Quantitative, Live-Cell Kinetic Analysis of Microbial Function and Morphology

Summary & Impact
- Microglia are resident immune cells of the central nervous system and play significant roles in the regulation of homeostasis and the management of tissue repair to inflammatory or pathological insults.
- Microglial impact synaptic remodeling and turnover of dendrites (paths) through the removal of damaged or unnecessary synapses (nodes).
- Automated methods and on-cell models are now enabling high-throughput, high-content, and high-resolution morphological changes of these cells.
- New characterization features, such as phagocytosis and efferocytosis, revealed immortalized microglial and primary microglia survival requires a balance of signaling to phagocytosis.
- Cilengitide, an inhibitor of 

Quick Guide

Phagocytosis/Efferocytosis

Characterization of Immortalized Microglia Efferocytosis

Effect of Cytochalasin D & Cilengitide on Microglial Function

Conclusions
- Microglia can have vastly different morphology depending on the species and source of the cells.
- Microglial cell lineages have varying degrees of phagocytic potential, and this can be modified by interaction with LPS.
- The IncuCyte® S3 Live-Cell Analysis System for Neuroscience can be used to monitor cellular morphology and quantify functional phagocytic and efferocytic activity in microglia.

Incucyte® S3 Live-Cell Analysis System for Neuroscience

Incucyte® S3 Live-Cell Analysis System

iPSC-derived Microglial Phagocytosis of Relevant Target Material

Effect of LPS Activation on Microglial Cell Line Function

Differential Morphology of Microbial Sources

Apoptotic Neuro-2A

Beta-Amyloid (1-42)

Alpha-Synuclein

Myelin Basic Protein

N2A cells were pre-treated with staurosporine (24 hrs), labeled with the Incucyte® pHrodo® Orange Cell Labeling Kit, and added to pre-plated primary rat microglia (Brain Bits-top left), iPSC-derived microglia (Axol BioSciences-top middle), iPSC-derived microglia (Cellular Dynamics International-top right), immortalized murine microglial cell line BV-2 (bottom left), and CC1 (bottom middle), and HHCC human immortalized microglial (bottom right). Differential morphologies observed depending on species and source.