Supplementary Figures:

Fig. S1: Distribution and morphology of BTs in male zebrafish. (A) Dorsal view of a male zebrafish with pectoral fin BTs (black arrowhead). (B) Dorsal view of a female zebrafish with no BTs and translucent fins (black arrowhead). (C) Pectoral fin of a male *longfin* mutant with long BT clusters (outlined in blue). (D) Grouped BTs in a line/semi circle (white box) and isolated BTs (white arrowheads) on the side of a male zebrafish head. (E) BT on a barbel. (F) A BT on a scale pulled from the body surface. (G-J) BTs distributed along the anal fin rays. (K-N) BTs along the pelvic fin rays. (O-R) BTs along the dorsal fin rays. (S-U) No BTs are observed on the caudal fin. Fluorescence *Tg(KR21)* images (red), Merged (*Tg(KR21)* + Brightfield) images. Scale bar for C = 200μm; D = 400μm; E = 12.5μm; J, N, R, F = 25μm; G-I, K-M, O-Q, S-U = 200μm.

Fig. S2: Development of BTs in male zebrafish. (A) BTs are observed as a single row beginning at 1.30 cm standard length or 2.5 months post fertilization. (B) Individual BTs grow larger and form clusters 1.72 cm standard length or 3 months post fertilization. (C,D,E) BT clusters grow until zebrafish reach 1 year of age. Scale bars for all panels = 100μm.

Fig S3: Origin of BT vascularization. Longitudinal sections of the area connecting the body to the pectoral fin of males (A-C) of the *Tg(fli1a:EGFP)* fish. A blood vessel (yellow arrow) is observed sprouting from the central artery (white arrow) and projecting parallel to the hemiray (white asterisk). (A) Merge = Brightfield + GFP; (B) GFP fluorescence; (C) Brightfield. Scale bars = 100μm (shown in A).

Fig. S4: PAS stain on 7 dpa pectoral fin regenerate longitudinal sections. (A) Goblet

cells (green arrowheads) in the intact and regenerating dorsal and ventral surfaces of the females. (B) In males, goblet cells (green arrowheads) are present only in regions where BTs are absent. Amputation plane (white vertical lines). Scale bars for both panels = 25μm (shown in A).

Fig S5: Estradiol and flutamide inhibit BT regeneration and growth in the male pectoral fins. (A,C,E,G,I,K,M,O,Q,U,S,W) BTs along the anterior rays of control intact and regenerating fins. In some cases BT clusters are observed on dorsal and ventral surfaces of the fin rays (white arrowheads in (O)). (B,D,F,H,J,L) Treatment with flutamide (14 dot) results in smaller BTs on the intact fin/stump and no BTs on the fin regenerate. (N,P,R,T,V,X) E2 treatment (18 dot) results in BTs that are reduced in size in the intact fin and regenerate stump and no BTs in the regenerate. White vertical lines indicate amputation plane. Scale bar for all panels = 100μm (shown in A). B.F. = Brightfield; Fluo = KR21/RFP; Merge = Brightfield +KR21/RFP.

