Supplementary data

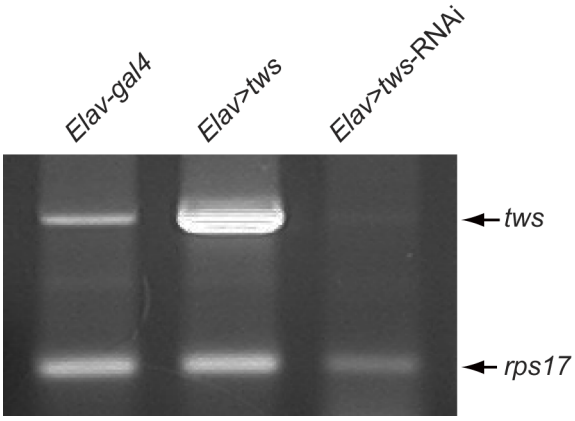

Fig. S1. Relative expression level of *tws*. UAS-*tws* and UAS-*tws*-RNAi transgenic constructs were driven by *Elav-gal4*. 10 μg of purified total RNA was reverse transcribed using oligo(dT) primers and SuperScriptase (invitrogen). PCR was performed using *tws* specific primers (5'-GGAGCTAACAGAGGTGATC-3' and 5'-CACGCTGATCTCATCCTTCTTTCG-3') and *rps17* primers (5′-CGAACCAAGACGGTGAAGAAG-3′ and 5′-CC TGCAACTTGATGGAGATACC-3′). PCR condition: at 94°C for 2 min, 30 cycles (at 94°C for 30 sec, at 40°C for 30 sec, at 72°C for 1 min), and at 72°C for 7 min. Samples were resolved in 1.5% agarose gel.

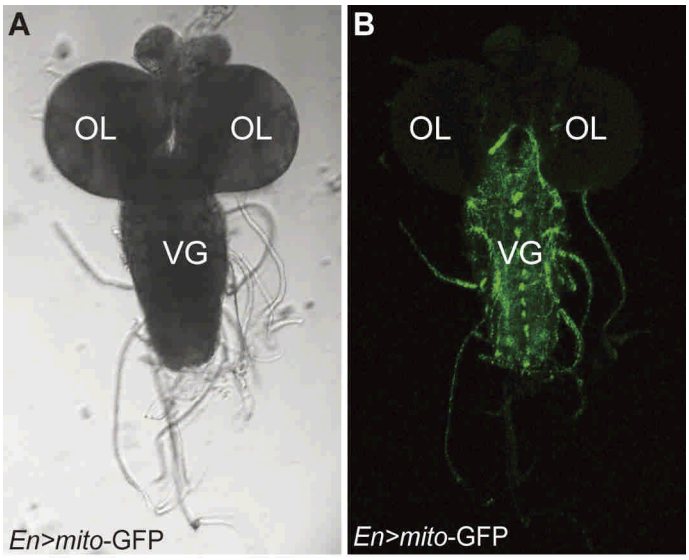

Fig. S2. *En-gal4* drives the expression of *mito*-GFP in neuritis of larva. **(**A**)** Larval brain lobe (optical view). (B) Mitochondria were labeled with *mito*-GFP. Expression of transgenic constructs in the neurites of ventral ganglia using *En-gal4*. OL, optical lobe; VG, ventral ganglion

