



Extended Data Figure 4 | Expression of BMP components in Nemertodermatida and Acoela. **a**, In the nemertodermatid *M. stichopi*, the BMP pathway antagonists *twisted gastrulation* (*tsg*) and *crossveinless 2* (*cv2*) are expressed dorsally, whereas the antagonist *BAMBI* is broadly detected in the ventral side. The gene *tolloid* (*tld*) is expressed both dorsally and ventrally. The BMP receptor *bmpR-I* is expressed dorsolaterally and *bmpR-II* is detected more broadly. The genes *smad1* and *smad4* are expressed broadly and *smad6* is expressed along the dorsal nerve cords. **b**, The BMP ligand *bmp2/4* is not expressed in neuronal cells

(*elav1*⁺ cells), but in cells located medially to the nerve cords (tubulin positive). The cells expressing *bmp2/4* also express *tsg*, and *cv2* is expressed dorsally along the nerve cords. **c**, In the acoel *I. pulchra*, the BMP antagonist *tld* is expressed ventrally, *bmpR-I* is detected in the inner body, and *bmpR-II* is expressed anteriorly and posteriorly around the copulatory organ. The genes *smad1* and *smad4* are expressed generally, while *smad6* is expressed in two bilaterally symmetrical anterior clusters. All main panels are dorsoventral views, and the insets are lateral views.