Supplemental Figure 1 - In situ hybridization for BDNF in the adult mouse forebrain. (A) In situ hybridization for BDNF in the adult mouse brain. Scale bar, 100 µm. (B) In situ hybridization for BDNF and immunostaining for PECAM (red) in the adult RMS showing that endothelial cells of blood vessels synthesize BDNF. Note, that BDNF mRNA is present in the endothelial cells (arrowheads), but not in other cell types of the adult RMS (asterisks). Scale bar, 10 µm. (C) In situ hybridization for BDNF and immunostaining for PECAM (green) in the striatum showing that endothelial cells of blood vessels in this region do not synthesize BDNF. Scale bar, 20 µm. (D,E) In situ hybridization for BDNF in the cortex (D) and hippocampus (E). Note that BDNF mRNA has neuronal pattern of expression. Scale bar, 100 µm.

Supplemental Figure 2 - Expression of BDNF and TrkB in the OB and striatum. (A,B) Expression of BDNF in the adult OB. Note, high level of expression of BDNF in the RMSOB and low level of expression in the granule cell layer (GCL) where neuroblast migration ends. Scale bar, 100 µm. (C) Expression of BDNF in the adult RMS and striatum. Note, high level of BDNF expression in the RMS and its absence in the striatum. Scale bar, 100 µm. (D) RT-PCR analysis for BDNF in the striatum and whole brain fraction. (E) The astrocytes adjacent to the blood vessels (green) do not contain BDNF (blue) in the striatum adjacent to the migratory stream in the adult brain. Scale bar, 10 µm. (F) Expression of TrkB receptors in the RMSOB and GCL of the OB. Note, higher level of expression of TrkB in the RMSOB as compared to the GCL. Scale bar, 50 µm.

Supplemental Figure 3 - BDNF induces vasculature-associated cell migration. (A) Stereotaxic injection of NaCl (0.9%) and BDNF (100 ng) in the striatum. Note de-routed Dcx+ neuroblasts in the striatum of BDNF-injected animals. Scale bar, 100 µm. (B) High-magnification images of the boxed area in (A), depicting examples of Dcx+ neuroblasts (red) migrating along PECAM-
labeled blood vessel (green) in the BDNF (blue) injected animal. Scale bar, 10 µm. (C,D) Images showing Dcx+ cells in the OB of IgG-Fc and TrkB-Fc (10 µg/ml) infused animals. Scale bars, 100 µm. (E) Mean immunofluorescent intensity of Dcx+ cells in the OB slices of IgG-Fc, TrkB-Fc (10 µg/ml) and p75NTR function blocking antibodies (90 µg/ml) infused animals. (F) Images illustrating caspase+ cells in the RMS. Scale bar, 10µm. (G,H) Quantification of caspase+ cells following incubation of slices (G) in IgG-Fc, TrkB-Fc, BDNF and p75 function-blocking antibody for 1 hour or following osmotic minipump infusions of these reagents just above horizontal limb of RMS (H).

Supplemental Figure 4 - Decreased number of BrdU+ cells in the RMSOB of TrkBfl/fl GLAST::CreERT2 mice. (A) Micrographs displaying TrkB (green) and GFAP (red) immunolabeling in the RMS of TrkBfl/fl GLAST::CreERT2 (TrkBfl/fl) and TrkBwildtype/wildtype GLAST::CreERT2 (TrkBwt/wt) mice 5 days after the end of tamoxifen treatment. Note, reduced labeling for TrkB in TrkBfl/fl GLAST::CreERT2 (TrkBfl/fl) mice. Scale bar, 10 µm. (B) Micrographs showing BrdU+ cells in the RMSOB of TrkBfl/fl GLAST::CreERT2 (TrkBfl/fl) and TrkBwildtype/wildtype GLAST::CreERT2 (TrkBwt/wt) mice 5 days following BrdU injection. Scale bar, 50 µm. (C) Density of BrdU+ cells in the RMSOB of TrkBfl/fl GLAST::CreERT2 (TrkBfl/fl) and TrkBwildtype/wildtype GLAST::CreERT2 (TrkBwt/wt).

Supplemental Figure 5 - Co-application of BDNF and TrkB-Fc induces different effects on the cell migration depending on the BDNF concentration. (A,B) Individual experiment demonstrating that BDNF (10 ng/ml) and TrkB-Fc (1µg/ml) co-application decreases the average distance that migrating cells propagate (A) and the percentage of cells in the migratory phase at each time-point (B). (C) Summary graph illustrating the effect of BDNF and TrkB-Fc co-application. (D,E,F) Individual experiment (D,E) and summary graph (F) demonstrating that co-application of BDNF (100 ng/ml) and TrkB-Fc
(1μg/ml) has no effect on the average distance that migrating cells propagate (D) and the percentage of cells that are in the migratory phase at each time-point (E). (G,H,I) Individual experiment (G,H) and summary graph (I) demonstrating that co-application of BDNF (200 ng/ml) and TrkB-Fc (1μg/ml) increases the average distance that migrating cells propagate (G) and the percentage of cells in the migratory phase at each time-point (H).

**Supplemental Figure 6 - Application of K252a does not affect migration of neuronal precursors.** (A,B) Individual experiment demonstrating that bath application of K252a (200 nM) does not affect the average distance that migrating cells propagate (A) and the percentage of cells that migrate at each time-point (B). The time period for K252a application is shown by a black line. Each time-point represents the average value for 20-30 cells. (C) Summary graph quantifying the effect of K252a application on the average distance that migratory cells propagates, the percentage of migratory cells and the duration of the stationary period. At least 50 stacks were averaged for each slice to obtain the mean value for the changes induced by K252a. Control values were calculated by averaging 50 stacks before K252a application.

