

# Phenotype changes of microglial cells under various stimuli

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Microglial cells are resident brain cells that monitor their surroundings and maintain homeostasis. Cells originate from the same progenitors as peripheral macrophages. They perform common macrophage functions such as phagocytosis, antigen presentation and repair of damaged tissue, while having specific central nervous functions like synaptic stripping and regulating pain mechanisms. There are several activation states of microglial cells, each caused by different stimuli.

In a healthy brain, they possess a ramified shape with many branches for communication with nearby cells, enabling their monitoring function. At the first sign of homeostasis disruption, they change form and adapt to their new surroundings. Common stimuli include bacteria, viruses and ischemia. Each stimulus requires a unique response, and microglial cells answer by performing different functions and releasing different signal molecules, while changing their morphological shape.

In our in-vitro studies, we work with BV-2 immortalized microglial cell line, which have proven to be a valid substitute for primary microglia. We will present several different shapes of microglia caused by three distinct stimuli: virus infection with murine cytomegalovirus, LPS and hypoxia. Furthermore, we will discuss the implications of microglial activation in the human brain.

Keywords: microglia, neuroinflammation, cell morphology

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