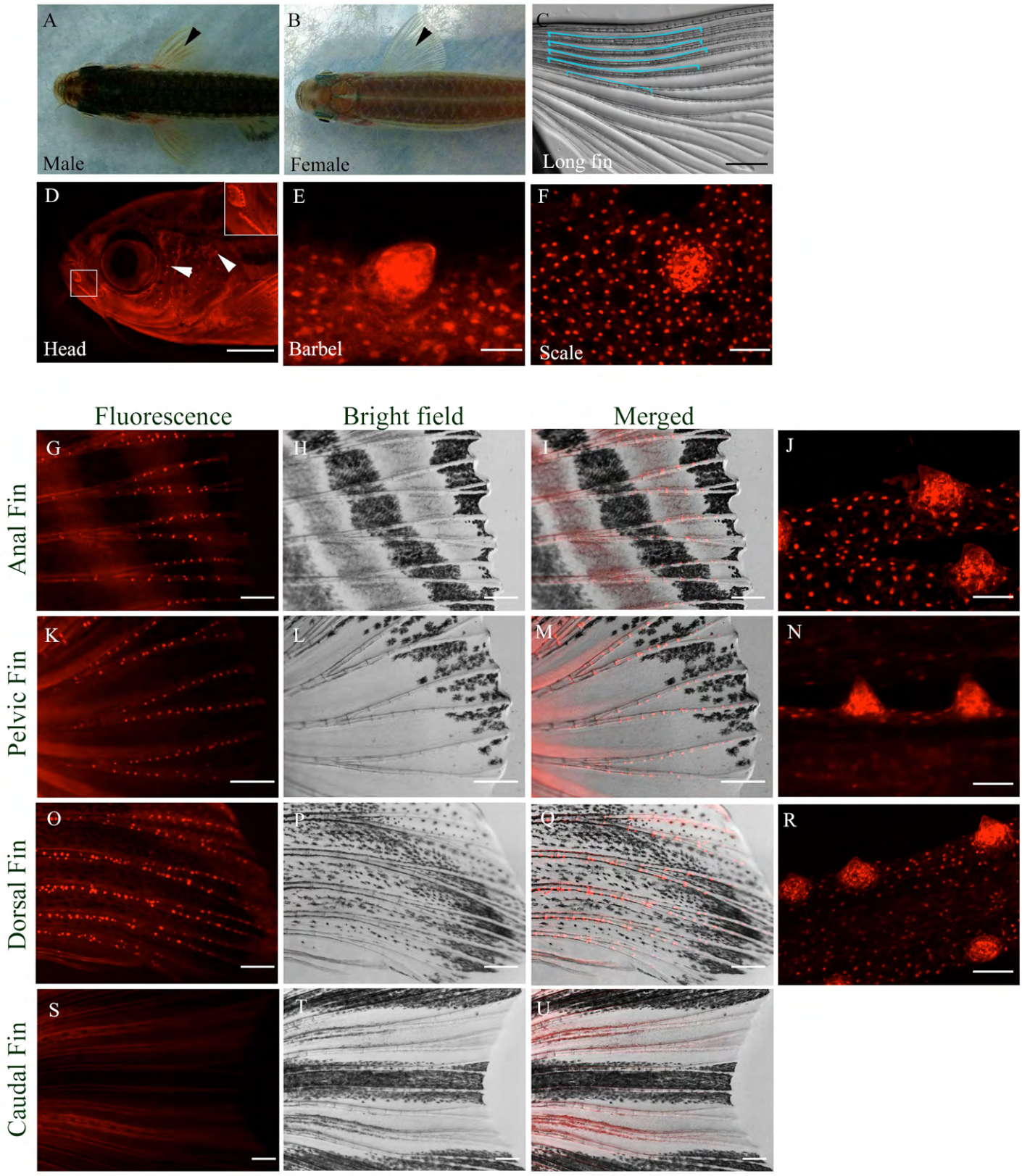
Fig. S6: Treatment with androgens increases BT width in males. (A-B) Androgen-treated (DHT and T) males (14 dot) displaying BT clusters that cover both dorsal and ventral sides of the regenerate rays (pink arrows). (C) Graph illustrating the average width of each BT. When compared to non-treated controls, T and DHT-treated anterior regenerating and intact fins possess BTs that are significantly wider in width (asterisk). ($p < 0.05$ via Student's T-test analysis) Error bars = s.d. Scale bars = 100 μm (shown in A).

Fig. S7: Androgens induce angiogenesis in intact and regenerating female pectoral fins. (A,C,E,G,I) Intact fins of T-treated females develop BTs following 4 dot (A). BTs are vascularized 5 dot (black arrow) (C). (E,G,I) 6-8dot, BTs mature and appear similar to

