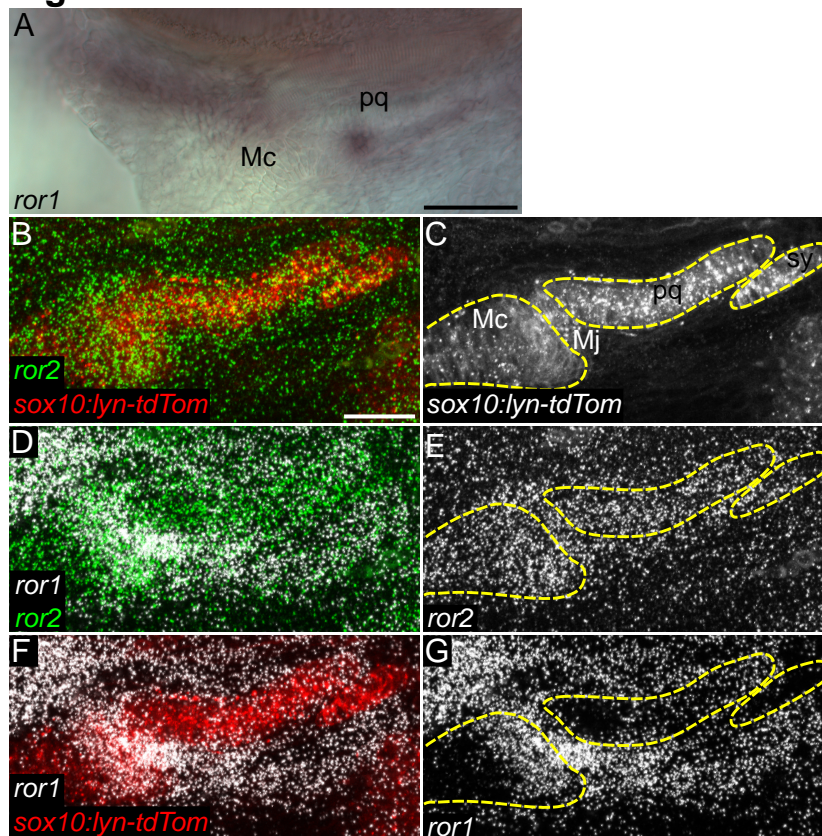


### Figure S1



**Fig. S1. *ror1* and *ror2* are expressed at the Meckel's joint and in chondrocytes at 72 hpf.**

(A) In situ hybridization for *ror1* in a 72 hpf wild-type

(WT) embryo. (B-G) HCR for *ror1* and *ror2* in a 72 hpf WT *Tg(sox10-lyn-tdTomato)*

