Title: Crosstalk between intracellular and extracellular signals regulating interneuron production migration and integration into the cortex

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ABSTRACT

During embryogenesis, cortical interneurons are generated by ventral progenitors located in the ganglionic eminences of the telencephalon. They travel along multiple tangential paths to populate the cortical wall. As they reach this structure they undergo intracortical dispersion to settle in their final destination. At the cellular level, migrating interneurons are highly polarized cells that extend and retract processes using dynamic remodeling of microtubule and actin cytoskeleton. Different levels of molecular regulation contribute to interneuron migration. These include: 1/ Extrinsic guidance cues distributed along migratory streams that are sensed and integrated by migrating interneurons; 2/ Intrinsic genetic programs driven by specific transcription factors that grant specification and set the timing of migration for different subtypes of interneurons; 3/ Adhesion molecules and cytoskeletal elements/regulators that transduce molecular signalings into coherent movement. These levels of molecular regulation must be properly integrated by interneurons to allow their migration in the cortex. The aim of this review is to summarize our current knowledge of the interplay between microenvironmental signals and cell autonomous programs that drive cortical interneuron porduction, tangential migration, and intergration in the developing cerebral cortex.