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论著

白细胞介素-2对心肌β-肾上腺素受体作用的调制

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摘要 目的：研究生理浓度白细胞介素-2（IL-2）对β-肾上腺素受体激动剂异丙肾上腺素（ISO）心肌细胞效应的调制作用及其信号途径。方法： 采用酶解分离的成鼠心室肌细胞模型，用视频跟踪系统测定单个心室肌细胞的收缩幅度、最大收缩速度和最大舒张速度（±dL/dtmax）；以Fura-2/AM为钙探针，用细胞内双波长钙荧光系统检测心肌［Ca2+］i的变化。结果： ① ISO显著增加心肌细胞的收缩幅度和±dL/dtmax，2×103 U/L的IL-2预处理15 min对心肌细胞的收缩没有影响，但是使心肌细胞对ISO的反应明显降低；② ISO浓度依赖性地增加心肌细胞的钙瞬态值，EC50为（0.12±0.01）μmol/L。2×103U/L的IL-2预处理15 min对心肌细胞的钙瞬态值没有影响，但是使心肌细胞对ISO的反应曲线显著降低，EC50为（0.44±0.06）μmol/L；③ 20 mg/L CTX预处理12 h可显著增加心肌细胞的钙瞬态值，2×103 U/L 的IL-2处理5 min可显著降低钙瞬态值；④ Forskolin显著增加单个心肌细胞的钙瞬态值，IL-2 2×103 U/L预处理15 min后，forskolin增加钙瞬态值的最大效应降低。结论： 生理浓度的IL-2 (2×103 U/L)能够显著抑制ISO对单个分离心肌细胞的正性肌力作用和钙瞬态值增高作用。IL-2的调制作用可能是通过抑制Gs蛋白，降低AC的活性来实现的。

关键词 心肌； 细胞； 白细胞介素-2； 异丙肾上腺素

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Modulation of interleukin-2 on the positive effect of isoproterenol in the isolated cardiomyocytes

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Abstract

<FONT face=Verdana>AIM: To explore the effects and mechanism of interleukin-2 (IL-2) on the positive effect of isoproterenol (ISO) in the isolated rat cardiomyocytes. METHODS: Enzymatically isolated cardiomyocytes were used. Peak twitch amplitude and maximal velocity of shortening/relaxation (±dL/dtmax) in the isolated cardiomyocytes were recorded with a microscope coupled to a charge-coupled device camera and ［Ca2+］i transients were determined with a fluorometric ratio method by using Fura-2/AM as Ca2+ indicators. RESULTS: ① ISO increased the peak twitch amplitude and ±dL/dtmax of the isolated cardiomyocytes. Perfusion for 15 min with IL-2 at 2×103 U/L, which had no effect at all, attenuated the enhancing effect of ISO on the peak twitch amplitude and ±dL/dtmax. ② ISO increased the ［Ca2+］i transients of the single ventricular myocytes in a dose dependent manner and the corresponding EC50 values of ISO was (0.12±0.01) μmol/L. Perfusion for 15 min with IL-2 at 2×103 U/L, which had no effect on the ［Ca2+］i transient at all, attenuated the enhancing effect of ISO and the corresponding EC50 was (0.44±0.06) μmol/L. ③ The electrically induced ［Ca2+］i transient was significantly increased by pretreatment with 20 mg/L cholera toxin for 12 h. The elevation of the ［Ca2+］i transient induced by cholera toxin was significantly attenuated by 2×103 U/L IL-2. ④ Forskolin (1 μmol/L), the activator of adenyl cyclase, significantly increased the electrically induced ［Ca2+］i transient, which was attenuated by IL-2 at 2×103 U/L. CONCLUSION: IL-2 inhibits the positive effect of isoproterenol in the isolated single ventricular myocytes, in which Gs protein and adenyl cyclase are involved.</FONT>

Key words Myocardium Cells Interleukin-2 Isoproterenol

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