

**Both daughter cells traffic and exocytose membrane at the cleavage furrow during mammalian cytokinesis**

John W. Goss and Derek K. Toomre, Department of Cell Biology,  
Yale University School of Medicine, New Haven, CT 06510.

**Correspondence :**

Derek K. Toomre  
Department of Cell Biology  
Yale University School of Medicine  
333 Cedar Street PO Box 209002  
New Haven, CT 06510  
Phone: (203) 785-4319  
Fax: (203) 785-3559  
derek.toomre@yale.edu

Recent studies have implicated membrane traffic in cytokinesis, the final stage of cell division. To address if constitutive exocytic membrane is focally delivered to the cleavage furrow, and if asymmetric or symmetric mechanisms of delivery are involved, we utilized advanced live cell imaging to track exocytosis of single vesicles. Fast three-dimensional confocal timelapse imaging of VSVG-ts045-YFP cargo revealed that vesicles from both daughter cells traffic out of the Golgi along curvi-linear paths and into the furrow. Immunolocalization and photobleaching experiments indicated that individual vesicles accumulate in the midbody and generate a reserve vesicle pool that is distinct from endosomal and lysosomal compartments. Total internal reflection fluorescence microscopy (TIRFM) imaging provided new, striking direct evidence that Golgi-derived vesicles from both daughter cells not only traffic to the furrow region, but dock and fuse there - supporting a symmetrically polarized exocytic delivery model. These results suggest new similarities (and differences) in trafficking pathways of animal and higher plant cells during cytokinesis.