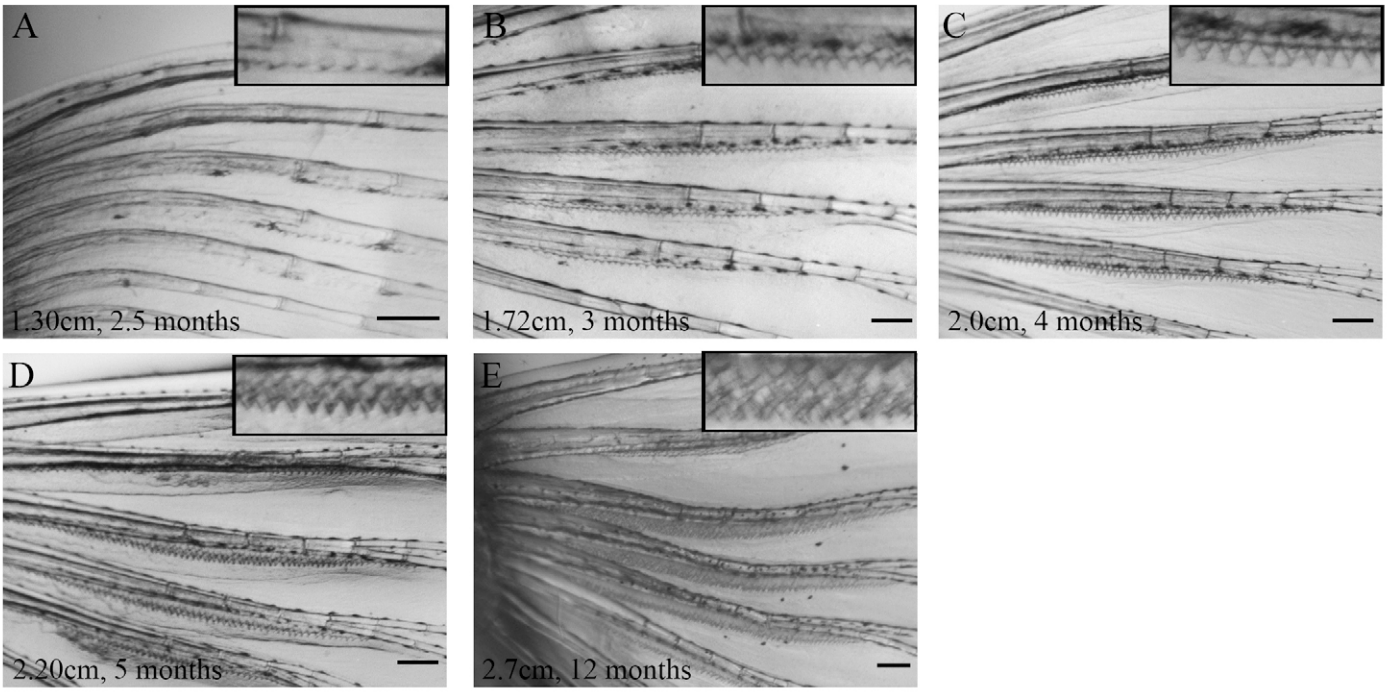
males. (B,D,F,H,J) Regenerating pectoral fins of T-treated females undergo two waves of blood vessel regeneration. (B) The central artery located between the hemirays regenerates in the first wave. (D,F,H,J) Initiated at 5 dpa, the second wave of angiogenesis travels in a proximal-distal fashion parallel to the hemiray (red arrowheads), occurring alongside BT regeneration. Amputation plane is indicated by white vertical lines. Scale bars= 50μm (shown in A).

Fig. S8: Quantitative RT-PCR for *AR* mRNA in male and female pectoral fins. Expression data indicate the relative expression levels for the *ar* mRNA are not significant between male and female pectoral fins ($p = 0.91$ via Student's T-test analysis) AU = arbitrary units. *ar* expression was normalized to *ef1α*. Four biological samples were performed per experiment and each biological sample was run in triplicate. Error bars = s.d.