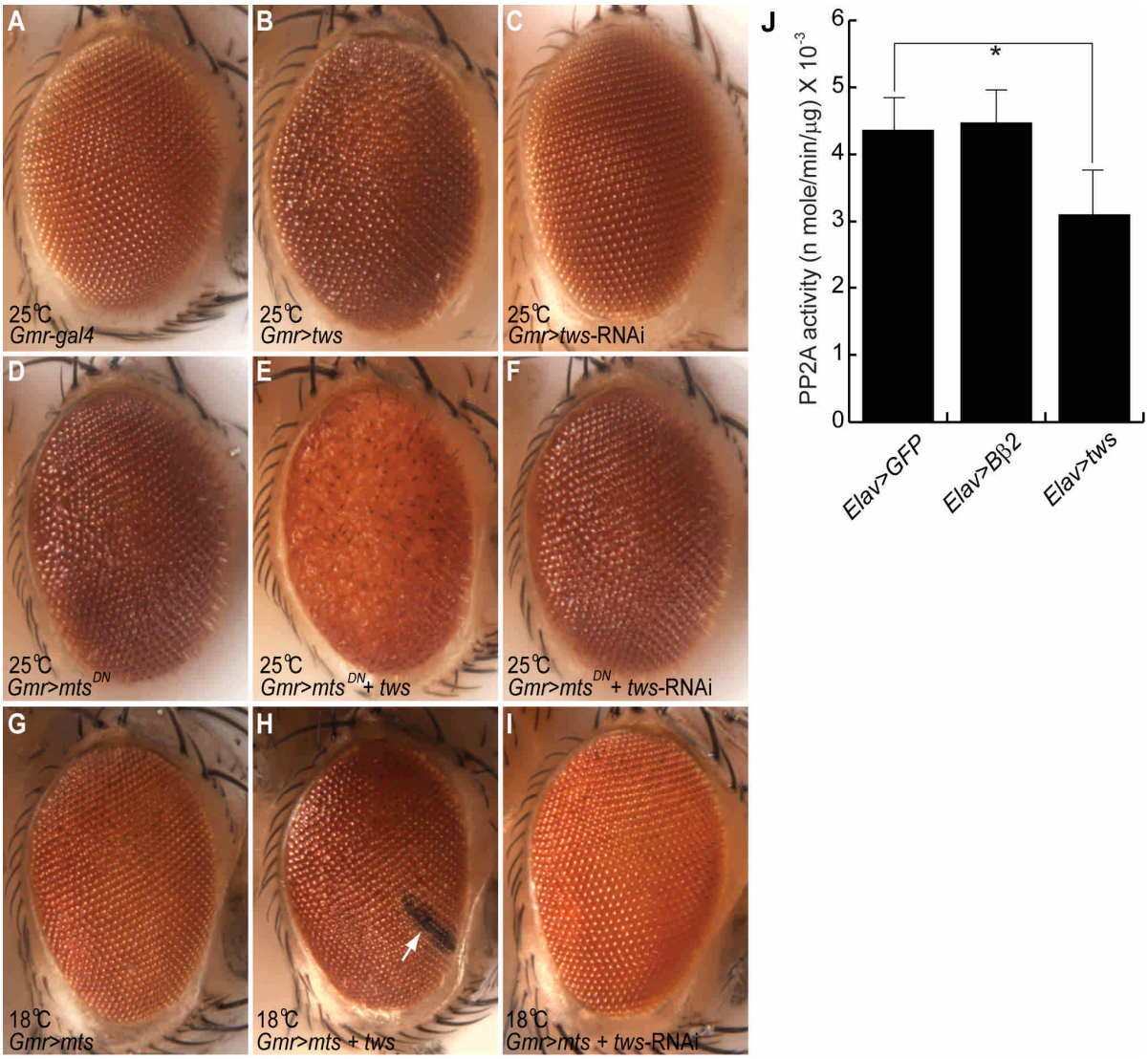

Fig. S3. *tws* induces apoptosis. Genetic crossed were conducted (A-F) at 25°C and (G-I) 18°C. (A) Control *Gmr-gal4* flies showed normal eye morphology. (B) Ectopic *tws* induce mild rough eye phenotype. (C) No obvious eye defect in *Gmr>tws*-RNAi flies. (D) Ectopic overexpression of dormant negative *mts* (mts^{DN}) caused very mild rough eye phenotype. (E). Depigmentation of ommatidia in flies co-expressing mts^{DN} and *tws*. (F) Very mild rough eye phenotype was observed in flies co-expressing mts^{DN} and *tws*-RNAi. (G) Targeted overexpression of *mts* under the control of *Gmr-gal4* caused lethality at 25°C. However, the flies were survival with no retinal defect at 18°C. (H). Ectopic *mts* and *tws* synergistically caused eye degeneration. Necrotic spots were consistently observed (white arrow). (I) Normal eye morphology in flies co-expressing UAS-*mts* and UAS-*tws*-RNAi transgenes. (J) PP2A activity was quantified using a PP2A activity assay kit (Promega, V631A). PP2A activity was not significantly increased in the heads of transgenic flies expressing Bβ2 flies, but its activity was significantly reduced in *tws*-expressing flies. Data were expressed as mean ± sd values and analyzed by Student's *t*-test; * indicates $p < 0.01$. (n = 3).

