

Legends to the Supplementary Figures

Figure S1. (A,B) Rescue of EphA4 knockdown (A4MO) by *Xenopus* EphA4 mRNA injection (A4) at indicated doses of MO or mRNA. Top: examples of sagittally fractured embryos at stage 11; bottom, archenteron lengths in experiments shown at top. (C,D) Kinase-dead EphA4 does not rescue and acts dominant-negatively. Top: examples of sagittally fractured embryos at stage 11; bottom, archenteron lengths in experiments shown at top. Asterisks, significant reduction.

Figure S2. Marker gene expression in control (A-E) and EphA4-MO embryos (F-J) at stage 11. (A,F) *Gsc*, prechordal mesoderm; (B,G) *Cerberus*, anterior mesendoderm; (C,H) *Chordin*, anterior chordamesoderm; (D,I) *Xbra*, chordamesoderm; (E,J) *Sox2*, neuroectoderm.

Figure S3. Control of *Xbra* expression. (A-D) *Xbra* expression under various treatments. A4MO, EphA4-MO; caMEK, constitutively active MEK; SU5402, inhibitor of FGF receptor; U0126, MAPK inhibitor; LY294002, PI3K inhibitor; DMSO, dimethylsulfoxide control.

Figure S4. Effect of *Xbra* injection on involution. (A) A4, EphA4-MO; *Xbra*, *Xbra* mRNA; doses as indicated. (B) Archenteron length in experiments shown in (A).

