SUPPLEMENTAL DATA

SUPPLEMENTAL FIGURE LEGENDS

Fig. S1. Analysis of Mfn1-null mice. Representative images of TH-immunoreactivity in (A) striatum and (B) midbrain at 22 weeks of age. No loss of TH signal is evident in the striatum or the SNc. Open field summary of (C) total distance, (D) average velocity, (E) rearing frequency and (F) immobile duration. Results of heterozygous and homozygous Mfn1 mutants were normalized to wildtype controls. Error bars represent propagated standard error.

Fig. S2. Comparison of Mfn-double mutants with Mfn2 mutants in the open field test. (A) Total distance traveled during a 15-minute period of observation. (B) Average velocity exhibited by animals. (C) Rearing frequency. (D) Average duration of immobility between bouts of activity. In all calculations, values were normalized to wildtype controls and error bars indicate the propagation of standard error. The Student t-test was used to calculate statistical significance (n=3-9 animals). * p<0.05; ** p<0.01; *** p<0.001.

Fig. S3. Mitochondrial transport in Mfn1 mutant cultures. Representative images of Dendra2-labeled dopaminergic neurons in (A) control heterozygous and (B) Mfn1 mutant midbrain cultures. Mitochondrial transport was monitored by kymograph analysis in (A) control heterozygous and (B) Mfn1 mutant neurons.

Movie S1. Video of 14-week old control heterozygous mouse and Mfn2 mutant littermate.
**Movie S2.** Time-lapse video of Dendra2-labeled mitochondria in SNc dopaminergic neurons of a control slice culture. Red mitochondria have been photoconverted. Note the rapid movement of a few mitochondria.

**Movie S3.** Time-lapse video of Dendra2-labeled mitochondria in SNc dopaminergic neurons of an Mfn2 mutant slice culture. Red mitochondria have been photoconverted. Note that the mitochondria are sparse and stationary.
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A
Distance (normalized to WT)

B
Velocity (normalized to WT)

C
Rearing (normalized to WT)

D
Duration of immobility (normalized to WT)

Age (weeks)

Mfn1+/-; Mfn2+/-
Mfn1-/-, Mfn2+/-
Mfn1+/-; Mfn2-/-
Mfn1-/-; Mfn2-/-