

## SUPPLEMENTARY MATERIAL

**Fig. S1: *Migration and Nrp1 expression of facial branchiomotor somata.***

The position of trigeminal (V) and facial (VII) branchiomotor neurons in ventricular (v) and pial (p) views of the hindbrain basal plate was monitored by in situ hybridisation (ISH) with a probe specific for *Isl1* between 11.5 and 13.5 dpc. After flat mounting, the ventral midline is located centrally (asterisk) and the dorsal basal plate laterally. Trigeminal somata have assembled into paired nuclei (Vn) on the pial side of the hindbrain by 11.5 dpc (Vn; B), whilst the somata of facial branchiomotor neurons (VIIIm) are still migrating at 11.5 (A), 12.5 (E) and 13.5 (I) dpc. The facial branchiomotor somata first move tangentially from r4 into r5 (filled arrowheads). During their migration, they loop around the abducens nucleus (VIIn; visible only in E) before moving into r6. In r6 territory, facial somata migrate radially from the ventricular to the pial side of the hindbrain; the location where they begin their radial migration is indicated with brackets in B,D and open arrowheads in E,I. On the pial side, the somata form the paired facial motor nuclei (VIIIn). *Nrp1* was expressed by facial branchiomotor somata during their migration (arrowhead in C,G,K) and after they settled into their nuclei (VIIIn; H,L). *Nrp1* was also expressed by trigeminal branchiomotor nuclei (Vn; D,H), but expression extended to surrounding territory at later stages (arrow; L). Scale bar: 250  $\mu$ m.

**Fig. S2: *Defective soma migration of facial branchiomotor neurons in mutants lacking VEGF164 or Nrp1 is not caused by an abnormal hindbrain architecture.***

Migrating facial branchiomotor somata (VIIIm) and differentiating neurons in two medial columns (M1 and M2) and one dorsal column (D1) were visualised in ventricular (v) and pial (p) views of the hindbrain at 12.5 dpc with a probe specific for *Phox2b*. In

wild type hindbrains (wt/wt; A,B) and in hindbrains lacking Nrp1 (Nrp1<sup>-/-</sup>; C,D) or VEGF164 (120/120; E,F), facial branchiomotor neurons originated in r4, and medial and dorsal neuron columns formed in their appropriate positions along the dorso-ventral and anterior-posterior axis (compare A with C,E). In contrast, the tangential soma migration of facial branchiomotor neurons from r4 to r6 on the ventricular side was compromised in the absence of Nrp1 or VEGF164 (C,E), and only few facial somata had condensed into facial motor nuclei on the pial side in mutants at this stage (VIIn; compare B with D,F). Scale bar: 250  $\mu$ m. The midline is indicated with an asterisk.