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PDF文档

捕光天线LHCⅡ的膜脂组成及PG在LHCⅡ 聚集中的作用

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用去垢剂增溶及高速离心的方法，从菠菜类囊体膜中提取并纯化了光系统Ⅱ的捕光天线LHCⅡ异质三聚体。分析其膜脂组成和脂肪酸含量，发现其中磷脂酰甘油(PG)的含量特别高，是PSⅡ的两倍，而PG中含高达31.1%的反式十六碳一烯酸。采用特异作用于十六碳一烯酸链的磷脂酶A2(PLA2)消化PG和体外回加PG重组的方法证明，PLA2消化PG会引起LHCⅡ三聚体解聚为单体，使叶绿素b(Chlb)的吸收峰(475 nm，655 nm)和荧光激发峰(480 nm)下降非常明显，而回加PG重组后，部分LHCⅡ单体又可重新聚集成三聚体。以上实验结果证明，PG及其反式十六碳一烯酸不仅在LHCⅡ三聚体的形成中具重要作用，而且还影响色素分子在LHCⅡ三聚体中的结合状态以及叶绿素b到叶绿素a的正常能量传递。

THE MEMBRANE LIPID COMPOSITIONS IN SPINACH LHC Ⅱ AND THE FUNCTION ROLE OF PG IN LHCⅡ AGGREGATION

Light-harvesting complexes of photosystem Ⅱ (LHCⅡ) was isolated from spinach chloroplast by ultra centrifugation after non-ionic detergent treatment. Native and SDS denatured polyacrylamide gel electrophoresis analysis indicated that the complexes existed in heterotrimer form and consisted of three polypeptides with molecular mass of 29 ku, 28 ku and 26 ku respectively. Lipid and fatty acid compositions in complexes were determined. LHCⅡ had the similar lipid compositions as PSⅡ, but the content of phosphatidyl-DL-glycerol (PG) with unusual 16:1-trans-hexadecenoic acid as the predominant fatty acid chains in LHCⅡ was much higher (21.1%) than that in PSⅡ (10.4%). Treating the trimeric LHCⅡ with phospholipase A2(PLA2) could induce the dissociation of the complexes. Reaggregation of monomer occurred after adding PG into dissociated LHCⅡ, which suggested PG is directly involved in the trimer stabilization. In addition, The absorption band at 475 nm, 655 nm and the fluorescence excitation peak at 480 nm decreased obviously in monomer, indicating that the energy transfer from Chl b to Chl a in LHCⅡ was effected after deletion of PG. It was concluded that PG not only played an important role in trimer formation but also effected the pigments binding and the energy transfer within the LHCⅡ.

关键词

PG; LHCⅡ; 聚集(Aggregation); 色素(Pigment)