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IMMUNE RESPONSE IN NEUROINFLAMMATION

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INTRODUCTION

Cytokines are numerous pleiotropic peptides secreted in response to insults including antigens. These polypeptides mediate immune and inflammatory responses (1). Cytokine synthesis occurs through gene transcription (mRNA) followed by cell activation (2). Cytokines can act in concert with other cytokines, and some may have a stimulatory effect, while others an inhibitory effect (3). In addition, they can mediate physiological immune states, but can also induce inflammation with serious consequences. In the central nervous system (CNS), even if the number of white immune cells is low, cytokines play an important role, both physiological and pathological, during inflammatory states (4). In neuroinflammatory pathological states, microglia are involved, a producing source of cytokines that can cause alteration of homeostasis, tissue damage, destruction of neurons, and pathological changes (5). However, it is uncertain whether cytokines may play a role in brain tissue degeneration. The cells that make up the CNS are of different types. For example, glial cells include astrocytes, microglia, and oligodendrocytes that produce various cytokines and chemokines that mediate homeostatic processes (6). Astrocytes generate some cytokines such as IL-17 and IFNg, and the chemokine CCL2 (7). The oligodendrocytes that generate the myelin sheath that surrounds axons mediate fast signaling between neurons and may be an immune target (8). Microglia, which are myeloid cell types that are similar to peripheral blood monocytes, have the function of engulfing the remains of decaying cells and also the microorganisms that manage to cross the blood-brain barrier (BBB) (9). Activated microglial cells produce several pro-inflammatory cytokines such as IL-1, TNF, and IL-6 which damage the CNS (10). Moreover, activated microglia also produce IL-12 and IL-23, cytokines involved in the phagocytosis of cellular debris and microorganisms, promoting tissue regeneration (11).

CONCLUSION

Here in this short letter, we report that neuroinflammation involves immune cells that when activated by various biological, chemical, or physical stimuli produce hypo-inflammatory immune cytokines that can damage brain tissue. At present we do not know whether anti-inflammatory cytokines such as IL-37 and IL-38 can be produced by microglia mimicking the functions of monocytes/macrophages, which produce anti-inflammatory cytokines.

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