**Supplemental Figure 7 - Role of IP3-sensitive intracellular stores in the Ca2+ fluctuations in astrocytes and neuroblasts migration.** (A) Blockade of Ca2+ release from IP3-sensitive intracellular Ca2+ stores by 2-aminoethoxydiphenyl borate (2-APB) (100 μM) pre-application completely abolished the effect of bicuculline on the Ca2+ activity in astrocytes and ablated neuroblasts migration. (B) Summary graph showing changes in the Ca2+ activity in the astrocytes following pre-incubation of slices with 2-APB followed by application of bicuculline or GABA.

**Supplemental Movie 1 - Neuronal precursors are aligned along the blood**
vessels. The part of rostral migratory pathway was reconstructed in three dimensions from 35 z-plane confocal optical sections taken at a step of 1 μm. A 360° rotation of the cluster is shown. Note that blood vessels (labeled in green by Dextran-FITC) parallel migratory stream of adult neuronal precursors (RMS). Most of these neuronal precursors (stained in red by BrdU injection 5 days before analysis) are positioned close to blood vessels.

Supplemental Movie 2 - Migration of neuronal precursors in the acute slices prepared from the adult mouse forebrain. Time-lapse videoimaging of neuronal precursors in the acute slices prepared from the adult mouse forebrain. Time is indicated in minutes in the upper left corner. Scale bar, 10 μm.

Supplemental Movie 3 - Neuronal precursors migrate along the blood vessels. GFP-labeled neuronal precursors migrates along blood vessel in the acute slices of the adult mouse forebrain. Blood vessels were labeled by injection of dextran-TexasRed to the tail vein 1 hour before preparation of acute slices. GFP-expressing retrovirus was injected into the SVZ 3 days before time-lapse imaging in the RMS. Time is indicated in minutes in the upper left corner. Scale bar, 10 μm.

Supplemental Movie 4 - Neuronal precursors preserve their vasculature-association via leading process. Example of two GFP-labeled neuronal precursors that migrates along blood vessel in the acute slices of the adult mouse forebrain. The first cell has straightforward migration and consistently remains close to the blood vessel with its soma. The second cell also preserves an association with the vasculature via its leading processes despite the fact that the soma of the cell moved more than 3 μm away from the blood vessels. Blood vessels were labeled by injection of dextran-TexasRed to the tail vein 1 hour before preparation of acute slices. GFP-expressing retrovirus was injected into the SVZ 3 days before time-lapse imaging in the RMS. Time is indicated in
minutes in the upper left corner. Scale bar, 10 μm.

**Supplemental Movie 5 - BDNF increases migration of neuronal precursors.**
Time-lapse videoimaging of GFP-labeled neuronal precursors in the RMS of acute slices of the adult mouse forebrain. GFP-expressing retrovirus was injected into the SVZ 3 days before time-lapse imaging in the RMS. GFP+ migratory cells are labeled in green during their migratory periods and in red during their stationary periods. The beginning of BDNF (10 ng/ml) application is shown in the upper left corner. Note, increased number of GFP+ cells in the migratory phase following application BDNF. Scale bar, 10 μm.

**Supplemental Movie 6 - TrkB-Fc decreases migration of neuronal precursors.** Time-lapse videoimaging of GFP-labeled neuronal precursors in the RMS of acute slices of the adult mouse forebrain. GFP-expressing retrovirus was injected into the SVZ 3 days before time-lapse imaging in the RMS. GFP+ migratory cells are labeled in green during their migratory periods and in red during their stationary periods. The beginning of TrkB-Fc (1 μg/ml) application is shown in the upper left corner. Note, decreased number of GFP+ cells in the migratory phase following TrkB-Fc application. Scale bar, 10 μm.

**Supplemental Movie 7 - BDNF does not affect migration of neuronal precursors in p75NTR deficient animals.** Time-lapse videoimaging of GFP-labeled neuronal precursors in the RMS of acute slices prepared from p75NTR deficient animals. GFP-expressing retrovirus was injected into the SVZ 3 days before time-lapse imaging in the RMS. GFP+ migratory cells are labeled in green during their migratory periods and in red during their stationary periods. The beginning of BDNF (10 ng/ml) application is shown in the upper left corner. Note, reduced migration of neuronal precursors in p75NTR deficient animals and lack of BDNF effect on the neuroblasts migratory behavior. Scale bar, 10 μm.
Supplemental Movie 8 - GABA increases the frequency of Ca2+ fluctuations in astrocytes. Time-lapse videoimaging of Fluo4-labeled astrocytes in the acute slices of the RMS under control condition (left panel) and following application of GABA (10 µM) (right panel). Note, increased Ca2+ fluctuations after GABA application. Scale bar, 5 µm.

Supplemental Movie 9 - GABAA receptor antagonist decreases the frequency of Ca2+ fluctuations in astrocytes. Time-lapse videoimaging of Fluo4-labeled astrocytes in the acute slices of the RMS under control condition (upper panel) and following application of bicuculline (100 µM) (lower panel). Note, decreased Ca2+ fluctuations after application of bicuculline. Scale bar, 10 µm.