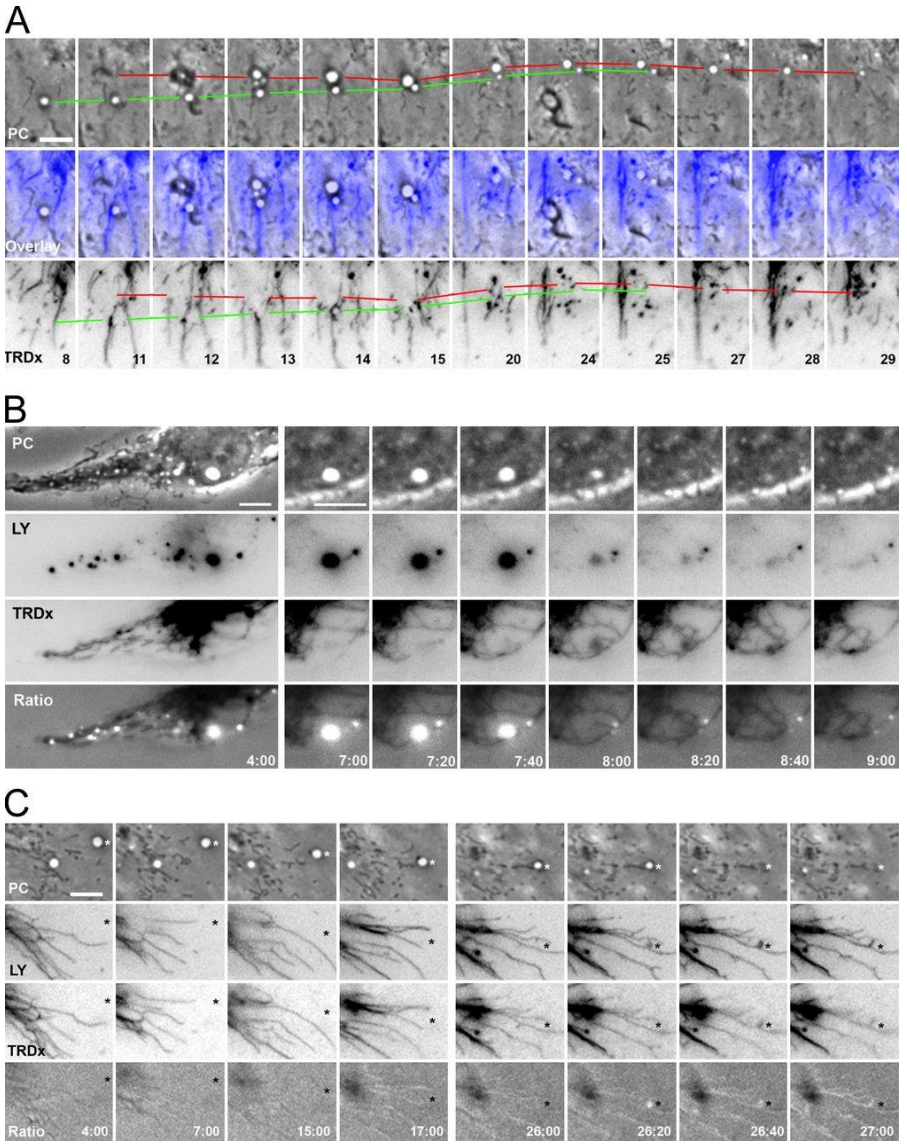
Rapid delivery of extracellular small solutes into endolysosomes by M-CSF–induced macropinosomes in macrophages.



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Rapid delivery of extracellular small solutes into endolysosomes by M-CSF–induced macropinosomes in macrophages. (A) BMMs with TRDx-labeled endolysosomes were stimulated with M-CSF and then imaged by time-lapse phase contrast (PC) and fluorescence (TRDx) microscopy. Corresponding distributions of macropinosomes and lysosomes are indicated in overlay images (middle row) and by the lines that track macropinosomes between time points (top and bottom rows). Time after the addition of M-CSF is indicated in the bottom row (minutes). Macropinosomes were repeatedly engaged by endolysosomes and shrank gradually. (B) PC images show phase-bright macropinosomes and the time course of maturation for one LY-labeled macropinosome. Inverted contrast images of macropinosomes (LY) and endolysosomes (TRDx) show dye exchange between the compartments. Time after addition of M-CSF is indicated in the bottom row (min:sec). LY/TRDx fluorescence ratio images (Ratio) show the relative distributions of macropinosomes (white) and endolysosomes (black). Tubular endolysosomes containing TRDx elongated toward the phase-bright macropinosome containing LY (*t* = 7:00–7:20), and wrapped around it (*t* = 7:40). The two dyes mixed in the macropinosome (*t* = 8:00), which then disappeared quickly (*t* = 8:00–9:00). (C) Size-selective solute exchange between tubular endolysosomes and macropinosomes. Tubular endolysosomes prelabeled with LY and TRDx contacted phase-bright macropinosomes and delivered LY before delivery of the larger TRDx. Asterisks indicate the position of a macropinosome in corresponding PC, LY, and TRDx fluorescence images. LY/TRDx ratio images show the early entry of LY into the macropinosome (26:20), followed by entry of the TRDx and rapid shrinkage of the macropinosome (26:40). Bars, 5 µm.