Berman et al., http://www.jcb.org/cgi/content/full/jcb.200809060/DC1

Table S1. **Data summary for mitochondrial observations (Figs. 2, 5 B, and 7 A)**

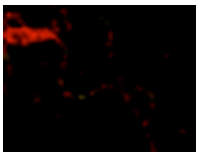
Condition	Observed mitochondria	Fissions	Fusions	Mean length	Number density (per micrometer)
				μm	
WT	122	31	10	1.63 ± 0.09	0.142 ± 0.007
Bcl-x_L	146	67	33	2.15 ± 0.12	0.145 ± 0.004
dnDrp1	94	23	21	2.99 ± 0.2	0.109 ± 0.008
both	52	15	9	3.33 ± 0.22	0.123 ± 0.004

WT, wild type.

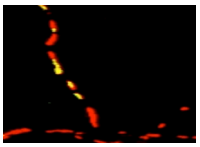
Table S2. **Comparison of different approaches to solving Eq. 4 in "Computational methods" for fission rates per unit length (in units of per micrometer per second)**

Solution method	WT	Bcl-x_L	dnDrp1	Both
Exact solution[a]	0.0002089	0.0003567	0.0001111	0.0001219
Lower-bound solution[b]	0.0001996	0.0003167	0.0001041	0.0001133
Linear approximation[c]	0.0001730	0.0002366	0.0000908	0.0000961

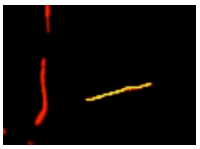
WT, wild type.
[a]From the optimize nonlinear equation solver in the R system (see Fig. 5 B).
[b]Mean of exponentials replaced with the exponential of the means in the right-hand side of Eq. 4.
[c]Expanded exponential on the right-hand side of Eq. 4 in Taylor series and neglecting all but the lowest order term.



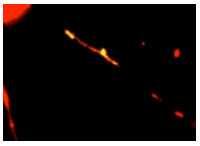
Video 1. **Mitochondria move through neuronal processes.** Cultured rat cortical neurons transfected with mitoRFP and mitoPA-GFP for 24 h were monitored in this 15-min time-lapse series (10 s/frame) immediately after photoactivation of selected mitochondria that appear yellow in the merge (see "Mitochondrial length and DrOF in rat neurons" and Fig. 3). The neuronal cell body is on the left. The video is displayed at 5 frames/s.



Video 2. **Photoactivated mitochondrion undergoes two fission events.** See Video 1 legend and Fig. 3 B. The video is displayed at 5 frames/s.



Video 3. **Photoactivated mitochondrion undergoes a fusion event.** The video shows a photoactivated mitochondrion (yellow) undergoing fusion with an unactivated (red) mitochondrion. See Video 1 legend. The PA-GFP–filled mitochondrion on the left moves adjacent to the red (unactivated) mitochondrion. After fusion of these two mitochondria, the PA-GFP diffuses very rapidly into the unactivated mitochondrial matrix. The video is displayed at 5 frames/s.



Video 4. **Photoactivated stationary mitochondrion undergoes a fusion event.** Video shows a photoactivated (yellow) and an unactivated mitochondrion (red) undergoing fusion (see Video 1 legend and Fig. 3 C). The photoactivated (possibly branched) mitochondrion appears to reach out and fuse with the unactivated mitochondrion on the left, and the PA-GFP rapidly diffuses into the red mitochondrion. The video is displayed at 5 frames/s.