

Anna Hoerder-Suabedissen: **Subplate through the ages: from development to adult connectivity**

Subplate neurons have an essential role in cortical circuit formation. They are among the earliest formed neurons of the cerebral cortex, are located at the junction of white and grey matter (Kostovic and Rakic 1980). They are necessary for correct thalamocortical axon growth towards the cortex, including crossing the pallial-subpallial boundary, correct areal targeting and formation of periphery related innervation patterns such as ocular dominance columns and formation of barrels in rodent somatosensory cortex (see Hoerder-Suabedissen and Molnár (2015) for review). Recent transcriptomic studies have provided opportunities for monitoring and modulating selected subpopulations of these cells. Several markers including connective tissue growth factor and complexin 3 are suitable for identifying subplate neurons across a wide range of species during later developmental stages. Analyses of mouse lines expressing reporter genes have demonstrated a novel, extra-cortical site of subplate neurogenesis (Pedraza et al. 2014), and highlighted that the early born cells of the subplate compartment are continuous with the cells residing in layer 6b, adjacent to the white matter, in adult rodent brains. Moreover, layer 6b cells integrate into the mature cortico-thalamic circuitry in unique patterns that are distinct from those of the other cortico-thalamic projection neuron groups (Hoerder-Suabedissen et al. 2018).

- Hoerder-Suabedissen A, Hayashi S, Upton L, Zachary N, Casas-Torremocha D, Eleanor G, Sarada V, Kanold PO, Francisco C, Kim Y, Molnár Z. 2018. Subset of Cortical Layer 6b Neurons Selectively Innervates Higher Order Thalamic Nuclei in Mice. *Cereb Cortex*.
- Hoerder-Suabedissen A, Molnár Z. 2015. Development, evolution and pathology of neocortical subplate neurons. *Nat Rev Neurosci*. 16:133–146.
- Kostovic I, Rakic P. 1980. Cytology and time of origin of interstitial neurons in the white matter in infant and adult human and monkey telencephalon. *J Neurocytol*. 9:219–242.
- Pedraza M, Hoerder-Suabedissen A, Albert-Maestro MA, Molnár Z, De Carlos JA. 2014. Extracortical origin of some murine subplate cell populations. *Proc Natl Acad Sci U S A*. 111:8613–8618.