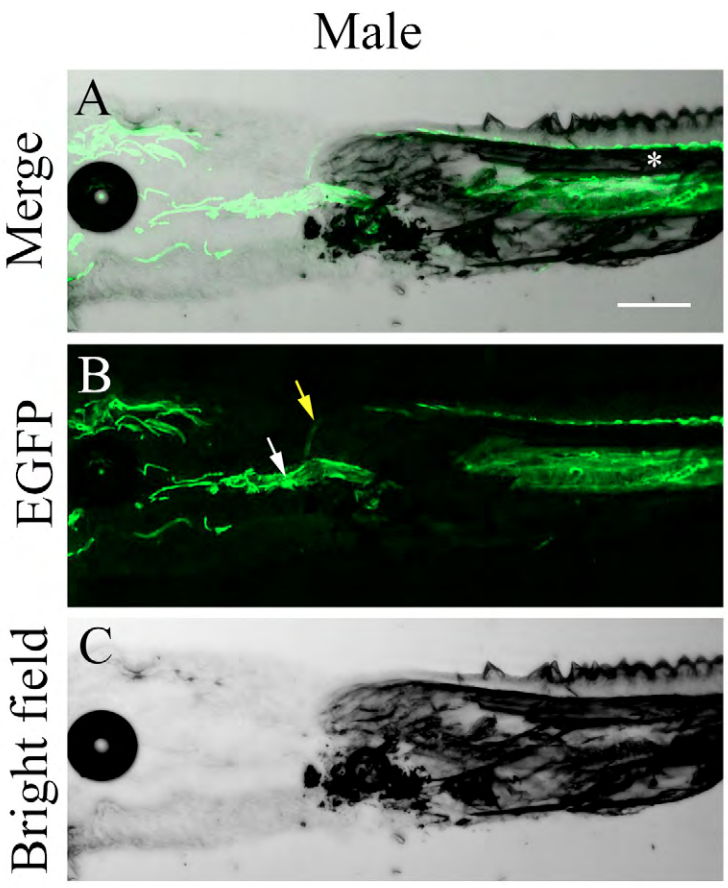
Fig. S9: **Female pectoral fin BT growth is affected by PTK787.** (Aa,Ba) A single row of BTs on the intact fin, and 6dpa regenerate stump after 6 dot with PTK787 and 4 dot testosterone. No BTs were visible in the regenerate (Aa). (Ca,Da) Small individual BTs appear in the fin regenerate after 8 dot with PTK787 and 6 dot with testosterone. BTs are visible on the intact fin and stump. (Ea,Fa) Small BT cluster on the regenerate 14 dot with PTK787 and 12 dot with T. Small BTs on the intact fin and stump. (Ab,Bb) After 4 dot, T-treated females develop BT clusters on the regenerate, stump, and intact fin. (Cb-Fb) BT clusters continue to grow on the intact fin, stump, and regenerate from 6-12 dot with T. (Ac-Fc, Ad-Fd) No BT growth in the intact and regenerating fins with PTK787 treatments or system water controls. White vertical lines indicate the amputation plane. Scale bars for all panels = 100μm.



Supplementary figure 1



Supplementary figure 2



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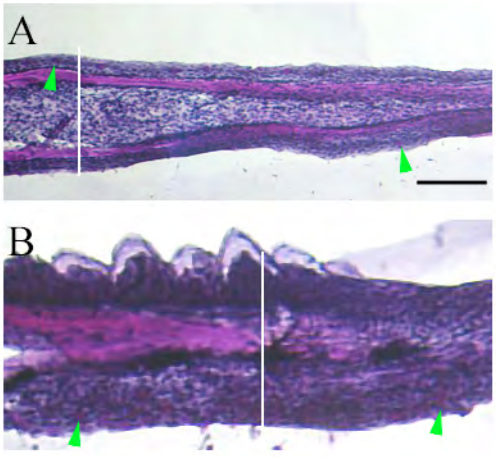

