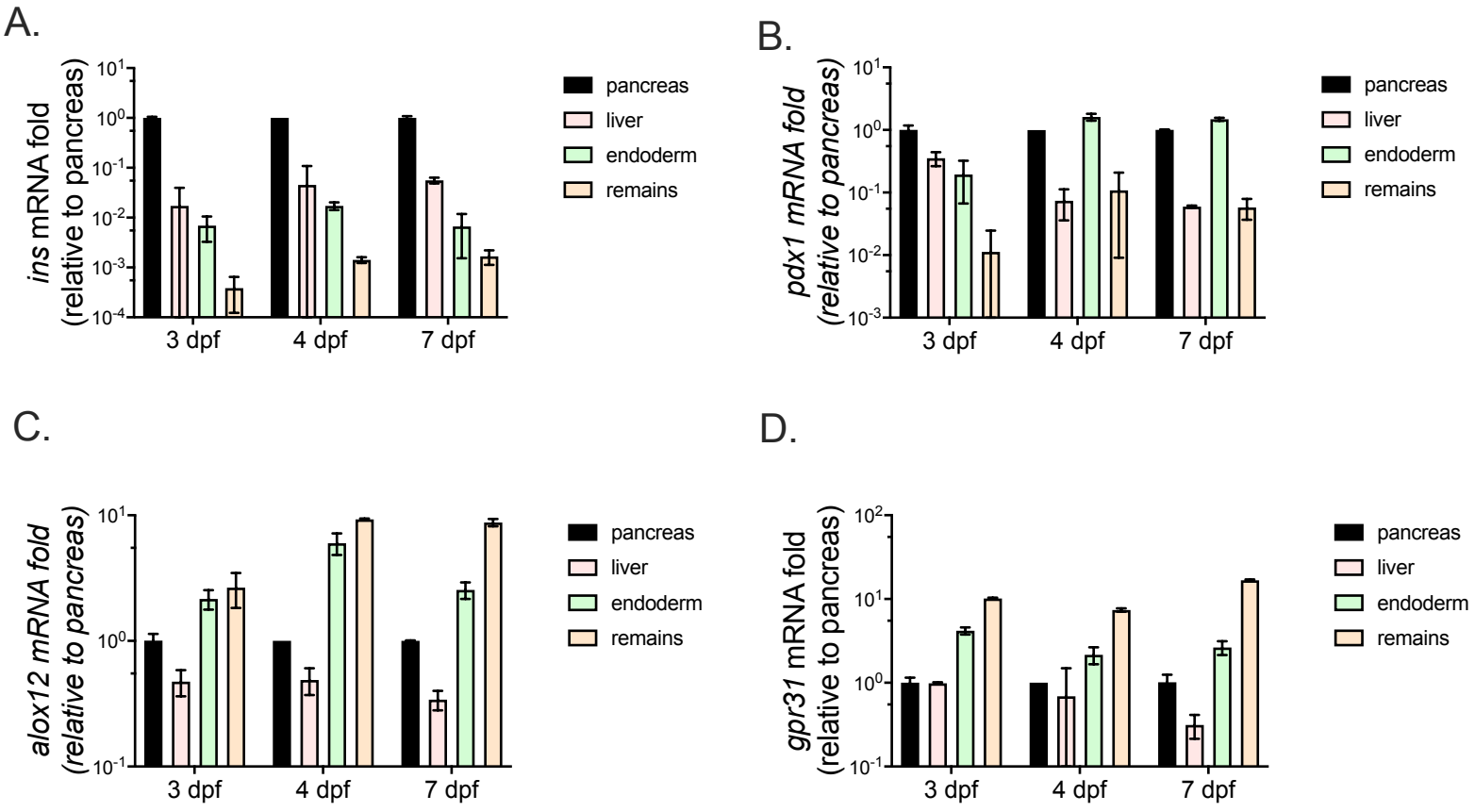
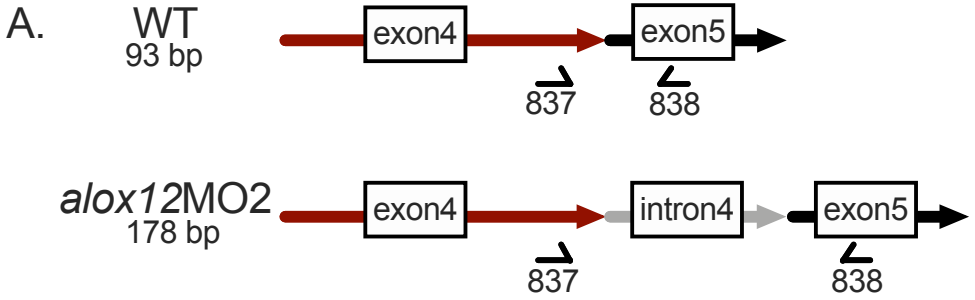
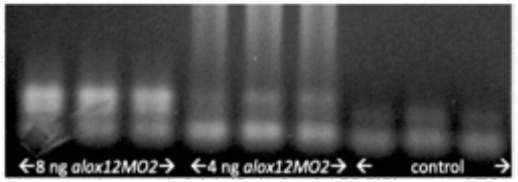
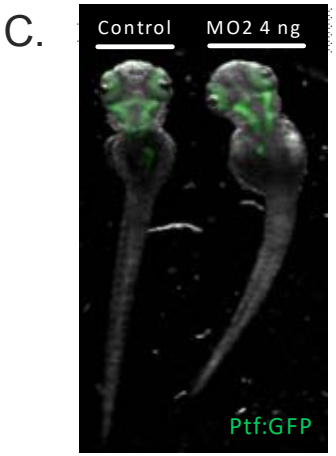
Supplemental Figure 1.

