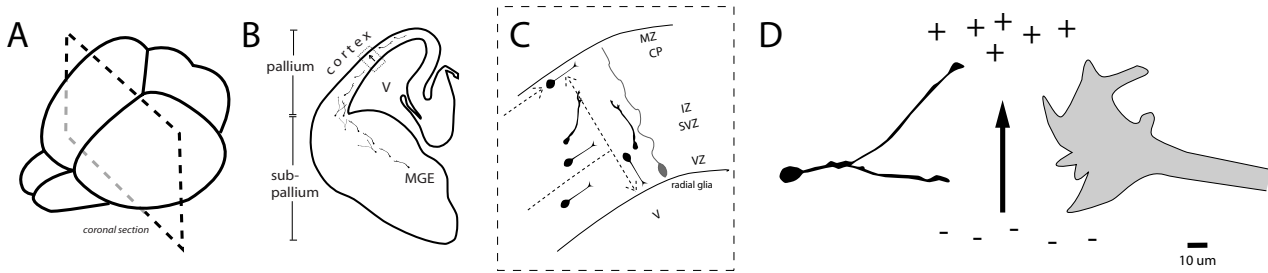
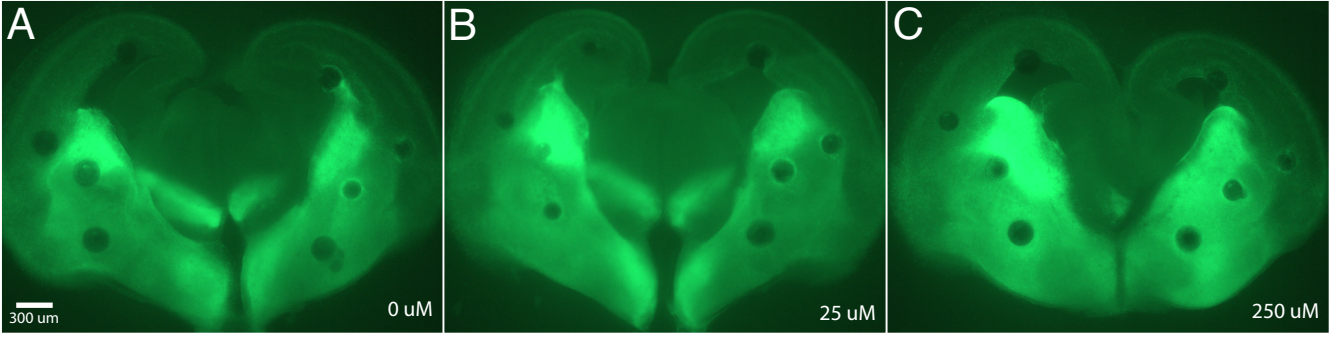
Supplemental Fig. S1



Supplemental Figure S1.**Interneurons migrate long distances making multiple guidance decisions along their path** (A) Developing mouse forebrain, sliced in the coronal plane shown in B. (B) Interneurons migrate from the medial ganglionic eminence (MGE) in the ventral sub-pallium to the cortex (dorsal pallium) to integrate into circuits involved in cognition and memory. (C) Interneurons in the cortex migrate tangentially in streams in the marginal zone (MZ) and subventricular zone/intermediate zone (SVZ/IZ). After an unknown change in guidance, interneurons exit the migration streams and invade the cortical plate (CP), their final destination. Excitatory neurons are born in the ventricular zone (VZ) next to the fluid-filled ventricle (V). They migrate radially to the cortical plate on radial glial fibers. (D) To make their guidance change, interneurons may use the dynamic branching of their leading process to probe their surrounding area for attractants or repellants similar to how a growth cone guides a projecting axon.

Supplemental Figure. S2



Supplemental figure S2. **Interneuron attraction to SDF1 is not affected by forskolin treatment**
(A) Agarose beads soaked with BSA (left hemisphere) or SDF1 (right hemispere) were implanted in Dlx-5/6-Cre-IRES-GFP brain slices and cultured 24 hours in control (DMSO). GFP+ cells form rings around SDF1+ beads (right), but not around BSA+ beads (left). (B and C) GFP+ rings form in slices treated with 25uM (B) or 250uM (C) forskolin. Representative images, at least two slices for each condition, three independent experiments. [Scale bar = 300 um]

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SDF1 regulates leading process branching and speed of migrating interneurons

Video Legends

Fig1video1. SDF1 reduces branching frequency and increases speed. Primary interneurons migrating *in vitro* from a medial ganglionic eminence explant treated with control display leading process and interstitial branching (left). Interneurons treated with SDF1 display increased migration speed and reduced frequency of branching (right). 10X time-lapse phase microscopy, 1 frame / 10 min, 3 FPS.

Fig3+5video1. Interneurons migrate in defined streams in Dlx5/6-Cre-IRES-GFP mouse brain slices (left). AMD3100 disrupts interneuron stream migration by increasing branching frequency in slices and results in increased cortical plate invasion (center). Forskolin-treatment (right) disrupts interneuron stream migration by increasing branching frequency in slices and results in increased cortical plate invasion, similar to blocking SDF1-signaling with AMD3100. 20X time-lapse confocal microscopy, 1 frame / 10 min, 7 FPS.

Fig4video1. Control-treated DsRed-transfected primary interneurons migrate *in vitro* at typical speed (upper left), while SDF1-treated interneurons migrate faster (upper right). Co-transfection with Gi-minigene does not significantly change migration speed in

control-treated interneurons (lower left), but in SDF1-treated interneurons, co-transfection with the Gi-minigene returns migration speed to control levels (lower right). 10X time-lapse epi-fluorescence microscopy, 1 frame / 10 min, 7 FPS.

Fig4video2. Control-treated primary interneurons display basal branching frequency *in vitro* (top), while treatment with forskolin increases branching significantly (middle). Treatment with db-cAMP results in a similar increase in branching frequency (bottom). Both these treatments block SDF1-induced reduction in branching frequency. 10X time-lapse phase microscopy, 1 frame / 10 min, 3 FPS.