Muscle cells point the finger at each other

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A new study reveals that muscle cells fuse together during development by poking "fingers" into each other to help break down the membranes separating them. The study appears online on November 22, 2010 in the *Journal of Cell Biology*.

During muscle development, individual muscle cells fuse together to form long myotubes containing multiple cell nuclei. In the fruit fly Drosophila melanogaster, fusion occurs between two different types of muscle cell: founder cells and fusion-competent myoblasts. Using electron microscopy to analyze developing fly embryos, Elizabeth Chen and colleagues from the Johns Hopkins University School of Medicine in Baltimore, MD, discovered that fusion-competent myoblasts send multiple "finger-like" protrusions into neighboring founder cells. These fingers contained large amounts of the cytoskeletal protein actin, and their formation required several proteins that stimulate the assembly of actin molecules into long filaments.

The actin-rich fingers helped form a small pore connecting the founder cell and fusion-competent myoblast, which gradually expands to fuse the two cell types together. The researchers think that the fingers assist pore formation by pushing the two cell membranes extremely close to each other.

The structure and behavior of these myoblast fingers are very similar to other types of actin-rich protrusions called invadosomes that researchers have previously identified in cancer cells and other cell types in culture. But this is the first example of this type of structure in a developing

tissue. The researchers now want to investigate how these invasive myoblast fingers are formed and controlled.

More information: Sens, K.L., et al. 2010. J. Cell Biol. doi:10.1083/jcb.201006006