- α) expression in female rats. Despite existing literature suggesting heightened neuroimmune responses to stress, our findings challenge these assumptions within our experimental parameters. Utilizing immunohistochemistry techniques, we specifically measured IBA-1 and TNF- α expression levels in the dentate gyrus region of the hippocampus, a critical area for learning and memory. Rats subjected to acute stress through lipopolysaccharide (LPS) injection were compared to saline-injected controls. There was not an observed increase in microglial activation and TNF- α expression post-stress exposure. Statistical analysis, including t-tests of microglial soma area, process length, cell count, and TNF- α colocalization, indicated no significant differences between the stressed and control groups. These results may indicate a potential variability in stress impact due to biological sex or experimental conditions. Our findings emphasize the need for further detailed investigations into the mechanisms of stress and region-specific neuroinflammation to better understand their inconsistent effects across different biological contexts, which are crucial for understanding cognitive health.