Vascular Neurology 2018;6:2-2
ISSN 2092-6855

Regulatory T Cell Therapies have the Potential to Mitigate the Exacerbation of Brain Injury by Inflammation and to Promote an Active Post-Injury Brain Repair Programme

Recently it has been reported that immune cell based treatments in neurological disorder. The healthy immune system has natural checkpoints that temper pernicious inflammation. Cells mediating these checkpoints include regulatory T cells, regulatory B cells, regulatory dendritic cells, microglia, macrophages and monocytes. In this article, highlight discoveries on the beneficial functions of regulatory immune cells and their mechanisms of action and evaluate their potential use as novel cell-based therapies for brain disorders.
Nature Reviews Neurology, Volume 14, pages 559-568 (2018)

The past three decades has forced that the CNS is isolated from the peripheral immune system and is immunologically inert but in reality, the brain and spinal cord are under continuous immune surveillance and regulation. The activation and recruitment of immune cells during CNS disease or injury are crucial for pathogen eradication, debris clearance, resolution of inflammation and neurorestoration. However, excessive or indiscriminate immune responses harbour the potential to exacerbate damage to the brain and impair its capacity for self-repair. The ability of immune sentinels to maintain or upset immune equilibrium presents us with new opportunities to mitigate tissue damage and expedite restoration of the neurovascular unit.

In this article propose that these therapeutic goals might be achieved by boosting natural immune regulatory mechanisms using cell-based approaches. Various types of immune cells, including regulatory T (Treg) cells, regulatory B (Breg) cells, regulatory dendritic cells, microglia, macrophages and monocytes are known to alleviate inflammation and promote brain debris clearance. Intriguingly, these cells also execute unique regenerative functions during brain repair and regeneration, such as oligodendrocyte differentiation, myelin restoration, neural stem cell proliferation, neurovascular remodelling and rewiring of neural circuitry. Extensive preclinical testing and promising results from early clinical trials of immune cell therapy in autoimmune diseases and transplantation have kindled great interest in adoptive immune cell therapies, particularly for their ease of delivery, ability to naturally home in on target tissues and potential to change disease course.

Regulatory immune cell therapies have the potential not only to mitigate the exacerbation of brain injury by inflammation but also to promote an active post-injury brain repair programme. By harnessing the reparative properties of these cells, we can reduce over-reliance on medications that mask clinical symptoms but fail to impede or reverse the progression of brain disorders. Although these discoveries encourage further testing and genetic engineering of regulatory immune cells for the clinical management of neurological disorders, a number of challenges must be surmounted to improve their safety and efficacy in humans.