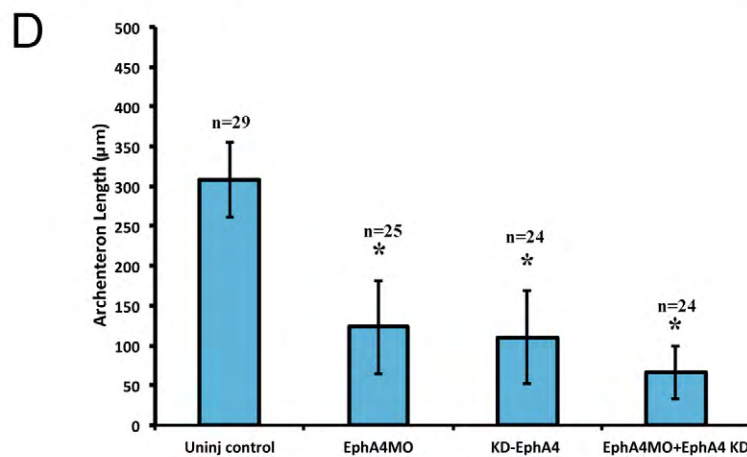
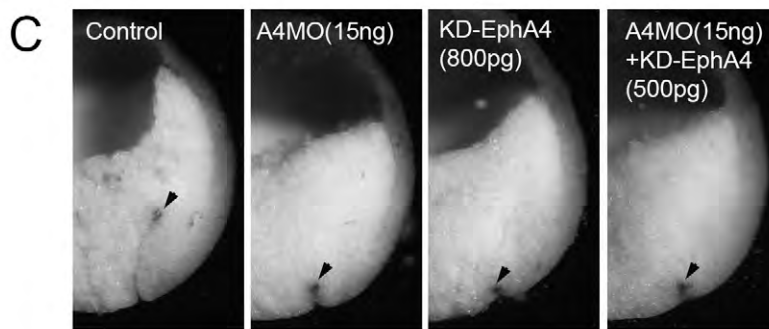
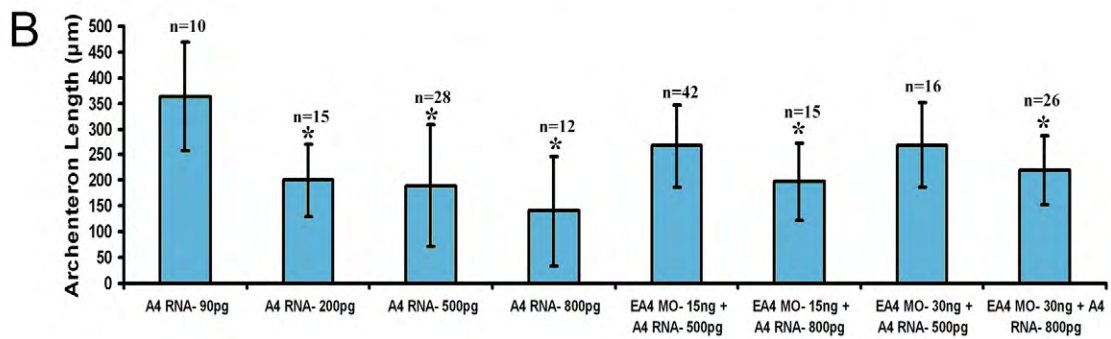
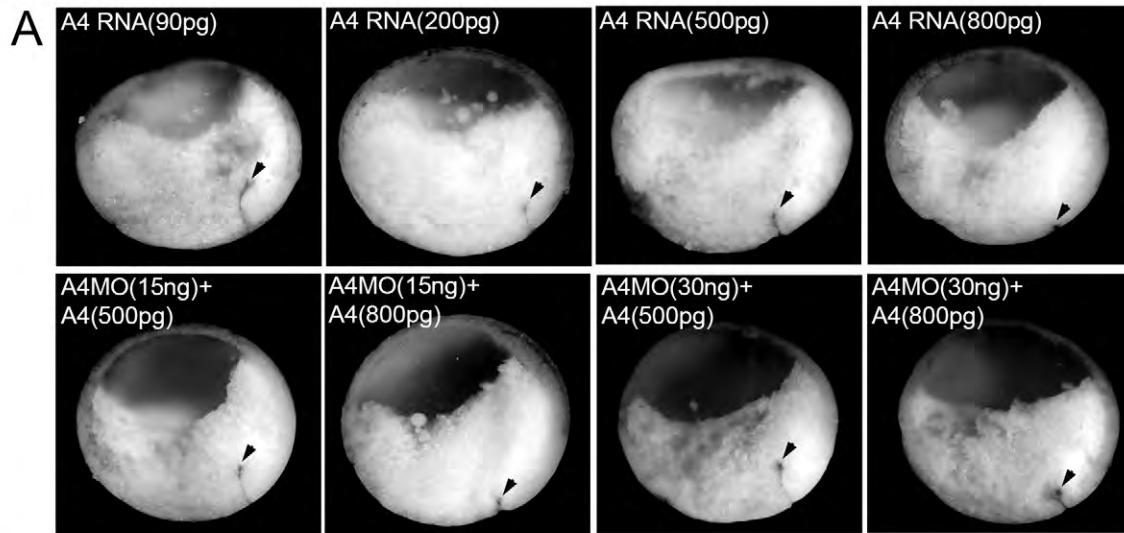


Figure S1.

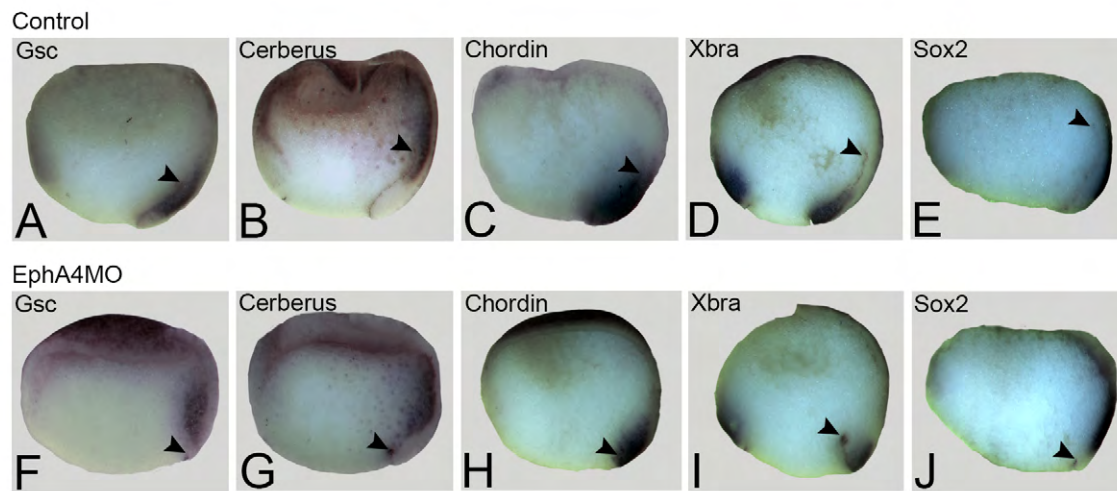


Figure S2.

