**Requirement for Neo1p in Retrograde Transport from the Golgi Complex to the Endoplasmic Reticulum (Arial 11 bold)**

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**Abstract (Arial 11 bold)**

Neo1p from *Saccharomyces cerevisiae* is an essential P-type ATPase and potential aminophospholipid translocase (flippase) in the Drs2p family. We have previously implicated Drs2p in protein transport steps in the late secretory pathway requiring ADP-ribosylation factor (ARF) and clathrin. Here, we present evidence that epitope-tagged Neo1p localizes to the endoplasmic reticulum (ER) and Golgi complex and is required for a retrograde transport pathway between these organelles. Using conditional alleles of *NEO1*, we find that loss of Neo1p function causes cargo-specific defects in anterograde protein transport early in the secretory pathway and perturbs glycosylation in the Golgi complex. Rer1-GFP, a protein that cycles between the ER and Golgi complex in COPI and COPII vesicles, is mislocalized to the vacuole in *neo1-ts* at the nonpermissive temperature. These phenotypes suggest that the anterograde protein transport defect is a secondary consequence of a defect in a COPI-dependent retrograde pathway. We propose that loss of lipid asymmetry in the *cis* Golgi perturbs retrograde protein transport to the ER. **(Arial 10, less than 250 words)**