



### Extended Data Figure 8 | Gene expression in the nemertean

*L. ruber*. **a**, None of the nerve cord patterning genes is expressed during gastrulation in *L. ruber*. In the intracapsular larva, *nkx2.1* is expressed in the cephalic imaginal discs (arrowheads), *nkx2.2* and *nkx6* in an anterior and a posterior domain of the trunk imaginal discs (arrowheads) respectively, and *pax6* is detected both in the cephalic and in the anterior trunk imaginal discs (arrowheads); *pax3/7* is broadly expressed. With metamorphosis, *nkx2.1* is detected in the head and proboscis, *nkx2.2* is detected in the nerve cords and isolated trunk cells (arrowheads), *nkx6* is

expressed in the nerve cords (arrowheads), *pax6* is observed in the head and nerve cords (arrowheads), and *pax3/7* remains broadly expressed. All gastrulae are vegetal views. For larvae and early juveniles, the left column is a dorsoventral view and the right column is a lateral view (anterior to the left). **b**, Lateral views (anterior to the left) of neuronal markers in juveniles. They are all expressed in the VNCs (arrowheads), and not in the dorsal neurite bundle. In all panels, the asterisk indicates the position of the mouth opening. Abbreviations: bp, blastopore; mo, mouth; pb, proboscis.