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## Microglia activation states and cannabinoid system: Therapeutic implications

M Mecha <sup>1</sup>, F J Carrillo-Salinas <sup>2</sup>, A Feliú <sup>2</sup>, L Mestre <sup>2</sup>, C Guaza <sup>3</sup>

Affiliations

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### Abstract

Microglial cells are recognized as the brain's intrinsic immune cells, mediating actions that range from the protection against harmful conditions that modify CNS homeostasis, to the control of proliferation and differentiation of neurons and their synaptic pruning. To perform these functions, microglia adopts different activation states, the so-called phenotypes that depending on the local environment involve them in neuroinflammation, tissue repair and even the resolution of the inflammatory process. There is accumulating evidence indicating that cannabinoids (CBs) might serve as a promising tool to modify the outcome of inflammation, especially by influencing microglial activity. Microglia has a functional endocannabinoid (eCB) signaling system, composed of cannabinoid receptors and the complete machinery for the synthesis and degradation of eCBs. The expression of cannabinoid receptors - mainly CB2 - and the production of eCBs have been related to the activation profile of these cells and therefore, the microglial phenotype, emerging as one of the mechanisms by which microglia becomes alternatively activated. Here, we will discuss recent studies that provide new insights into the role of CBs and their endogenous counterparts in defining the profile of microglia activation. These actions make CBs a promising therapeutic tool to avoid the detrimental effects of inflammation and possibly paving the way to target microglia in order to generate a reparative milieu in neurodegenerative diseases.

**Keywords:** Cannabinoids; Microglia; Neurodegeneration; Neuroinflammation; Phenotypes; Repair.

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