

论著

降钙素基因相关肽对早期糖尿病大鼠血管ATP敏感性钾通道的影响

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摘要 目的 研究早期糖尿病大鼠血管平滑肌ATP敏感性钾通道 (K_{ATP}) 的变化, 进一步探讨糖尿病血管功能的改变机制。方法 大鼠单次注射链佐霉素60 mg/kg制作糖尿病模型; 1周或2周后, 两步酶消化法进行肠系膜动脉平滑肌细胞 (MASMC) 的消化分离; 全细胞膜片钳制技术记录MASMC的ATP敏感性钾电流 (I_{KATP})。结果 在保持电位-40 mV, 指令电位+50 mV时, 对照组, 糖尿病1周和2周组MASMC的 I_{KATP} 分别为 (79±6), (70±7) 和 (48±9) pA, 糖尿病2周组的 I_{KATP} 明显低于对照组。给予降钙素基因相关肽0.01~100 nmol/L, 3个组的 I_{KATP} 均浓度依赖性增加, 对照组: $Y=118.3+2.9X$, $r=0.887$; 糖尿病1周组: $Y=123+4.4X$, $r=0.981$; 糖尿病2周组: $Y=100.2+4.6X$, $r=0.975$; 糖尿病组 I_{KATP} 对降钙素基因相关肽量效反应斜率高于对照组。结论 早期糖尿病血管平滑肌的基础 I_{KATP} 减小, I_{KATP} 对降钙素基因相关肽的量效反应斜率增加。

关键词 糖尿病 肌, 平滑, 血管 膜片钳技术, 全细胞 钾通道, ATP敏感性 降钙素基因相关肽

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Effects of calcitonin gene related peptide on ATP-sensitive potassium channels of blood vessels in short-term diabetes rats

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Abstract

AIM To explore the mechanism of functional change in blood vessels of diabetes rats with respect to ATP sensitive potassium channel (K_{ATP}). **METHODS** The diabetes rat model was made by single injection of streptozotocin (60 mg/kg, ip). The mesentery artery smooth muscle cells (MASMC) were obtained 1 or 2 weeks later by two-step enzyme digestion method, and the current of K_{ATP} (I_{KATP}) was recorded by whole cell patch clamp technique. **RESULTS** When holding potential was -40 mV, commanding potential was +50 mV, the I_{KATP} recorded were (79±6), (70±7) and (48±9) pA in control, 1-week-diabetes and 2-week-diabetes groups, respectively. And I_{KATP} in 2-week-diabetes group was lower than that in control significantly. I_{KATP} in three groups increased concentration-dependently when concentration of calcitonin gene related peptide (CGRP) increased from 0.01 to 100 nmol/L: control: $Y=118.3+2.9X$, $r=0.887$; 1-week-diabetes group: $Y=123+4.4X$, $r=0.981$; 2-week-diabetes group: $Y=100.2+4.6X$, $r=0.975$. The slopes of concentration-response curve in diabetes groups were higher than that in control. **CONCLUSION** The basic I_{KATP} in MASMC of short-term diabetes rats attenuated, but the slopes of concentration-response curves of CGRP in diabetes groups were higher than that in control.

Key words diabetes muscle smooth vascular patch clamp technique whole-cell potassium channels ATP-sensitive calcitonin gene related peptide

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