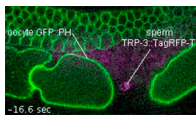
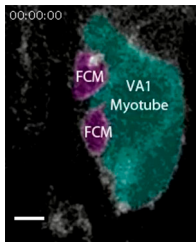


## Supplemental material

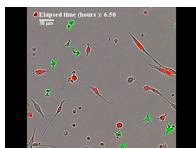
Brukman et al., <https://doi.org/10.1083/jcb.201901017>



Video 1. **Sperm-oocyte fusion in *C. elegans***. The plasma membranes of oocytes are labeled in green by GFP::PH (pleckstrin homology domain), whereas the sperm expresses TRP-3::TagRFP-T channels. Note that during fertilization, the TRP-3::TagRFP-T signal is transferred from the sperm to the oocyte indicating the merger of the membranes. Video used with permission from [Takayama and Onami, 2016](#).



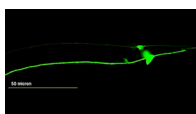
Video 2. **Myoblast fusion in *Drosophila* embryos**. In the first frame, FCMs and VA1 muscle are shown in magenta and turquoise pseudo-colors, respectively. PI(4,5)P2 molecules in the membranes are detected with  $PH^{Plc}::GFP$  transgene. Over the acquisition time, PI(4,5)P2 becomes enriched at the cell-cell interface and disappears with the actual myoblast fusion event. Arrows point to accumulations of PI(4,5)P2, arrowheads to filopodia. Red arrow indicates fusion event with the disappearance of the FCM, and purple arrow points to opening in the fusion interface just before fusion. Video used with permission from [Bothe et al., 2014](#).



Video 3. **Mouse-derived macrophage-cancer cell fusion in vitro**. Fusion of murine marrow-derived macrophages expressing actin-GFP and murine cancer cells expressing Histone 2B fused to red fluorescent protein (H2B-RFP). Video used with permission from [Gast et al., 2018](#).



Video 4. **Syncytia formation in the dorsal epidermis in *C. elegans* embryos**. EFF-1::GFP is shown in green, and the apical cell junctions are labeled magenta with DLG-1::RFP. Lower panel represents enlarged area of the embryo. Arrows mark the start of apical junction disassembly, indicative of fusion. Video used with permission from [Smurova and Podbilewicz, 2016](#).



Video 5. **Axonal fusion: neuronal repair mechanism**. Two bilateral posterior neurons PLMs are labeled in live worms with GFP and were cut by laser-induced neurosurgery (each PLM was cut twice). During the regenerative process, axons that fuse to their distal detached parts contribute to recovery of escape behavior following touch stimulation. Photobleaching of axon parts that have merged show bright vesicular organelles travel along the remodeled axons, demonstrating that fusion of injured axons restores structural and functional connectivity. Video used with permission from [Basu et al., 2017](#).

## References

- Basu, A., S. Dey, D. Puri, N. Das Saha, V. Sabharwal, P. Thyagarajan, P. Srivastava, S.P. Koushika, and A. Ghosh-Roy. 2017. *let-7* miRNA controls CED-7 homotypic adhesion and EFF-1-mediated axonal self-fusion to restore touch sensation following injury. *Proc. Natl. Acad. Sci. USA.* 114:E10206–E10215. <https://doi.org/10.1073/pnas.1704372114>
- Bothe, I., S. Deng, and M. Baylies. 2014. PI(4,5)P2 regulates myoblast fusion through Arp2/3 regulator localization at the fusion site. *Development.* 141:2289–2301. <https://doi.org/10.1242/dev.100743>
- Gast, C.E., A.D. Silk, L. Zarour, L. Riegler, J.G. Burkhart, K.T. Gustafson, M.S. Parappilly, M. Roh-Johnson, J.R. Goodman, B. Olson, et al. 2018. Cell fusion potentiates tumor heterogeneity and reveals circulating hybrid cells that correlate with stage and survival. *Sci. Adv.* 4:eaat7828. <https://doi.org/10.1126/sciadv.aat7828>
- Smurova, K., and B. Podbilewicz. 2016. RAB-5- and DYNAMIN-1-Mediated Endocytosis of EFF-1 Fusogen Controls Cell-Cell Fusion. *Cell Reports.* 14:1517–1527. <https://doi.org/10.1016/j.celrep.2016.01.027>
- Takayama, J., and S. Onami. 2016. The Sperm TRP-3 Channel Mediates the Onset of a Ca(2+) Wave in the Fertilized *C. elegans* Oocyte. *Cell Reports.* 15:625–637. <https://doi.org/10.1016/j.celrep.2016.03.040>