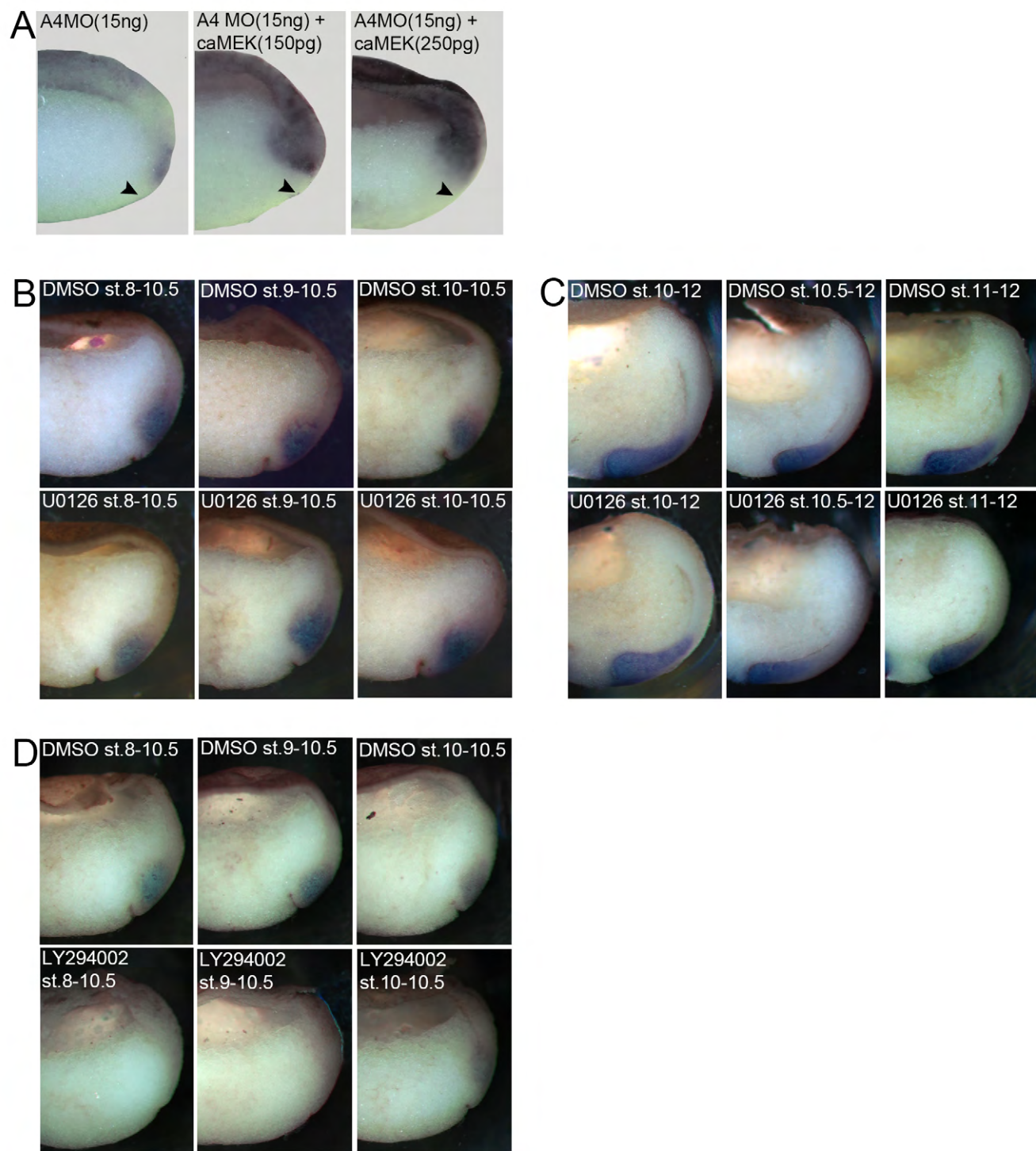


Figure S3.

