

Polydendrocytes (NG2+ cells) are recently discovered glial cells in central nervous system (CNS) distinct from neurons, oligodendrocytes, astrocytes and microglia. Polydendrocytes could be identified mainly by the expression of the proteoglycan NG2 and platelet derived growth factor receptor alpha. They could be found in grey and white matter and represent the largest proliferating cell population in adult CNS. It is accepted that a subpopulation of polydendrocytes gives rise to oligodendrocytes not only in development, but also in adult CNS and after demyelination. A subpopulation gives rise also to protoplasmic astrocytes in embryonic development. In in vitro studies was observed that neurons and astrocytes may arise from polydendrocytes. Electrophysiological studies revealed that polydendrocytes form synapses with neurons and that their rate of proliferation could be controlled this way. Polydendrocytes are very important in study of remyelination after ischemia and demyelinating diseases, as they might serve as source of new oligodendrocytes or possibly of another glial cells. This thesis summaries general knowledge about polydendrocytes. Initially, I focus on their immunohistochemical markers and morphology. Next, I summarise findings about their development and fate in both embryonic and adult CNS. A bit more focus is given on their physiology and at the end I give information about their possible role in remyelination.