

质体醌库和细胞色素 b_6f 参与调控蓝细菌 *Synechocystis* sp. PCC 6803的状态转换

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用调制叶绿素荧光研究了对苯醌(1,4-benzoquinone, BQ)和二溴百里香醌(2,5-dibromo-3-methyl-6-isopropyl-1,4-benzoquinone, DBMIB)对蓝细菌*Synechocystis* sp. PCC 6803状态转换的作用。BQ和DBMIB是质体醌(PQ)的类似物,两者均可充当PQ的电子受体。其中,DBMIB能够和细胞色素 b_6f 的 Q_o 位点特异结合。在没有作用光的情况下,BQ诱导暗适应的蓝细菌进入状态I;相反,DBMIB诱导*Synechocystis* 6803向状态II转换。据此提出,在生理状态下蓝细菌根据PQ库的氧化还原状态调节状态转换;细胞色素 b_6f 参与此调控过程。

PLASTOQUINONE POOL AND CYTOCHROME b_6f ARE INVOLVED IN STATE TRANSITIONS OF *Synechocystis* sp. PCC 6803

The effects of 1,4-benzoquinone (BQ) and 2,5-dibromo-3-methyl-6-isopropyl-p-benzoquinone (DBMIB) on the state transitions of *Synechocystis* sp. PCC 6803 were investigated by using modulated chlorophyll fluorescence. Both BQ and DBMIB are benzoquinone analogues and can accept electrons from plastoquinone. DBMIB also can bind to the Q_o site of the cytochrome b_6f complex with high affinity. In the absence of actinic light, BQ induced a transition from state 2 to state 1 in dark-adapted cells. To the contrary, DBMIB induced transition to state 2 in the presence of BQ or DCMU (3-(3',4'-dichlorophenyl)-1,1-dimethylurea). These results imply that the redox state of plastoquinone pool controls the state transitions and cytochrome b_6f is involved in these processes.

关键词

状态转换(State transition); 蓝细菌(Cyanobacteria); 细胞色素 b_6f (Cytochrome b_6f); 质体醌(Plastoquinone); 叶绿素荧光(Chlorophyll fluorescence)