Recruiting matrix proteins with a peroxisomal targeting signal type 2 (PTS2) to the peroxisomal membrane requires species-specific factors. In Saccharomyces cerevisiae, the PTS2 receptor Pex7p acts in concert with the redundant Pex18p/Pex21p, whereas in Yarrowia lipolytica, Pex20p might unite the function of both S. cerevisiae peroxins. Herein, the genome of the filamentous fungus Neurospora crassa was analyzed for peroxin-encoding genes. We identified a set of 18 peroxins that resembles that of Y. lipolytica rather than that of S. cerevisiae. Interestingly, proteins homologous to both S. cerevisiae Pex7p and Y. lipolytica Pex20p exist in N. crassa. We report on the isolation of these PTS2-specific peroxins and demonstrate that NcPex20p can substitute for S. cerevisiae Pex18p/Pex21p, but not for ScPex7p. Like Pex18p, NcPex20p did not bind PTS2 protein or the docking proteins in the absence of ScPex7p. Rather, NcPex20p was required before docking to form an import-competent complex of cargo-loaded PTS2 receptors. NcPex7p did not functionally replace yeast Pex7p, probably because the N. crassa PTS2 receptor failed to associate with Pex18p/Pex21p. However, once NcPex7p and NcPex20p had been coexpressed, it proved possible to replace yeast Pex7p. Pex20p and Pex18p/Pex21p are therefore true orthologues, both of...
which are in need of Pex7p for PTS2 protein import.