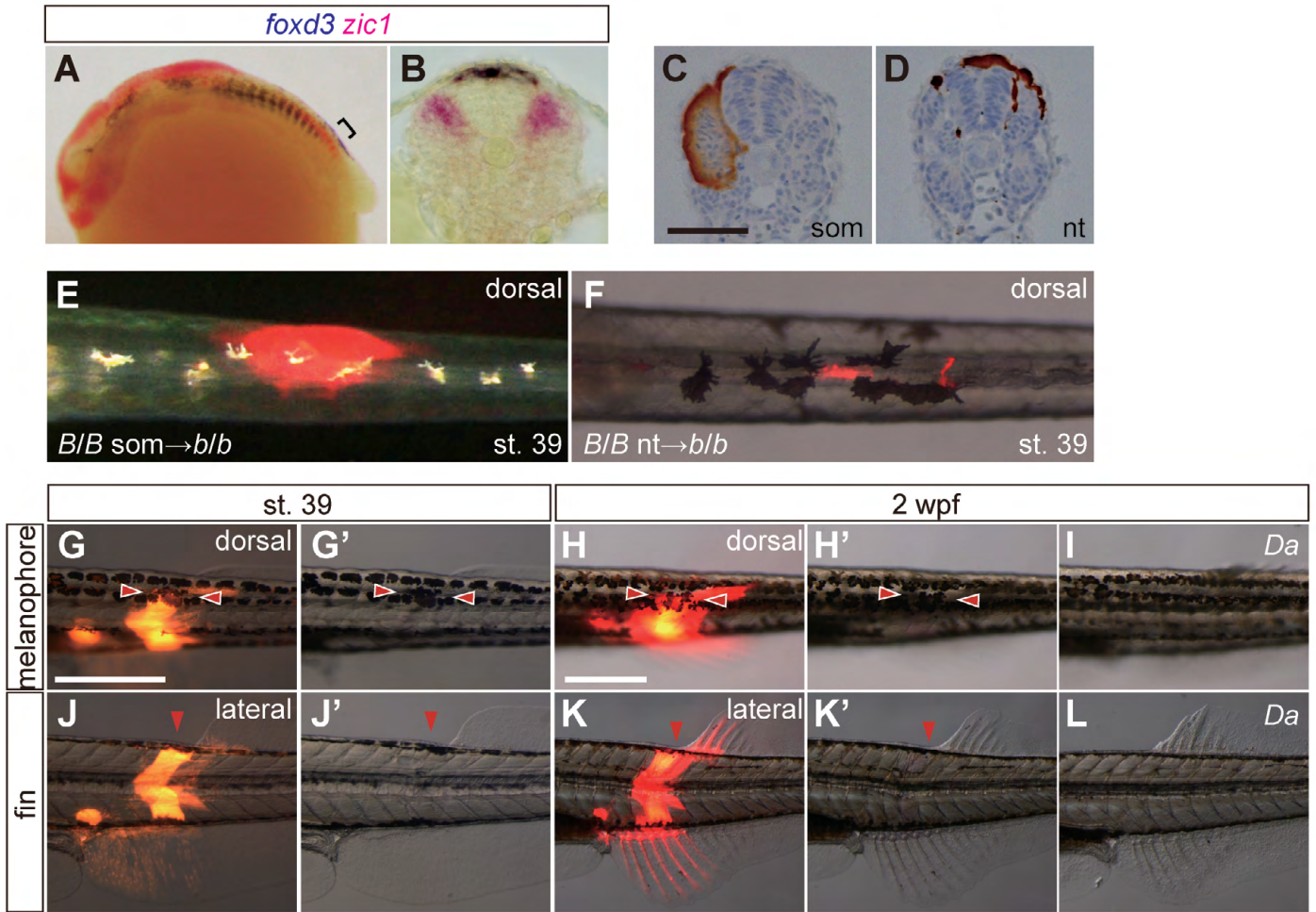
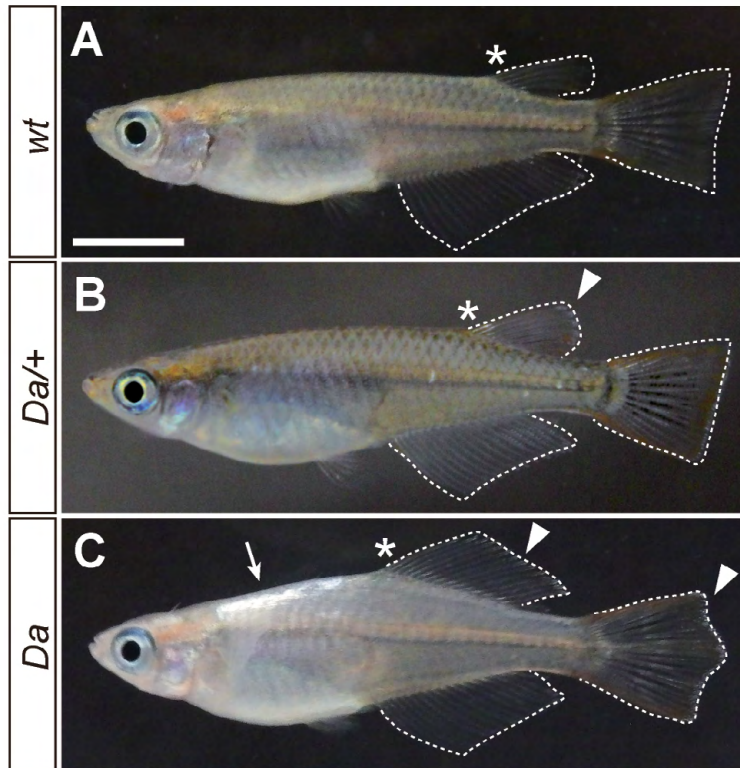


