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PDF文档

莱茵衣藻叶绿素暗合成突变体y-1类囊体膜形成过程中PSI核心色素蛋白复合物CPI的积累

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主要运用温和电泳和蛋白印迹技术检测了暗培养4天脱绿的衣藻Y-1细胞以及转绿后Y-1细胞光系统I的核心色素蛋白复合物（CPI）和核心叶绿素脱辅基蛋白PsaA/B。暗培养衣藻细胞中，PSI中主要的色素蛋白复合物-CPI完全缺失，然而核心多肽PsaA/B仍有一定量的积累，同时检测不到P700的含量。当脱绿的Y-1细胞转移至光照下(50 μmol Photons m-2 s-1)时，伴随着叶绿素的合成，色素蛋白复合物CPI和PsaA/B脱辅基蛋白的合成也逐渐达到正常水平，叶绿素和PsaA/B蛋白进行组装并形成了具有功能的PSI反应中心,同时P700含量也得到恢复。实验证明了光照是形成光合系统色素蛋白复合物的重要前提，叶绿素的合成能够稳定并促进PsaA/B的积累。同时发现，叶绿体基因编码的PSI核心多肽PsaA/B能够在暗条件下合成，而资料报道[1]高等植物如豌豆、大麦的黄化体中不能合成PsaA/B蛋白，这可能是由于在脱绿的Y-1细胞中叶绿体的量并没有发生明显的减少，且仍具有相对完整的大小和形状，而在叶绿体的被膜上具有许多参与光合作用的酶系统。

Accumulation of PSⅠCore Complex CPI During Light-Induced Thylokoid biogenesis in Chlamydomonas Reinhardtii Y-1

With Green gel electrophoresis and western blotting, Chlorophyll apoproteins and chlorophyll-protein complexes of photosystem Ⅰ(PSⅠ) core complex were examined in degreened cells of Chlamydomonas reinhardtii y-1 by growth in the dark for 4 days. In the dark, CPⅠ, the major chlorophyll-protein complex of the PSⅠ reaction center, was absent. But the core polypeptides PsaA/B were existed clearly. At the same time, P700 was not detected in dark-grown cells. When the etiolated cells were exposed to light (50 μmol Photons m-2 s-1), CPⅠand PsaA/B apoproteins accumulated rapidly in parallel with the synthesis of chlorophyll. The function of PSI reaction center was obtained with assembly of chlorophyll and PsaA/B apoproteins .The changes resulted in a rise of P 700 content in PSⅠ. The results in the present study suggest that accumulation of CPⅠrequire chlorophyll. Chlorophyll facilitated accumulation of PsaA/B apoproteins and played a direct role in the stabilization of core polypeptides. The most important, PsaA/B apoproteins can be synthesized obviously in the dark, which is different with the early report [1] that PsaA/B apoproteins can’t be synthesized in the etiolated plants such as pea, barley. This different may come from that the volume and size of the chloroplast is not markedly reduced in dark-grown Y-1 cells and many enzymes involved in photosynthesis are localized on the chloroplast envelope.

关键词

衣藻Y-1突变体(Chlamydomonas reinhardtii Y-1,); 类囊体膜形成(Thylokoid biogenesis); PSI核心色素蛋白复合物CPI(photosystem Ⅰcore complexes CPI)