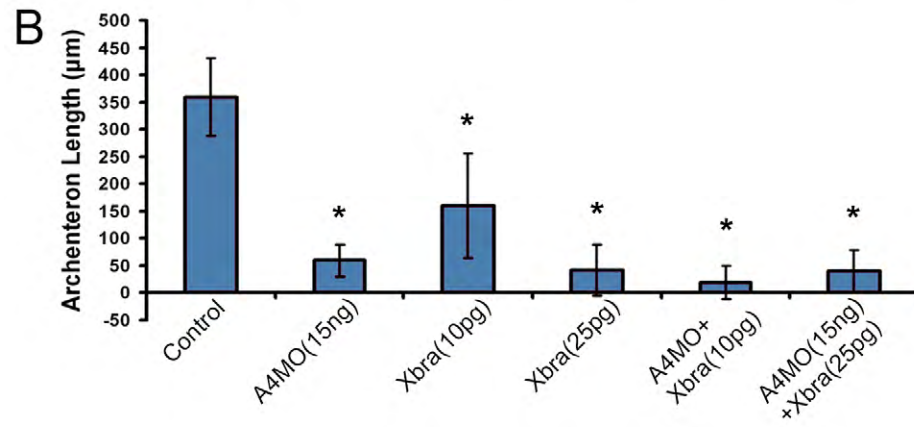
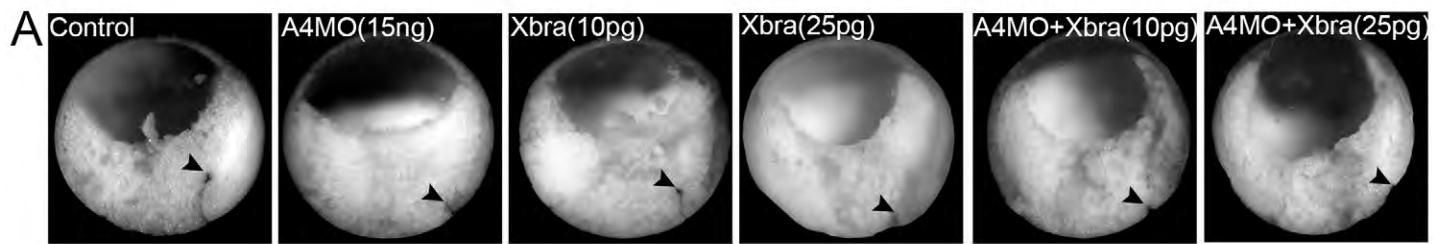


Figure S4.

Movie titles and captions

Movie 1. Lip-BCR explant. Explant was made at stage 10+ and filmed for 2 hours. Ectodermal BCR (with darkly pigmented outer surface) is to the left, lip forms on the right. Inner surface is viewed.

Movie 2. Open-faced explant. Explant was made at stage 10+ and filmed for 45 min. Former vegetal side is to the left. For details see Fig. 3A.

Movie 3. Lip-only explant. Explant was made at stage 10.5 and filmed for 1 hour. Former vegetal side is to the left, cut surface is viewed. For details see Fig. 4E.

Movie 4. Explant of Xbra domain. Explant was made at stage 10.5 and filmed for 1 hour. Cut surface is viewed, as in movie 3. For details see Fig. 4H.

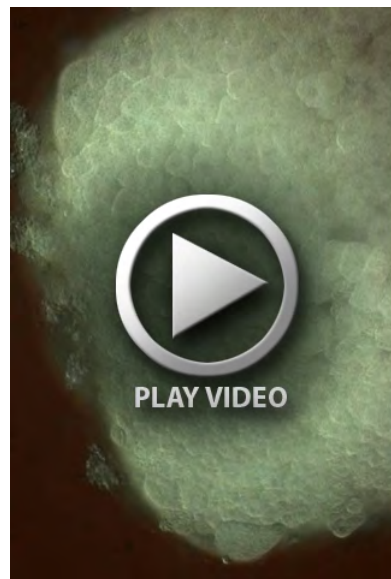
Movie 5. Explant of Xbra domain in side view. Stage 10.5 explant was filmed for 1 hour, viewed in 45° mirror submerged in culture buffer. For details see Fig. 4I,J.