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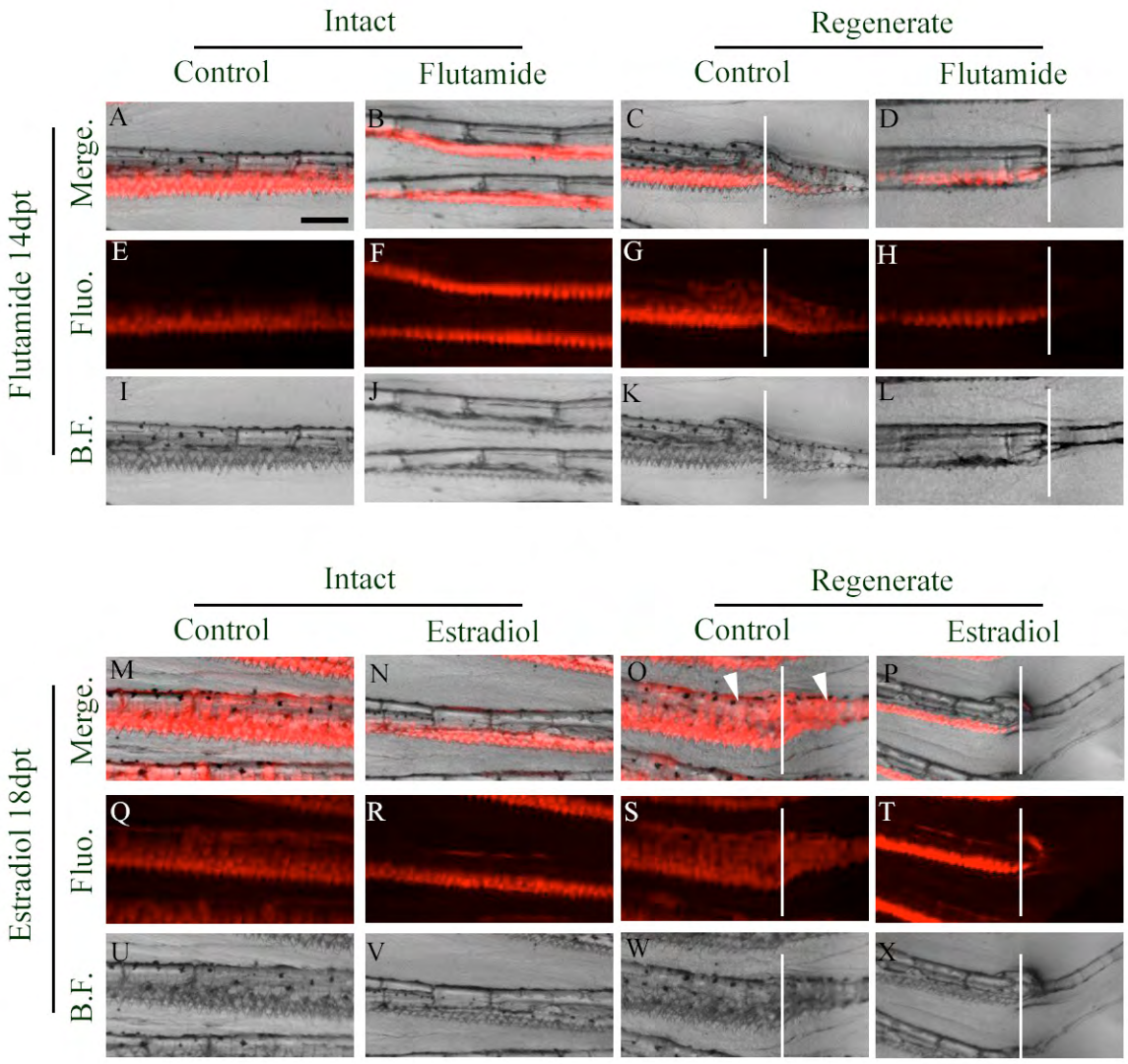

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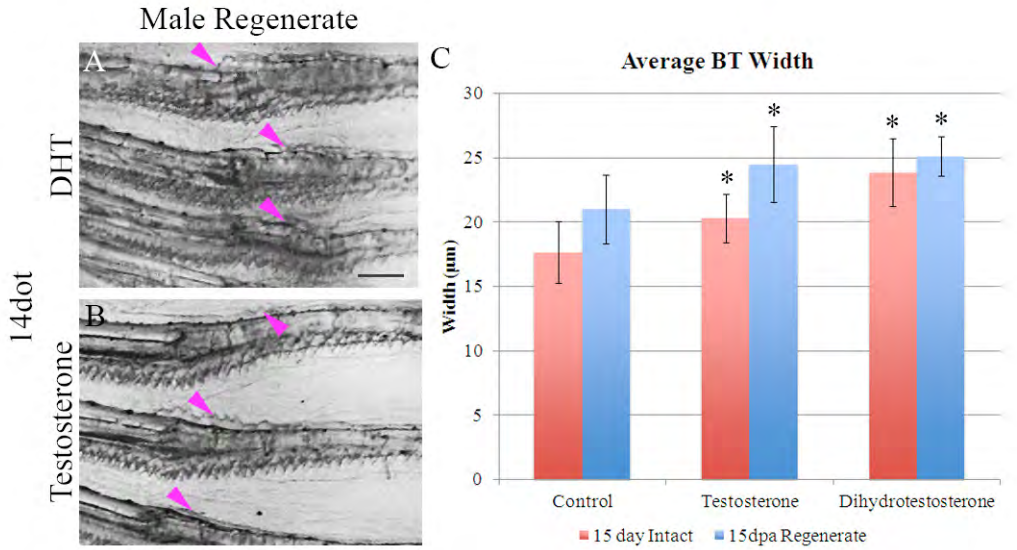