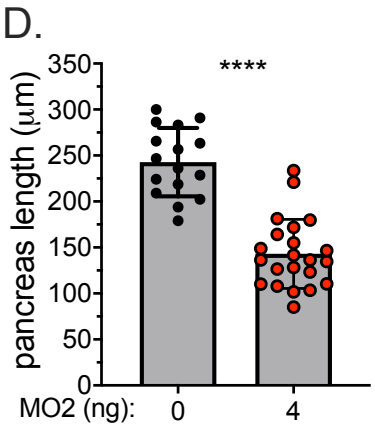


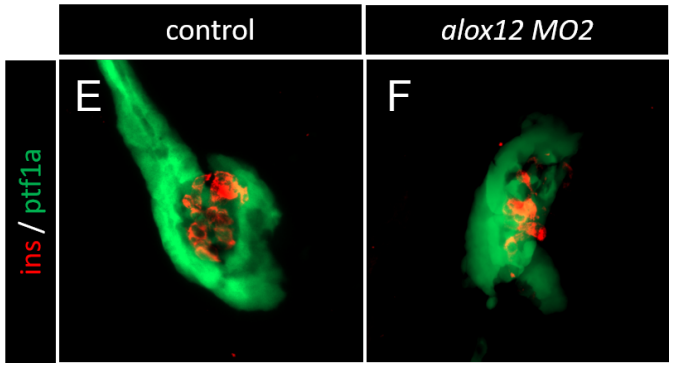
Supplemental Figure 2.