**Fig. S1. Ventralized phenotypes of *Da* mutants at larval and adult stages.** (A,B,K,L) Staining with DiAsp (0.05 mg/ml) visualizes the ectopic deposition of neuromasts (sensor complexes of the lateral line) on the dorsal sites (arrowheads) in *Da* mutant embryos at 2 wpf (B) and in adult (L). Dashed lines indicate the lateral midline of the trunk. (C-F') Skeletal patterns of the dorsal (C,D) and anal fins (E,F) in wild-type and *Da* mutant adult males. Magnified views in (C'-F') correspond to the white boxes in C-F, respectively. The papillary processes (arrowheads), which normally develop only on the anal fin in response to testosterone, are also observed on the dorsal fin in the *Da* mutant. (G-J) Pigmentation patterns of the wild-type and *Da* mutant adult trunk surface, showing that while the dorsal skin of wild type has only melanophores and leucophores, that of *Da* also possesses iridophores (arrowheads in H), similar to the ventral side of wild type. (M) Contours of wild-type and *Da* mutant male adults (excluding fins), showing that the dorsal part of *Da* is more rounded, forming a teardrop body shape. Dashed line indicates the lateral midline. Embryos and adults in A-F',K-M are shown in lateral view with anterior towards the left. Scale bars: 500  $\mu$ m for A; 1 cm for C.



**Fig. S2. Further validation of transplantation experiments.** (A,B) Expression pattern of *foxd3* (early neural crest marker) and *zic1* in wild type at stage 23 (14 somites). Bracket indicates the site from which the somites are dissected. *foxd3*-expressing dorsal neural tube and neural crest cells do not express *zic1*. (C,D) Transverse sections of somite (C) and dorsal neural tube (D) transplants from Tg( $\beta$ -actin:DsRed) to wild type, stained with DAB at 3 dpf (stage 27). The labeled cells in C formed a smoothly packed tissue whereas in D they showed mesenchymal shape, located at both the medial and lateral side of the somite. (E,F) Additional evidence for lack of neural crest cell contribution during the somite transplantation experiments. (E) Somites derived from a melanophore-containing strain 'Kusu' (*B/B*, labeled with DsRed by having crossed with a  $\beta$ -actin promoter-driven DsRed transgenic line) were transplanted into d-rR hosts that lack melanophores (*b/b*) at stage 23 (14-16 somites). This panel shows a dorsal view of a transplant at stage 39. No melanophores appeared in 19 out of 19 transplants. (F) Control experiments by transplanting the dorsal neural tube of a *B/B* embryo into a *b/b* host. Melanophores appear around the transplantation site at stage 39. Dorsal view is shown with anterior towards the left. (G-L) Phenotypes of dorsal patterns after transplantation of wild-type somites (labeled with DsRed) into *Da* mutant embryos at stage 39 (G,J) and 2 wpf (H,K). Melanophore (G-H') and dorsal finfold (J-K') rescue are maintained at stage 39, and also at 2 wpf, when the dorsal finfold starts to be replaced with the dorsal fin with fin rays. Arrowheads indicate the rescued sites. Homotopic regions of the *Da* mutants at 2 wpf are also shown (I,L). Scale bars: 100  $\mu$ m for C; 500  $\mu$ m for G,H.



**Fig. S3. Phenotype of the heterozygous *Da* mutant.** Lateral view of wild-type (A) and heterozygous (*Da*+, B) and homozygous (C) *Da* mutant males. The heterozygous *Da* mutant exhibits the wild-type phenotypes in the pigmentation pattern and caudal fin skeleton. However, the size of the dorsal fin shows intermediate between that of wild type and *Da* (asterisks). Asterisks indicate the anterior limit of the dorsal fins. Scale bar: 1 cm.



**Movie 1. Experimental procedure of somite transplantation.** In the first half of the movie, somites are isolated from donor embryos. In the latter part, a hole is made in a host embryo embedded in agarose, and the donor somites are implanted through the hole.