SPRINGER NATURE Link

Find a journal Publish with us Track your research Search

Home > Regenerative Engineering and Translational Medicine > Article

Macrophages' Functions in the Central and Peripheral Nervous Regeneration

Review | Published: 14 October 2024

(2024) Cite this article

Shukur Wasman Smail, Aida Karimian, Arash Abdolmaleki, Asadollah Asadi, Hasan Taheri & Shwan Ali Omar

22 Accesses Explore all metrics →

Abstract

Purpose

Microglia, the immune-competent central nervous system (CNS), have long been suspected of causing many CNS diseases. However, microglia are neuroprotective, so we must reconsider their role in CNS and peripheral nervous system (PNS) illnesses.

Method

In this review, data sources including Google Scholar, Scopus, PubMed, and Science Direct were searched for publications with no particular time restriction to get a holistic and comprehensive view of the research.

Results

Recent study shows that microglia are vital to the CNS and have complicated effects on astrocytes and myeloid cells. The pathophysiology of many disorders, including peripheral nervous system ailments, requires an understanding of microglia activities. The impact of microglia on neuronal survival in CNS and PNS diseases and bloodborne macrophages on CNS and PNS injuries is examined in this article.

Conclusion

Metabolic changes in glycolysis and oxidative phosphorylation are crucial in understanding the activation of microglia as they are strongly linked to reactive oxygen species formation and variations in pro- and anti-inflammatory phenotypes.

Lay Summary

Macrophages play a crucial role in tissue homeostasis, inflammation, and regeneration. They are divided into pro-inflammatory (M1) and pro-repair (M2) subtypes, each with distinct functions. M2-polarized exosomes have anti-inflammatory properties and can be used to treat various diseases, including autoimmune diseases, heart, kidney, lung, liver, brain, muscle, and skin conditions.