



Contribution ID: 29

Type: Poster

From neuroinflammation to behavior: uncovering microglial roles in perinatal stroke.

Perinatal stroke (1:2,300 births) occurs during critical plasticity windows, disrupting neurodevelopment. While microglia-driven inflammation is well-studied in adults, its role in the developing brain remains unclear. To address this, we induced a cortical lesion (MCAO) at P14, assessing recovery via longitudinal behavioral testing. MCAO mice reveal motor deficits and reduced NeuN+ cells. To dissect microglial contributions, we depleted this population using the CSF1R inhibitor, PLX-5622. Beyond immune surveillance, microglia regulate synaptic pruning and, potentially, E/I balance. We investigated via confocal microscopy the landscape of excitatory (vGLUT-PSD95) and inhibitory (vGAT-Gephyrin) markers, and perineuronal nets (PNNs) under microglial modulation. Finally, we correlated peripheral inflammatory markers with microglial activity and functional outcomes. Our findings will clarify microglial roles in neuro-immune crosstalk, providing a foundation for neuroprotective strategies.

Biography

Emanuela Beretta is a PhD student at the University of Padua at the Department of Biomedical Sciences. She earned her master's degree in Biology Applied to Biomedicine from the University of Milan. After a professional experience in education during the covid pandemic, she returned to research as a fellow with a focus on neuro-immune crosstalk and brain plasticity, an area in which she recently published a first-author review. Her current work integrates developmental neuroscience and optical imaging to investigate the neuroimmune regulation of synaptic architecture, aim to uncover microglia-mediated neuroinflammatory mechanisms after perinatal stroke.

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Session Classification: Poster Session

Track Classification: Poster: P7