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生命科学

氧化胁迫对骨骼肌型钙释放通道与相关蛋白作用的影响

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摘要 利用［3H］ryanodine结合实验，SDS PAGE和Western Blotting，光子相干光谱法（PCS）和DPH荧光偏振法，考察氧化胁迫条件下氧化型通道调控剂1,4NQ和Na 2SeO 3对RyR1通道活性，SR膜蛋白分布，RyR1的平均粒径和SR膜流动性的影响.结果显示，高浓度的1,4NQ和Na 2SeO 3处理使RyR1通道活性和SR膜的流动性降低，并且导致SR上的膜蛋白交联形成大分子交联复合物，而RyR1参与了它的形成，DTT可以逆转交联复合物的的形成.结果提示，高浓度氧化剂对RyR1通道的抑制作用，可能是由于氧化了负责关闭通道的职能巯基导致蛋白间错误交联，从而影响了钙释放通道和钙释放单元的结构和功能.

关键词 氧化调控剂；钙释放通道；巯基；大分子交联复合物；氧化胁迫

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Effects of extensive oxidative stress on the interaction between the skeletal type ryanodine receptors and related proteins

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Abstract

By using ［3H］ryanodine binding assay, SDS PAGE, Western Blotting, photon correlation spectroscopy (PCS) and DPH fluorescence polarization, the influences of oxidation modulators 1,4NQ and Na 2SeO 3 on the channel activity, the average particle size of RyR1, the distribution of SR proteins in cross linking complex, and fluidity of SR membrane under the oxidative stress were

investigated. The results indicate that, upon to the oxidants treatment of 1,4NQ and Na 2SeO, both the activity of RyR1 channel and the fluidity of SR membrane decreased, and macromolecular cross linked complexes consisting of RyR1 emerged on the gel of the SR membrane proteins. Further investigations showed that DTT decomposed the cross linked complexes. Above results suggest that the inhibition of RyR1 channel caused by the high concentration of oxidant modulators is probably due to oxidation of the functional sulfhydryls which are responsible for the closure of the channels, and the occurrence of mistaken cross linking between SR proteins which would alter the function of the calcium release unit.

Key words oxidation modulator calcium release channel sulfhydryl macromolecular cross linking complex oxidative stress

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