Movie 6. Lip-BCR explant expressing DN-Pak1. Explant was made at stage 10+ and filmed for 2 hours, as in movie 1, from embryo expressing DN-Pak1. Involution movement is compromised. Lip forms at the left, BCR is to the right.

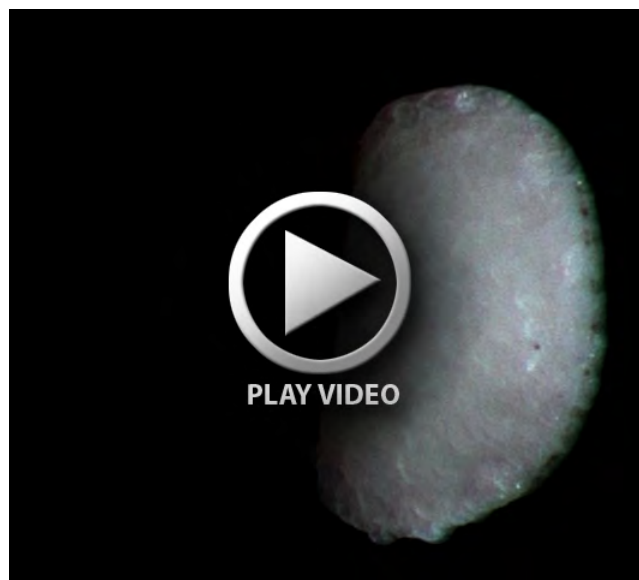
Movie 7. Open-faced explants expressing DN-Pak1. Explant was made at stage 10+ from embryo expressing DN-Pak1 and filmed for 1 hour. For details see Fig. 8I.



Movie 1.



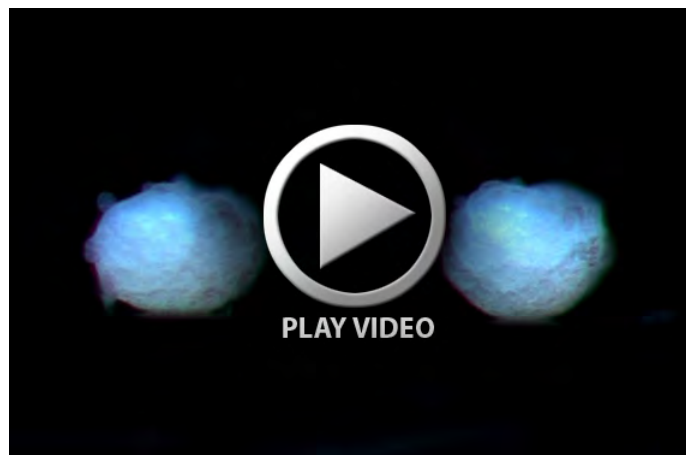
Movie 2.



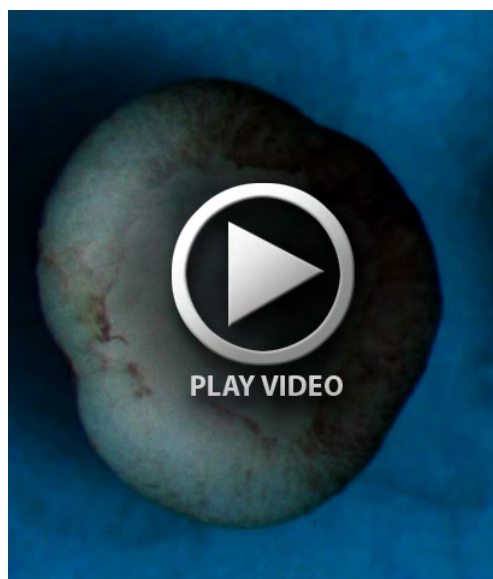
Movie 3.



Movie 4.



Movie 5.



Movie 6



Movie 7.