ABSTRACT

Astrocytes are the most numerous cell type in the brain, where they are known to play multiple important functions. While there is an increasing evidence of their morphological, molecular, and functional heterogeneity, it is not clear whether their positional and morphological identities are specified during brain development. We addressed this problem with Star Track, a novel strategy to analyze cell lineages through the combinatorial expression of fluorescent proteins under the GFAP promoter regulation. Following in utero electroporation, stochastic expression of these proteins produces inheritable marks that enable the long-term in vivo tracing of glial progenitor lineages. Analyses of clonal dispersion in the adult cortex revealed unanticipated and highly specific clonal distribution patterns. In addition to the existence of clonal arrangements in specific domains, we found that different classes of astrocytes emerge from different clones. Moreover, due to an artefactual expression of the GFAP promoter in NG2-glia, we found that this population is produced as immense clonal clusters whose number of cells is about one order of magnitude higher than in other neural types. Unexpectedly, this number remained low during embryonic and early postnatal stages, increasing up afterwards. Together, these findings demonstrated significant similarities and differences in the development of these important glial populations.

Publicaciones

