

Characteristics and functions of NG2 cells in normal brain and neuropathology.

Wang A, He BP.

Department of Anatomy, Yong Loo Lin School of Medicine, National University of Singapore, Singapore.

Abstract

OBJECTIVE: This review is focused on the current understanding of the roles of the fifth class of non-neuronal cells, NG2 cells, in the central nervous system (CNS). **METHODS:** We have reviewed some literature on properties of NG2 cells, including cell morphology, expression of receptors and possible functions. **RESULTS:** Chondroitin sulfate proteoglycan (NG2) is expressed in a high proportion in non-neuronal cells of the CNS. During development, NG2 cells can differentiate into oligodendrocytes, astrocytes and neurons. In the adult, the NG2 cells have a common morphology: multibranched processes and small cell bodies, and are ubiquitously distributed throughout brain parenchyma. They possess some functional receptors and contact neurons at nodes of Ranvier or via synaptic terminals. Some NG2 cells can even fire action potential. Various brain injury models have demonstrated that NG2 cells adjacent to the damage site could increase in number and become hypertrophic. However, there is no clear evidence indicating the function of NG2 cells in the adult brain. **DISCUSSION:** The function of NG2 cells in the adult brain is still uncertain. The NG2 expressing cells may be progenitor cells in the developing brain. In the adult, the discovery of functional receptors, interactions with neurons and ability to respond to different harmful stimulations have implied roles of NG2 cells in facilitating neuronal network function, which may be important in brain inflammation, neurodegeneration and neuroregeneration.

PMID: 19298754 [PubMed - indexed for MEDLINE]