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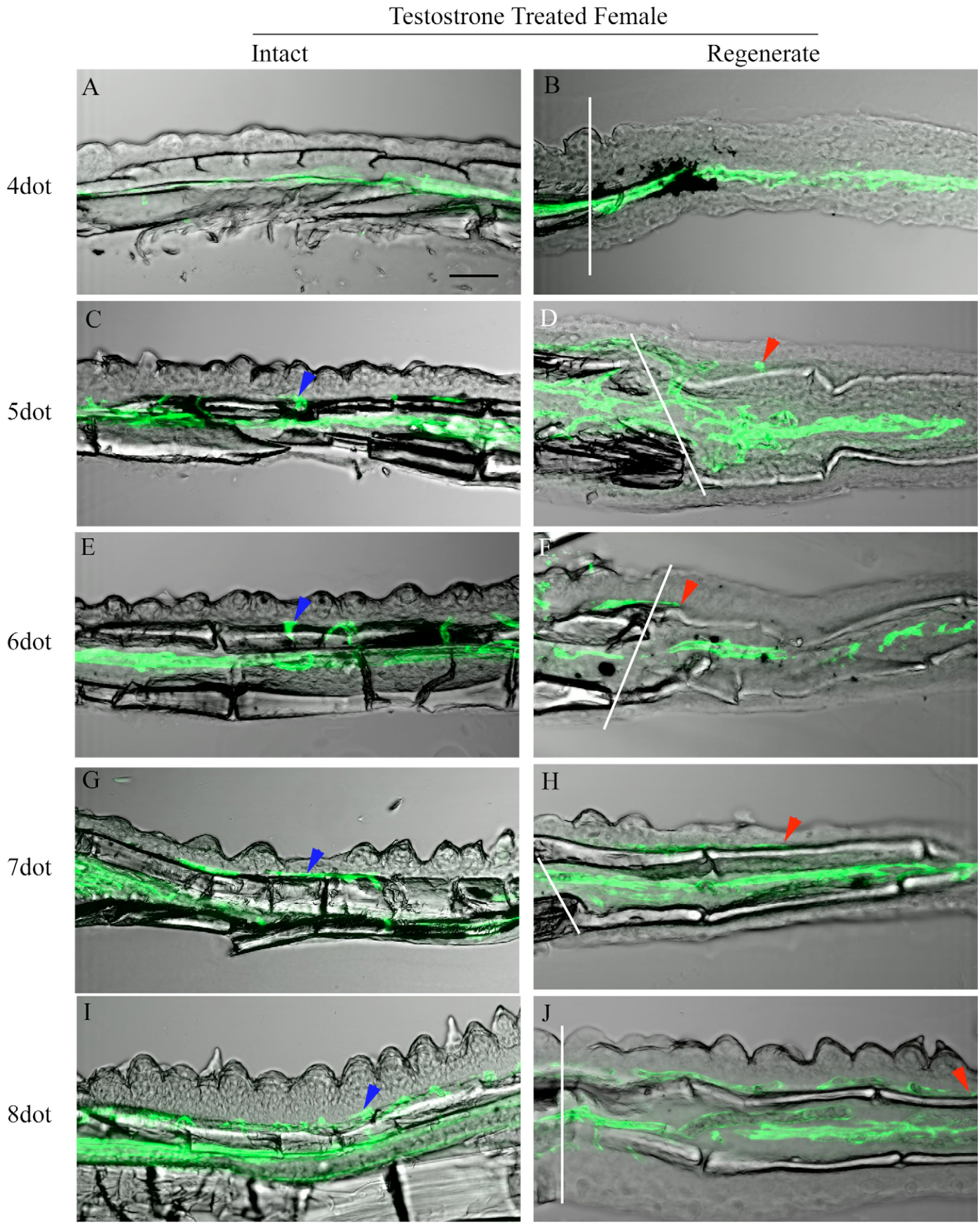