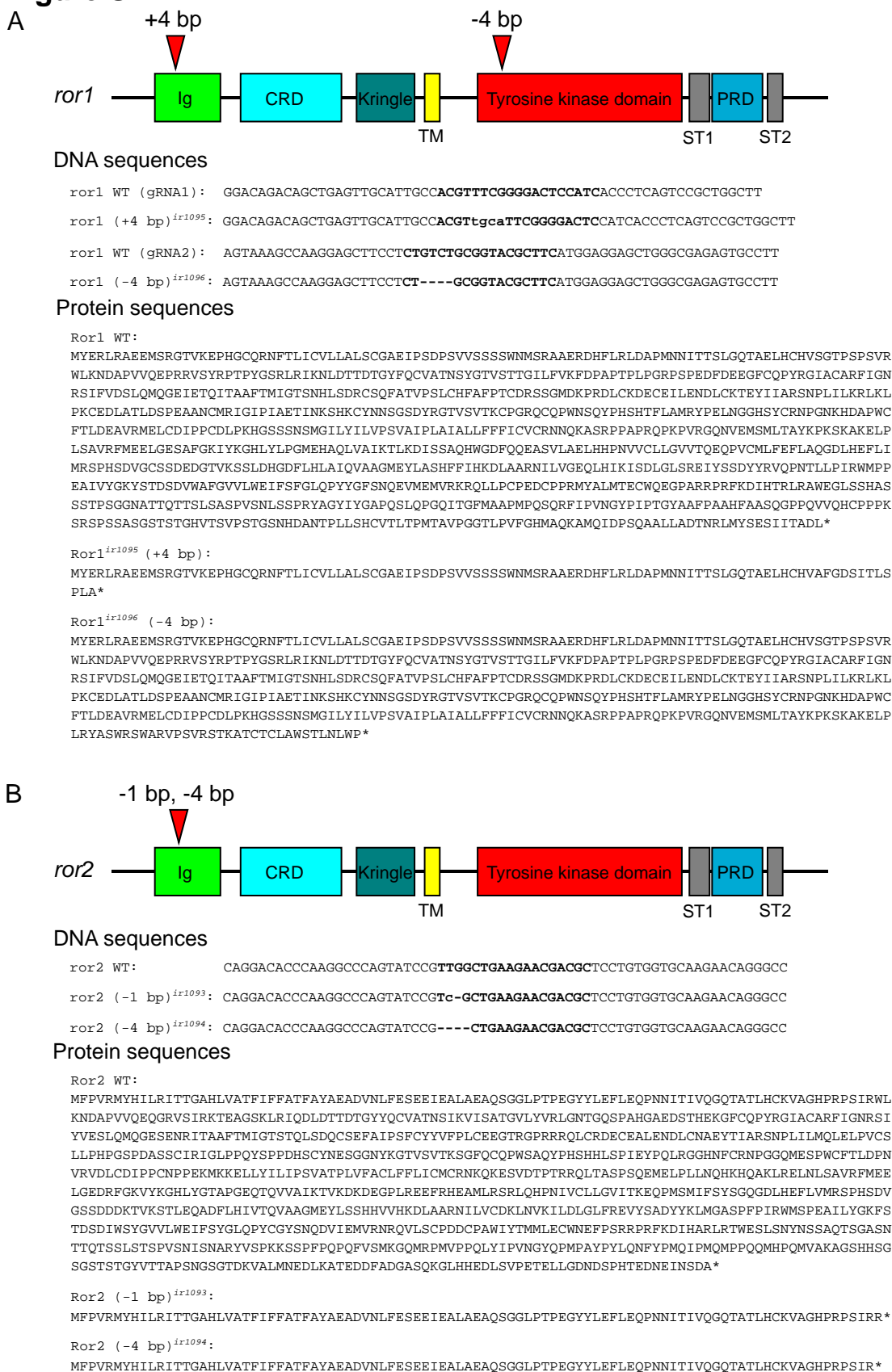
("sox10:lyn-tdTom") embryo. *ror1* in white, *ror2* in green, and *sox10:lyn-tdTom* in red (B, D, F). Grayscale (C, E, G). Panels B-G are z-projections. Mc, Meckel's cartilage; pq,

palatoquadrate cartilage; sy, symplectic cartilage; ch, ceratohyal cartilage; Mj, Meckel's

joint. Mc, pq, and sy cartilages are outlined in dotted yellow line. Anterior to the left in all

