Origin of microglia

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摘要

Abstract

This paper reviews the various proposed hypotheses on the origin of microglia. The seminal study of del Rio-Hortega first stated that the cells were derived from the mesodermal pial cells that invaded the brain during embryonic development. Along with this was the description of precursor cells in the yolk sac in early development. Our results in the embryonic mouse brain have shown the occurrence of lectin-labelled precursor cells at the yolk sac that later appeared in the mesenchymal tissue associated with the neuroepithelium where they penetrated the nervous tissue to become the microglia. A second major view has held that microglia are of neuroectodermal origin; the cells either originate from glioblasts or the germinal matrix. Another school of thought is that microglia are derived from blood monocytes. In this connection, circulating monocytes enter the developing brain to assume the form as amoeboid microglia that subsequently evolve to become the ramified microglia. In traumatic brain lesions following an intravenous injection of colloidal carbon as a cytoplasmic marker for monocytes, it was found that carbon-labelled monocytes were the main source of brain macrophages, some of which transformed into microglia during the healing process. In conclusion, our results derived from the normal and altered brain development as well as from experimental lesions tend to favour the view of the monocytic nature of microglia. Recent studies by us also point to the possibility that some microglial cells may arise from the pial mesenchymal macrophages that appear to originate from the yolk sac precursors.