

# The specific degradation of phosphatidylglycerol

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The biosynthesis of yeast phosphatidylglycerol (PG) takes place in the inner mitochondrial membrane. Outside mitochondria, the abundance of PG is low. We present evidence that the subcellular distribution of PG is maintained by the locally controlled enzymatic activity of the PG-specific phospholipase, Pgc1. A fluorescently labeled Pgc1 protein strongly accumulates on the surface of lipid droplets (LD). We show, however, that LD are not only dispensable for Pgc1-mediated PG degradation, but do not even host any phospholipase activity of Pgc1. Our *in vitro* assays document the capability of LD-accumulated Pgc1 to degrade PG upon entry to the membranes of the endoplasmic reticulum, mitochondria, and even of artificial phospholipid vesicles. In this model, LD serve as a storage place and shelter Pgc1, preventing its untimely degradation, while both phospholipase activity and degradation of the enzyme occur in the membranes. Taken together, our results indicate that interaction between endoplasmic reticulum and LD are the integral part of anionic mitochondrial phospholipids homeostasis.

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