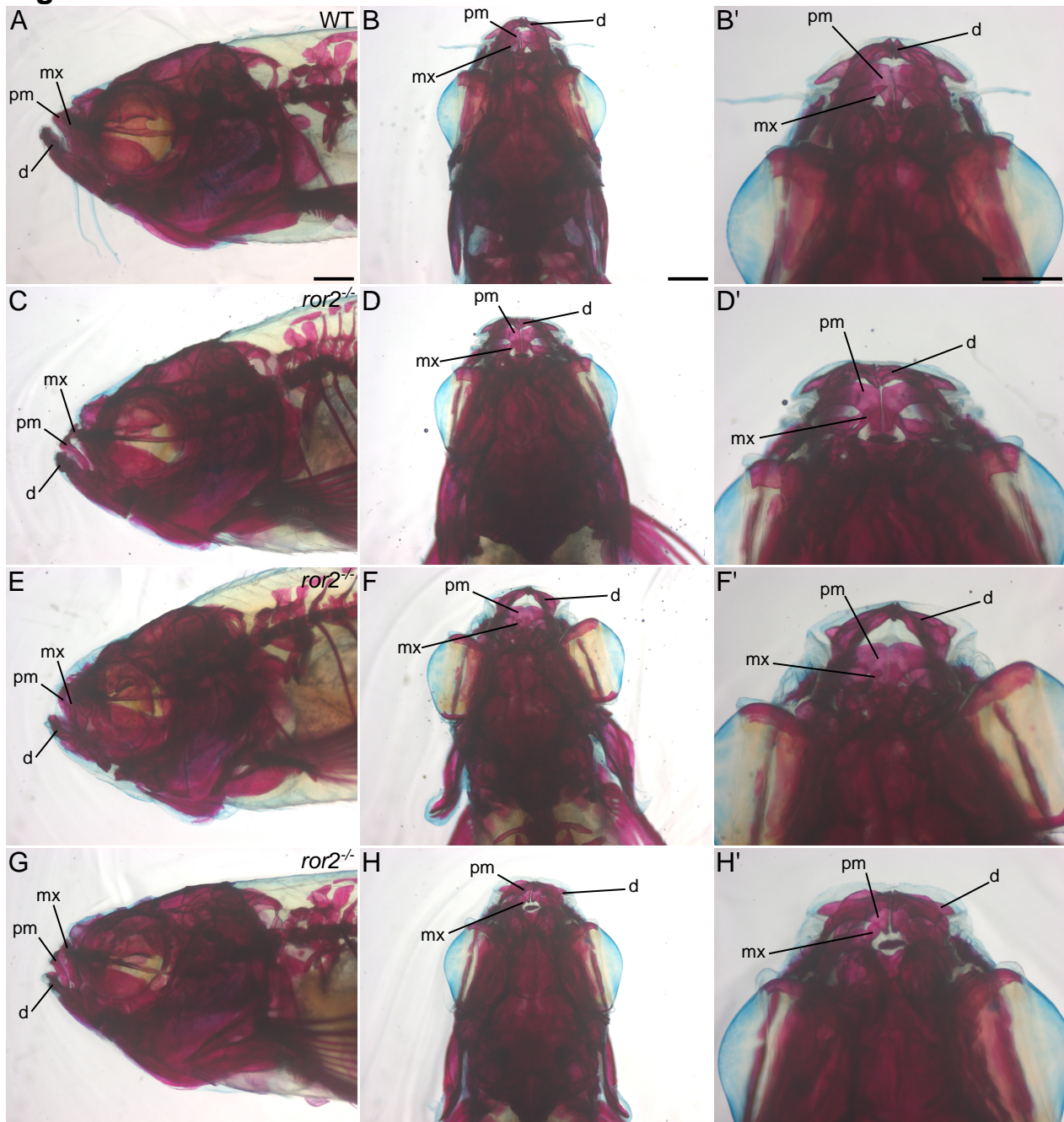
panels. Scale bars = 25 μm for A-I.

## Figure S2

Fig. S2. *ror1* and *ror2* gRNA target sites.

