

Subcortical origins of human and monkey neocortical interneurons

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GABAergic inhibitory interneurons play crucial roles in the development and organization of cortical networks. Nearly all GABAergic neurons in rodent cortex are generated from the ventral telencephalon. However, the developmental origin of interneurons in human cortex is controversial. A better understanding of interneuron development in human neocortex will provide insights into cortical evolution and also has implications in neuropsychiatric disorders such as epilepsy, schizophrenia and autism. In this work, the authors show that the expression patterns of several key transcription factors in the developing human and monkey telencephalon share common features with rodents. This enabled authors to unambiguously identify three main subcortical progenitor domains: the lateral, medial and caudal ganglionic eminence (LGE, MGE and CGE, respectively). Based on the continuity of Sox6, COUP-TFII and Sp8 transcription factor expression, they present strong evidence that the vast majority of monkey and human neocortical interneurons originate from the ganglionic eminences. These findings reveal that the origins of cortical interneurons are conserved from rodents to humans, significantly reshaping our understanding of the origin and classification of primate neocortical interneurons.

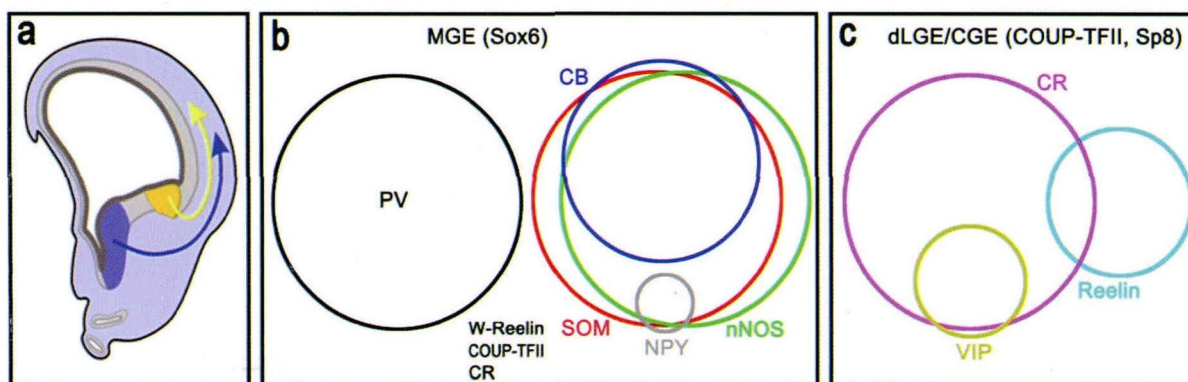


Figure Schematic diagram shows the origin and classification of monkey and human neocortical interneurons. a, We propose that the vast majority of primate neocortical interneurons originate from the MGE, dLGE and CGE. b, MGE-derived neocortical interneurons (Sox6+) mainly include PV+, SOM+, nNOS+, CB+, NPY+, weak Reelin (W-Reelin)+, a subset of COUP-TFII+/Sox6+ and CR+/Sox6+ interneurons. c, Dorsal LGE and CGE (dLGE/CGE)-derived neocortical interneurons (COUP-TFII+ and/or Sp8+) mainly include CR+, VIP+ and strong Reelin+ interneurons.