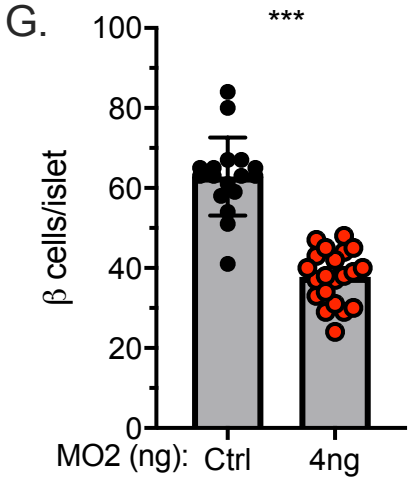




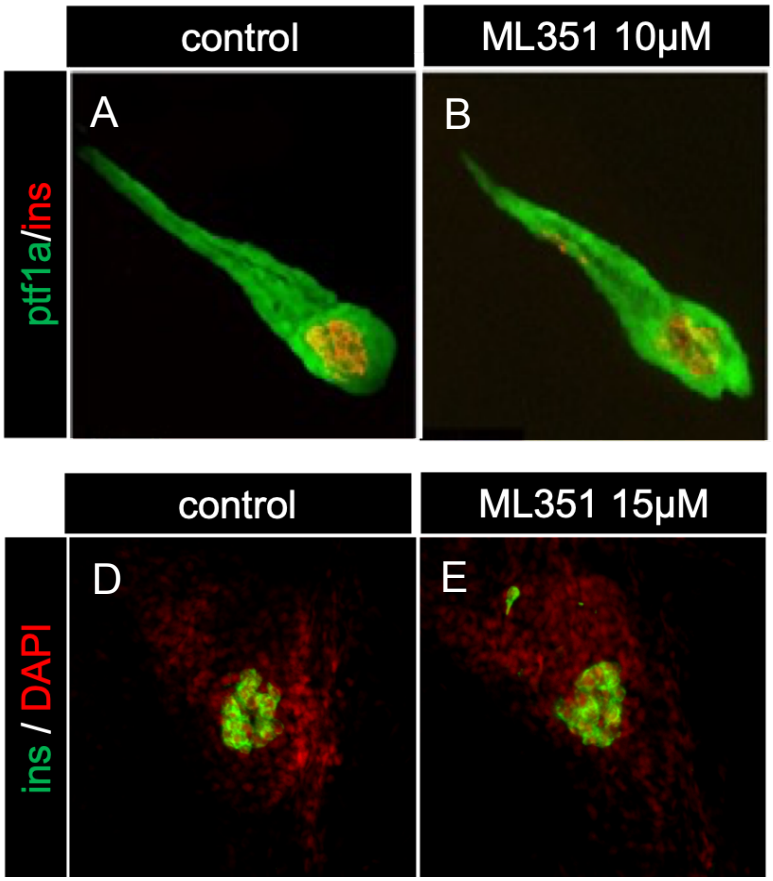


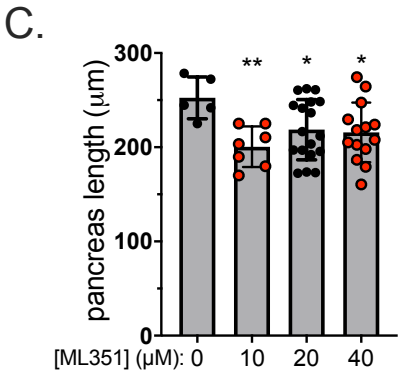


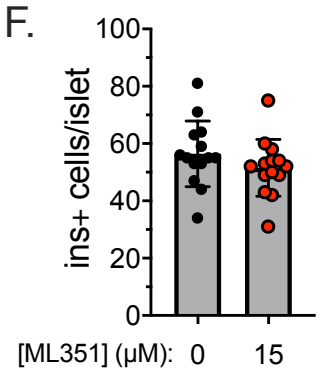


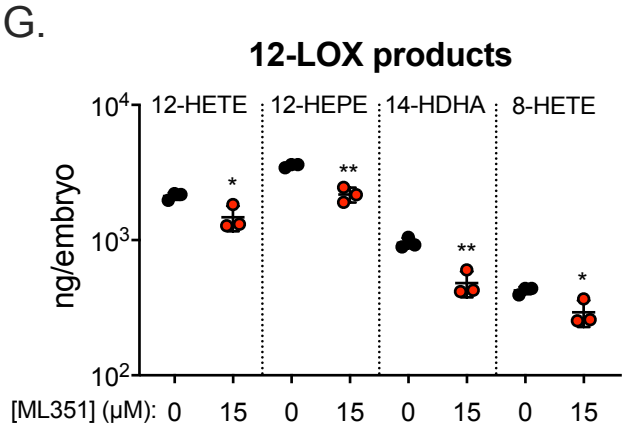


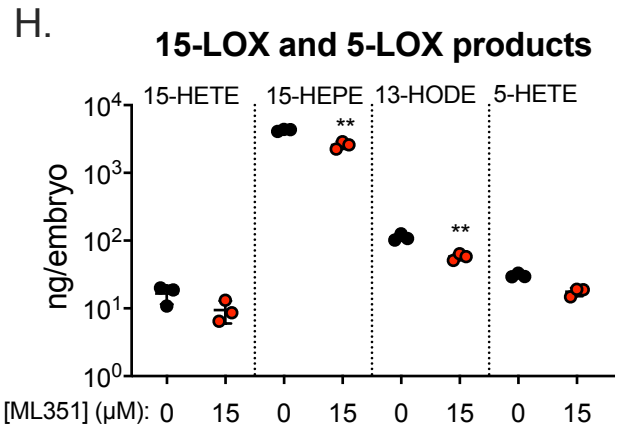
Supplemental Figure 3.