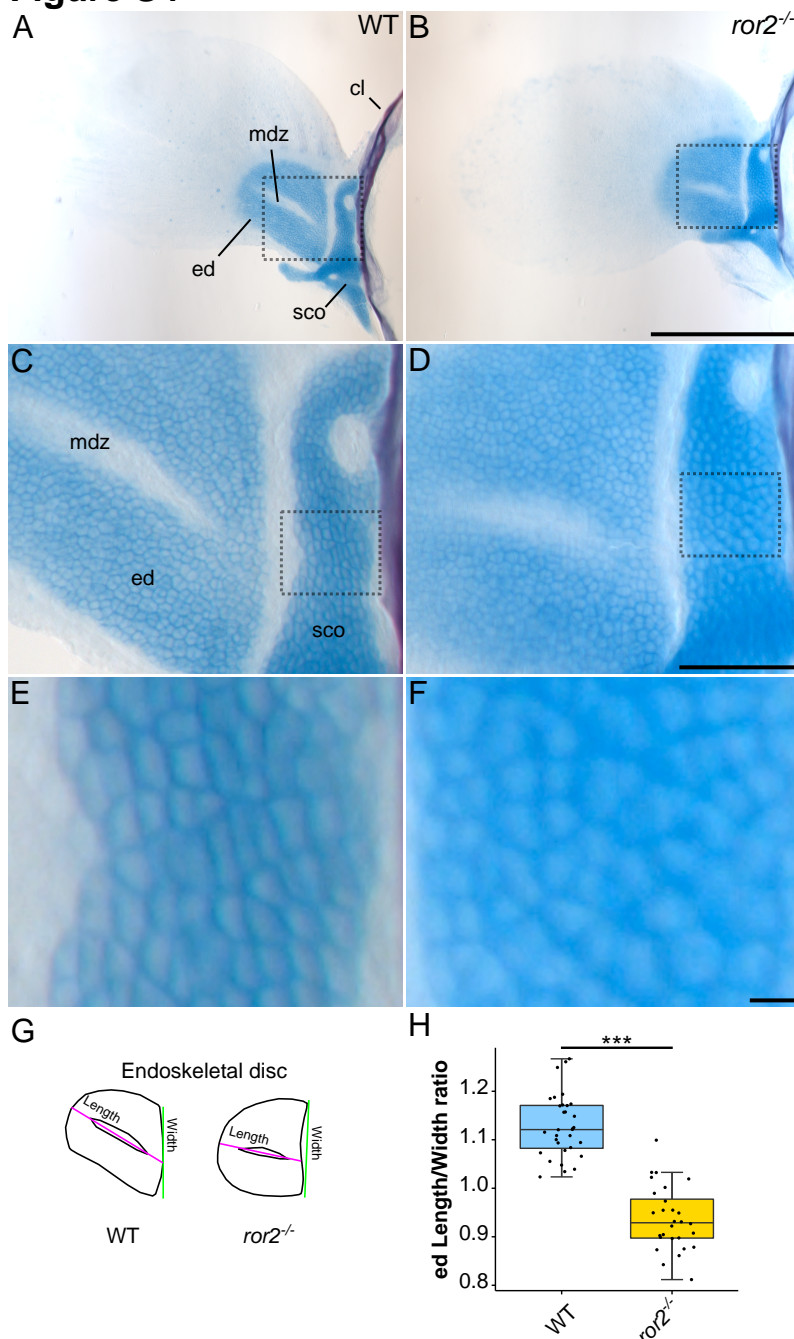
(A, B) Diagrams of zebrafish *ror1* (A) and *ror2* (B) genes with domains annotated. Red triangles indicate gRNA target sites. Ig, immunoglobulin-like domain; CRD, cysteine-rich domain; Kringle, Kringle domain; TM, transmembrane domain; ST1, serine-threonine domain 1; ST2, serine-threonine domain 2; PRD, proline-rich domain.

