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Movie 1. Time-lapse imaging of peroxisomes in *Saccharomyces cerevisiae* WT cells growing in the presence of oleate. Cells produce GFP-SKL to visualize peroxisomes. Peroxisomes migrate to developing buds at an early stage of bud development. The video was captured at 60 frames/hour and is displayed at 6 frames/second. Video stills from this video are presented in Figure 3A. Left panel, GFP fluorescence (green); right panel, merge of bright field and fluorescence.

Movie 2. Time-lapse imaging of peroxisomes in *S. cerevisiae vps1* cells growing in the presence of oleate. Cells produce GFP-SKL to visualize peroxisomes. Peroxisomes may migrate to developing buds after elongation in the neck between mother cell and bud or, alternatively, after fission in the mother cell followed by trafficking to the bud. Note that the two vague structures at the top of the cell represent droplets of oleate. The video was captured at 60 frames/hour and is displayed at 6 frames/second. Video stills are presented in Fig. 3B. Left panel, GFP fluorescence (green); right panel, merge of bright-field and fluorescence images.

Movie 3. Time-lapse imaging of peroxisomes in *S. cerevisiae dnm1 vps1* cells growing in the presence of oleate. Cells produce GFP-SKL to visualize peroxisomes. Cells characteristically contain a single peroxisome. Upon budding, these organelles elongate and move into the neck between the mother cell and the bud. The organelles form and retract extensions in various directions. Fission of the organelle is probably associated with the completion of bud formation. The video was captured at 60 frames/hour and is displayed at 6 frames/second. Video stills are presented in Fig. 3C. Left panel, GFP fluorescence (green); right panel, merge of bright-field and fluorescence images.

Movie 4. Reconstituted image of a peroxisome in a budding *dnm1 vps1* cell producing GFP-SKL, grown in the presence of oleate. The single organelle is located in the neck between mother cell and bud and extending into the bud. The video is based on a Z-stack of 22 CLSM images at 0.05 μm interval (see Fig. 4). The cell wall (yellow) was reconstructed by manual tracing of the contours in the bright-field images, the fluorescent structure (green) by using the isosurface function of Amira.

Movie 5. Visualization of Dnm1-GFP and Mitotracker Orange in WT *S. cerevisiae* cells, grown on glucose. The video shows a Z-stack with a 0.21 μm interval in the Z-direction. The data indicate that all Dnm1-GFP fluorescent spots are associated with mitochondria, except one, which is located in the top of the cell. Video stills are presented in Fig. 5A. Left panel, merge of MitoTracker Orange and Dnm1-GFP; right panel, merge of MitoTracker Orange, Dnm1-GFP and bright-field images.