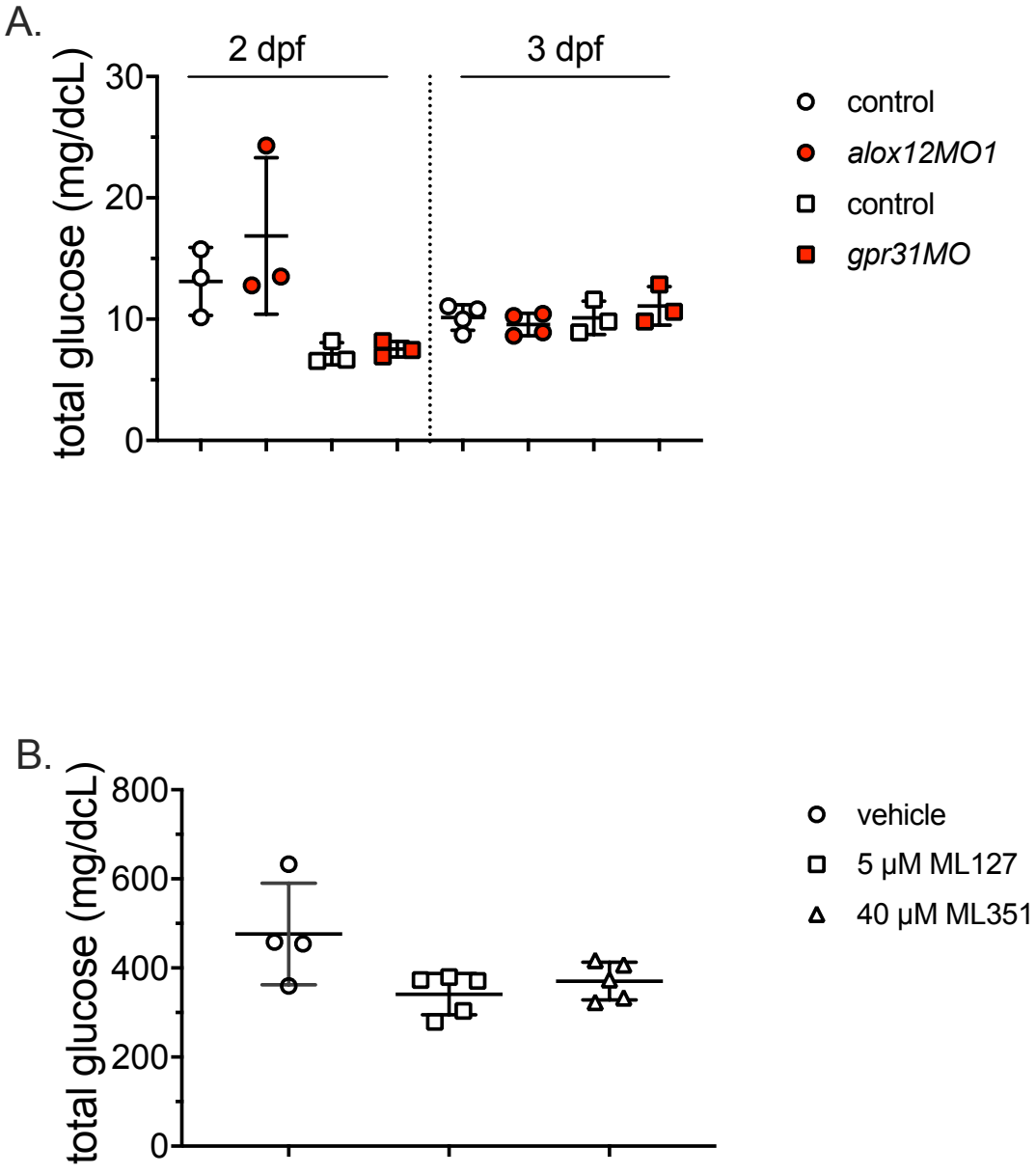








Supplemental Figure 4.