**Figure S3**



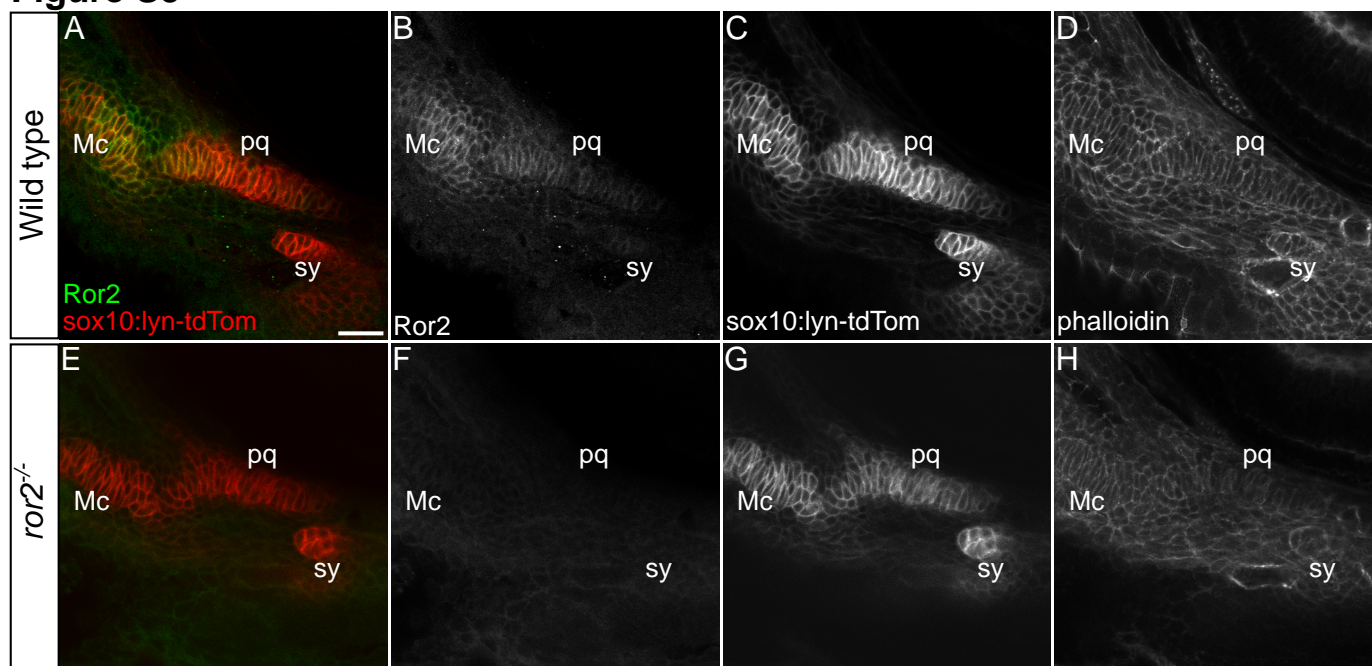
**Fig. S3. Dymorphic craniofacial skeletons of adult *ror2* mutants.**

(A-H') Alizarin red stained adult head skeletons. A representative wild type (WT; A-B') and 3 examples of *ror2*<sup>-/-</sup> animals (C-H'). A, C, E, and G are lateral views. B, D, F, and H are dorsal views. (B', D', F', and H') Magnified views of B, D, F, and H, respectively. d, dentary; pm, premaxilla; mx, maxilla. Scale bars = 1 mm for all panels.

**Figure S4**

**Fig. S4. Abnormal pectoral fin development in *ror2* mutants.** Representative wild type (WT; A) and *ror2*<sup>-/-</sup> (B) pectoral fins at 30 dpf. Panels C and D are magnified views of the boxed regions in A and B, respectively. Panels E and F are magnified views of the boxed regions in C and D, respectively. Diagrams of representative endoskeletal discs of 0.70 mm eye diameter WT and *ror2*<sup>-/-</sup> mutants indicating measured features (G). (H) Quantification of endoskeletal disc length-to-width ratios. Standard length (SL) = 7.80 mm, eye diameter = 0.70 mm for WT in A, C, and E, and SL = 6.85, eye diameter = 0.70 mm for *ror2*<sup>-/-</sup> in B, D, and F. n=32 endoskeletal discs from 16 0.70 mm eye diameter WT and 28 endoskeletal discs from 14 0.70 mm eye diameter *ror2*<sup>-/-</sup> animals for H. Eye diameter is used to normalize between genotypes as *ror2* mutants are shorter than WT. Wilcoxon rank-sum test, \*\*\*p<0.001 for H. Cl, cleithrum; ed, endoskeletal disc; mdz, zone of matrix decomposition; sco, scapulocoracoid. Scale bar = 0.5 mm for A and B, 100  $\mu$ m for C and D, 10  $\mu$ m for E and F.

**Figure S5**



**Fig. S5. Ror2 protein is expressed in cartilage progenitors.**

(A-H) Anti-Ror2 antibody staining in 54 hpf wild type (WT) (A-D) and maternal-zygotic (*MZ-ror2*) *ror2*<sup>-/-</sup> mutants (E-H) embryos. Merged images of anti-Ror2 staining in green and *sox10:lyn-tdTomato* in red (A, D). Grayscale images of anti-Ror2 alone (B, F), *sox10:lyn-tdTomato* (C, G), and Alexa Fluor 647 Phalloidin (D, H). Mc, Meckel's cartilage; pq, palatoquadrate cartilage; sy, symplectic cartilage. Scale bar = 20  $\mu$ m for A-H.