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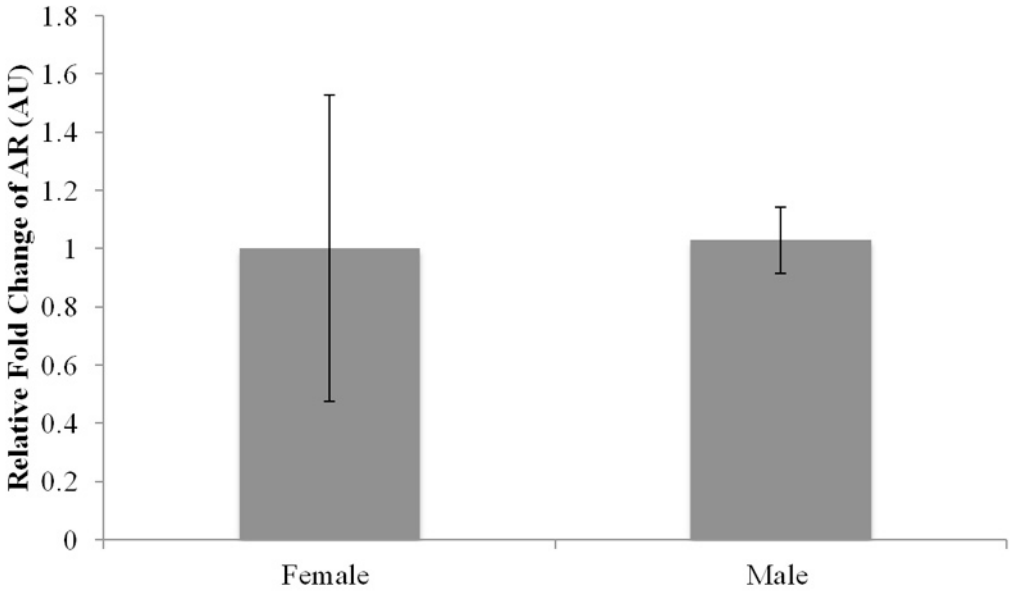
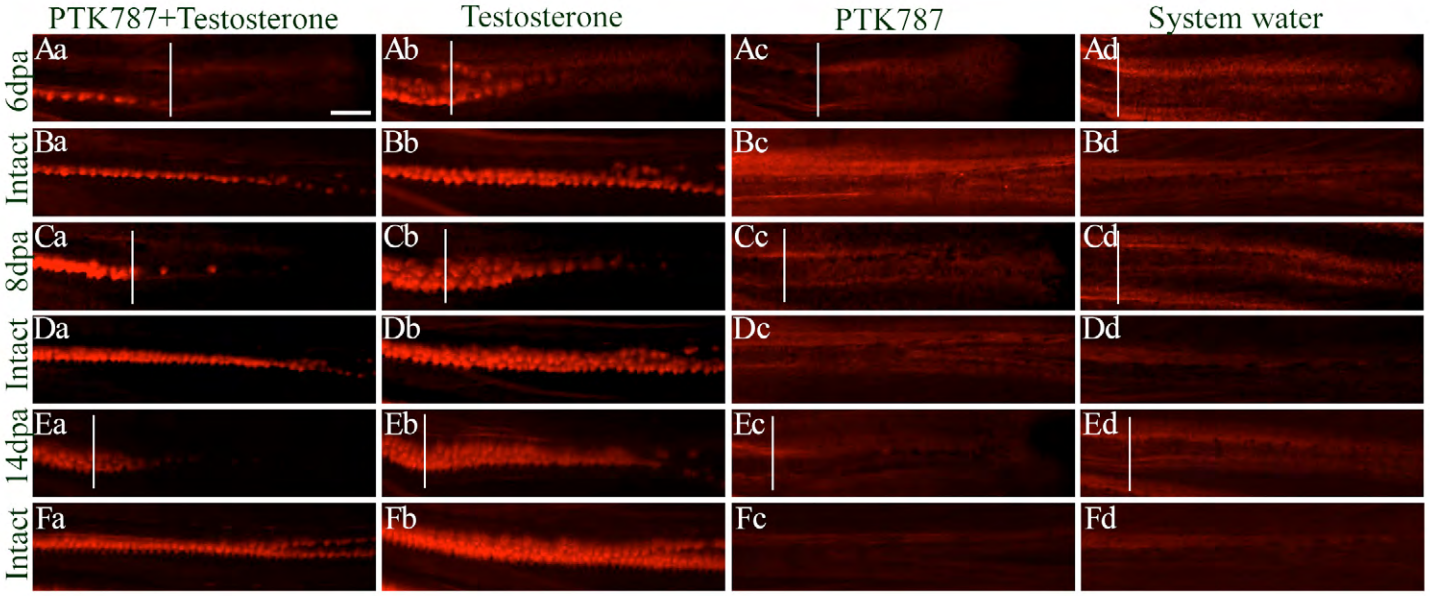


Supplementary figure 8



Supplementary figure 9