Cardiolipin Remodeling in Yeast requires the Phospholipase Cld1p to Generate monolyso-cardiolipin

Andreas Beranek, Heide Knauer, Gerald Rechberger, Heimo Wolinski, Sepp. D. Kohlwein, and Regina Leber

Abstract

The mitochondrial dimeric phospholipid cardiolipin is characterized by a high degree of unsaturation of its acyl chains, which is important for its functional interaction with mitochondrial enzymes. The unusual fatty acid composition of cardiolipin molecular species emerges from a de novo synthesized “premature” species by extensive acyl chain remodelling that involves as yet only partially identified acyltransferases and phospholipases. Recently, the yeast protein Taz1p was shown to function as a transacylase, which catalyzes the reacylation of monolyso-cardiolipin (MLCL) to mature cardiolipin. A defect in the orthologous human TAZ gene is associated with Barth Syndrome, a severe genetic disorder, which may lead to cardiac failure and death in childhood. We now identified the protein encoded by reading frame *YGR110W* as a mitochondrial phospholipase, which deacylates de novo synthesized cardiolipin. Ygr110wp has a strong substrate preference for palmitic acid residues and functions upstream of Taz1p, to generate MLCL for Taz1p-dependent reacylation with unsaturated fatty acids. We therefore rename the Ygr110wp as Cld1p (cardiolipin-specific deacylase 1).