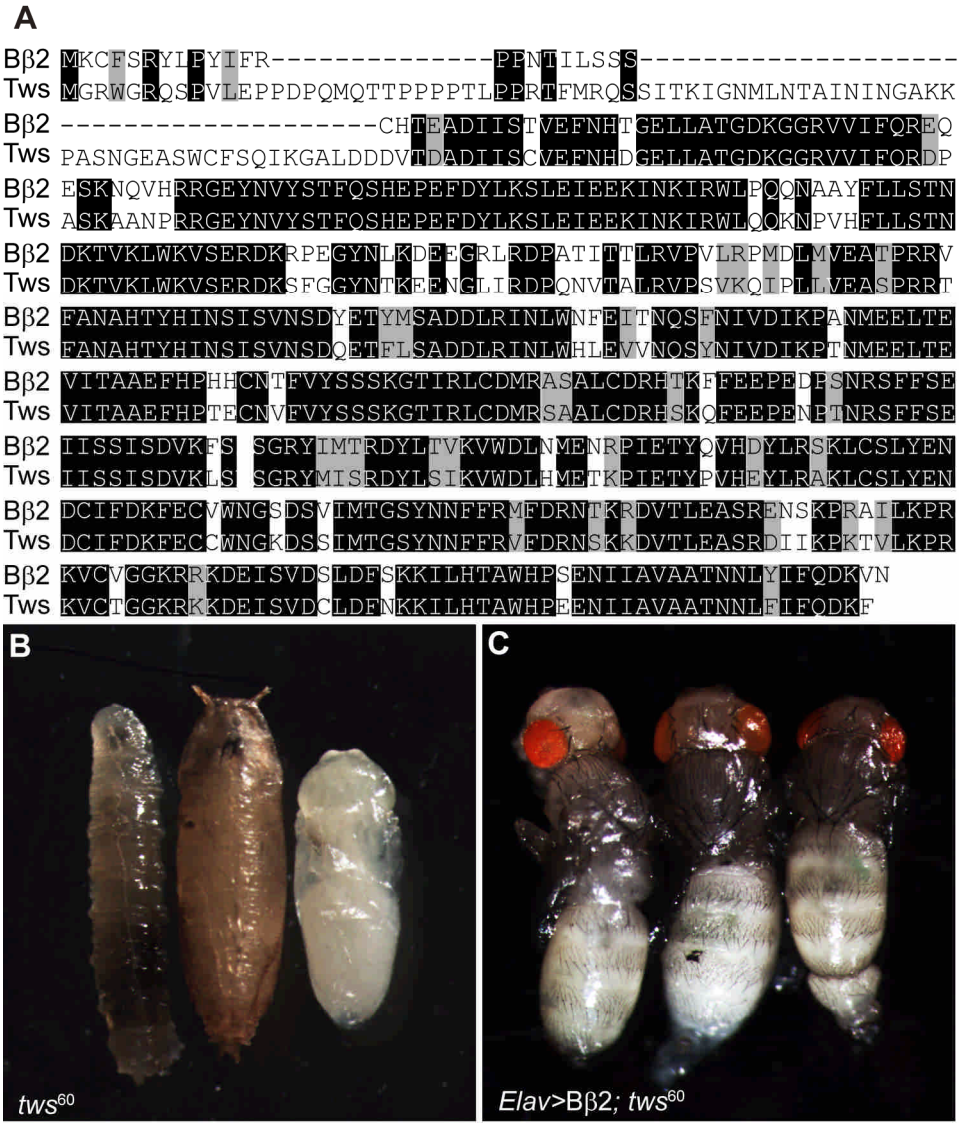

Fig. S4. Tws and Bβ2 are functionally equivalent. (A) Amino acid sequence alignment of Bβ2 and Tws. The entire sequence of Tws is highly homologous to the human Bβ2 except that the N termini of both proteins are less conserved. Identical and conserved amino acid residues are shaded in black and grey respectively. (B) Majority of homozygous *tws*^{60} mutants die at larval stages. Only few animals would survival to early pupal stages (3.58%). (C) Neuronal overexpression of Bβ2 driven by *Elav-gal4*, were able to rescue the survival of *tws*^{60} to the pharate adult stages.