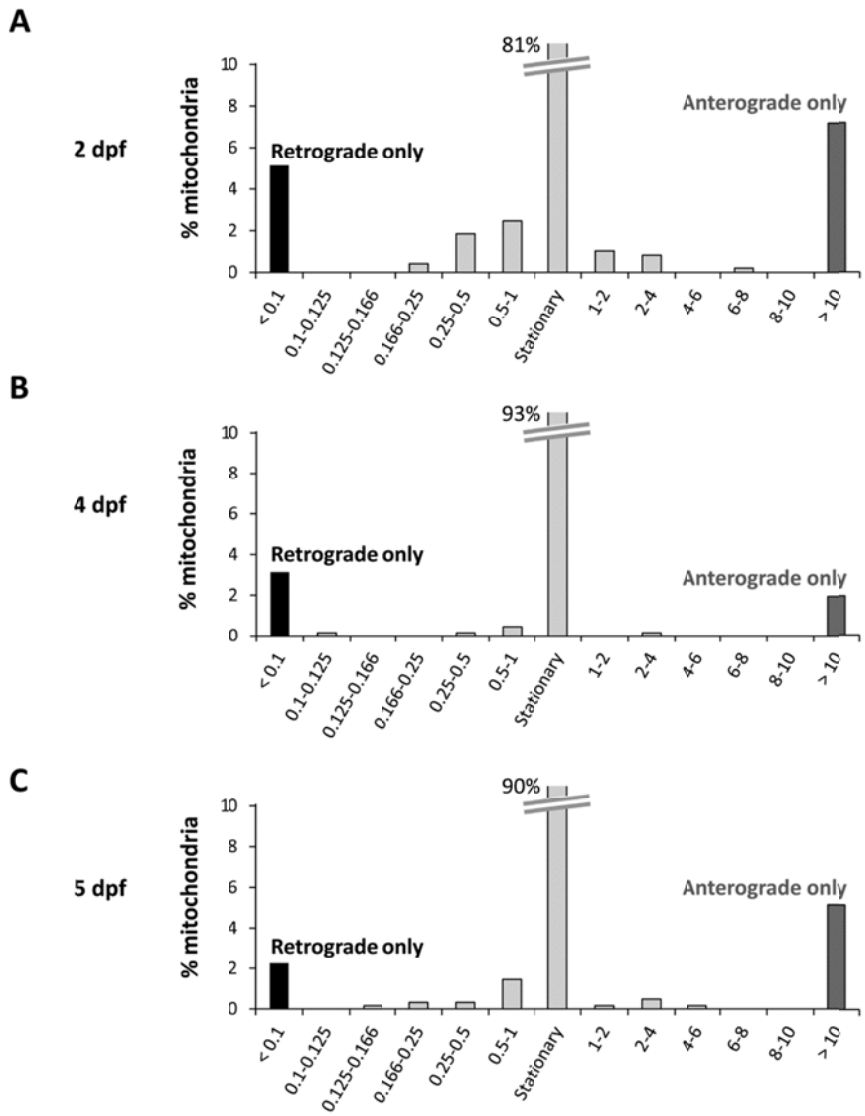
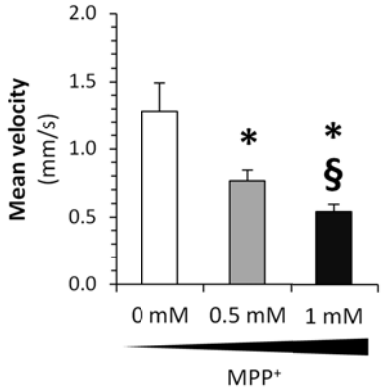
Supplementary figure S1



Histogram showing the frequency distribution of the ratio of anterograde to retrograde displacements for individual mitochondria at (A) 2 dpf, (B) 4dpf and (C) 5dpf. Most mitochondria were stationary over the 10 minutes of imaging, but motile mitochondria clearly showed unidirectional preference with displacement in one direction most frequently being 10-fold or more higher than in the opposite direction. See also figure 3.

Supplementary figure S2



Zebrafish larvae were exposed to 0, 0.5 or 1.0mM MPP+ as shown in figure 5A, then received a second 16 hour exposure at the same concentration 24 hours after the start of the first exposure. Larvae were then transferred to individual wells of a 96-well plate in fresh medium, and their movements measured by analysis of a video stream (Cario et al., 2011; Zhou et al., 2014). The bar chart shows the mean velocity (total displacement/time period of measurement) for each experimental group (white bars, control; gray bars, 0.5mM MPP^+; black bars, 1.0mM MPP^+) Error bars show standard error of the mean. *$p<0.0001$ compared with control; $^{§}p<0.05$, 0.5mM versus 1.0mM MPP^+; 1-way ANOVA.

Supplementary video – A time-lapse series is shown, corresponding to the images shown in figure 3A. Mitochondria in the axon of a dopaminergic neuron are pseudocolored red. The position of a motile mitochondrion is marked in each frame to illustrate the tracking method and to show the displacement of the mitochondrion over the course of the experiment.