Supplementary Figure 1. Tissue-specific mRNA expression of *alox12, gpr31,* and pancreas markers. mRNA was isolated from tissue pools dissected from 3, 4, and 7 dpf embryos to measure *insulin* (A), *pdx1* (B), *alox12* (C) and *gpr31* (D) expression levels. Tissues sampled were pancreas (represented in black), liver (pink), endoderm remainder (without liver and pancreas, green) and the remainder of embryos after dissection (orange). All reactions were normalized to *ef1a* and data is presented as fold-change relative to pancreas expression levels at each embryonic stage; two biological replicates were used per condition.

Supplementary Figure 2. Pancreatic phenotype of *alox12* splice-blocking MO (*alox12* MO2). (A) Schematic of spliced *alox12* mRNA in WT and alox12MO2-injected embryos showing location of oligos 837 (5'-gcttg tggga gatgg agtgt) and 838 (5'-tgtct gtgag ccatt tccag) that were used to detect inclusion of exon4 caused by the morpholino, which targets the splice junction between exon4 and intron4. (B) Photograph of agarose gel electrophoresis showing results from rt-PCR of control un-injected embryos and embryos injected with 4 ng or 8 ng of *alox12MO2*. Larger 178 bp product appears only with injection of the morpholino. (C) Representative image of 3 dpf *Tg*(*ptf1a-GFP*) embryos which were un-injected (left) or injected with 4 ng of *alox12* MO2 (right) showing shortened pancreas phenotype. (D) Quantification of *Tg*(*ptf1a-GFP*)-positive exocrine pancreas length in control and *alox12MO2*-injected embryos shows significant shortening of the pancreas results from morpholino injection (t-test, $p < 0.0001$ ****). (E,F) representative confocal images of un-injected control (E) and 4 ng *alox12MO2*-injected (F) *Tg*(*ptf1a-GFP*); *Tg*(*insulin-DsRed*) embryos. (G) Quantification of *Tg*(*insulin-DsRed*)-positive cells in control and morpholino-injected embryos shows significant loss of β cells (t-test, $p < 0.001$ ***).

Supplementary Figure 3. ALOX15 inhibitor ML351 has mild effects on zebrafish pancreas develoment. (A, B) Representative confocal images of 3 dpf *Tg*(*ptf1a-GFP*); *Tg*(*insulin-DsRed*) embryos treated with vehicle control (A) or treated with ML351 at a concentration of 10 µM (B). (C) Quantification of pancreas exocrine pancreas length shows only mild effects at 10, 20, or 40 µM doses. (t-test, $p < 0.05$ *, $p=<0.001$ **). (D,E) Representative confocal images of 3 dpf embryos treated with vehicle control (D) or treated with ML351 at a concentration of 15 µM, immuno-stained for Insulin (green) and counterstained with DAPI (red). (F) Quantification of Insulin-positive cells reveals no changes in pancreatic β cell number (t-test, $p>0.05$). (G,H) Lipidomics analysis of 12-LOX (G) and 15- and 5-LOX products (H) isolated from 3 dpf embryos that were treated for 12 hrs with 15 µM of ML351. 17-HDHA, 5-HEPE, 9-HODE and 4-HDHA were not detectable in these samples.

Supplementary Figure 4. Free glucose levels in embryos treated with morpholinos or lipoxygenase inhibitors. (A) Result of glucose oxidase assay performed on *alox12MO1* or *gpr31MO* morpholino-injected embryos and their matched controls that were aged 2 dpf (left) or 3 dpf (right) (10 embryos per sample with 3 - 4 biological replicates). (B) Result of glucose oxidase assay performed on embryos that were treated with 5 µM ML 127 or 15 µM ML351 from 12 hpf until collection (20 embryos per sample and 4 – 5 biological replicates).

No statistically significant differences were found between any treatment and their corresponding controls (t-test, $p = > 0.05$).