

## Supplementary information (Supplementary Figure S1, Supplementary Figure S2)

**Figure S1.** **A)** Percentages of similarity of amino acid sequences. **B)** Dorsal view photographs of representative control and *sacs*<sup>-/-</sup> larvae. No dysmorphology was noted at 120 hpf but homozygous larvae showed a slight reduction of the eye area. **(C)** Statistical analysis of the data shown in **(B)**. **D)** Lateral views of whole-mount embryos labeled with mAb Znp-1 (*sacs*<sup>-/-</sup> n=25; controls n=25). **E)** Lateral views of whole-mount embryos stained with acetylated tubulin mAb in *sacs*<sup>-/-</sup> and control embryos at 48 hpf (*sacs*<sup>-/-</sup> n=20; controls n=20). **F)** Muscle organization determined with birefringence in control and *sacs*<sup>-/-</sup> larvae at 120 hpf. Birefringence images were obtained by viewing zebrafish with a plane polarizing filter. **G)** Detection of dying cells by acridine orange staining in the tail region of control and *sacs*<sup>-/-</sup> mutant embryos at 48 hpf (lateral views). Quantitative analysis of apoptotic cells. Abbreviations: n, number of evaluated embryos in total; error bars indicate standard errors of the means (SEM); ns, not significant. The values are expressed as mean ± SEM. Statistical analysis was performed by Mann-Whitney test.

**Figure S2.** A-B) Automated analysis of spontaneous motor activity of *sacs* WT larvae at 120 hpf after drug treatments (untreated *sacs* WT n=40; *sacs* WT treated with ADLL/Tanganil™ n=40; *sacs* WT treated with TUDCA n=40) in 2 independent experiments. The values are expressed as mean ± SEM. Statistical analysis was performed by Mann-Whitney test. Abbreviations: ns, not significant.

**C-D)** RT-qPCR analysis on homozygous *sapje* zebrafish larvae and controls. Three independent RNA samples from each group were evaluated at 120 hpf. The mRNA expression levels of *vim* and *calr* were normalized to  $\beta$ -*actin*. **E-F)** Automated analysis of spontaneous motor activity of *sapje* after drugs treatment (untreated *sapje* n=29; *sapje* treated with ADLL/Tanganil™ n=20; *sapje* treated with TUDCA n=20). ns, not significant. The values are expressed as mean ± SEM. Statistical analysis was performed by Mann-Whitney test. Abbreviations: ns, not significant.

**Figure S3.** Full-length lanes of original blots referring to Figure 3H. Dotted lines indicate molecular weight

corresponding to the cut on the PVDF-membrane. Loaded samples not related to this work were removed and not shown.

**Supplementary Video S1:** Representative video of *sacs*<sup>-/-</sup> mutant zebrafish larvae at 120 hpf. Line A-D (*sacs* WT larvae); Line E-H (*sacs*<sup>-/-</sup> larvae).