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Forebrain embryonic zinc factor 2 directs the development of neural stem cells in the subventricular zone toward a cortical phenotype

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To determine whether the transcription factor Fezf2 is able to respecify the fate of neural stem cells during the postnatal state *in vivo*, Fezf2 was delivered by a lentivirus into the subventricular zone (SVZ) at the postnatal day 4. That zone is known as a postnatal and adult stem cell niche. Analogous to the physiological development of postnatal SVZ-derived granule cells of the olfactory bulb, Fezf2-expressing cells also migrated to the olfactory bulb and resided in the granule cell layer. Some of those Fezf2-expressing cells obtained soma diameters larger than 13 μm, which was never seen in bulbar granule cells. Patch-clamp experiments were done in those putatively respecified neurons to determine whether functional respecification was successful. My results revealed that functional properties were indeed respecified by ectopic expression of Fezf2. Passive electrophysiological properties, firing pattern, action potential waveforms of respecified neurons were reminiscent of corticofugal pyramidal neurons. Furthermore they integrated into the surrounding network while displaying pyramidal cell- like synaptic properties. Morphological analysis of respecified neurons revealed lost apicobasal polarity and a more elaborate dendritic structure compared to olfactory bulb granule cell. Interestingly an axon was not induced by overexpression of Fezf2. My results showed that Fezf2 is able to partially respecify the functional and morphological identity of postnatally generated neurons from the subventricular zone toward a pyramidal cell- like phenotype in the postnatal setting *in vivo*.