

论著

## T型钙通道在心肌肥厚大鼠心肌细胞钙内流中的作用

徐东杰, 陈相健, 盛红专, 徐晋丹, 卞智萍, 杨笛, 曹克将, 张寄南\*  
(南京医科大学第一附属医院心脏科, 心血管病研究所, 江苏 南京 210029)

收稿日期 2004-12-9 修回日期 网络版发布日期 2008-8-14 接受日期 2005-7-8

**摘要** 目的 研究T型钙通道在心肌细胞钙离子内流中的作用及其对心脏兴奋收缩耦联的可能影响。方法 测定选择性T型钙通道阻滞剂米贝拉地尔对培养的SD乳大鼠心室肌细胞和二肾一夹心肌肥厚大鼠心室肌细胞  $[Ca^{2+}]_i$  的影响。结果 血管紧张素 II (Ang II) 刺激使乳大鼠心室肌舒张期细胞  $[Ca^{2+}]_i$  增高, 收缩期细胞  $[Ca^{2+}]_i$  降低,  $[Ca^{2+}]_i$  上升和下降的时间延长。米贝拉地尔  $1.25\sim 5 \mu\text{mol} \cdot \text{L}^{-1}$  浓度依赖性降低 Ang II 引起的细胞  $[Ca^{2+}]_i$  变化。在心肌肥厚模型大鼠, 咖啡因刺激后,  $[Ca^{2+}]_i$  增幅和最高  $[Ca^{2+}]_i$  明显降低。而米贝拉地尔  $25 \text{ mg} \cdot \text{kg}^{-1} \cdot \text{d}^{-1}$  (灌胃给药 7~9 周) 组加入咖啡因刺激后细胞内  $[Ca^{2+}]_i$  增幅和最高  $[Ca^{2+}]_i$  明显增高。结论 T型钙通道异常开放可以引起心肌细胞内钙超载。阻断T型钙通道, 可能通过改善肌浆网摄取及释放钙的功能而抑制心肌细胞钙超载。

**关键词** [钙通道, T型](#) [钙通道阻滞药](#) [米贝拉地尔](#) [肥厚, 心室](#) [钙, 细胞内](#)

分类号 [R972](#)

## T-type calcium channels contribute to calcium influx in myocytes of rats with hypertrophic heart

XU Dong-Jie, CHEN Xiang-Jian, SHENG Hong-Zhuan, XU Jin-Dan, BIAN Zhi-Ping, YANG Di, CAO Ke-Jiang, ZHANG Ji-Nan\*

(Institute of Cardiovascular Disease Research, the First Affiliated Hospital of Nanjing Medical University, Nanjing 210029, China)

### Abstract

**AIM** To study the effect of T-type calcium channels in calcium influx of cardiomyocyte and the possible influence to excitation-contraction coupling. **METHODS** Effects of mibefradil, a selective T-type channel blocker, on intracellular concentration of calcium ( $[Ca^{2+}]_i$ ) in cultured newborn rat ventricular cells treated by angiotensin II (Ang II) and ventricular myocytes of rat with hypertrophic heart induced by two-kidney one clip were recorded. **RESULTS** The diastolic  $[Ca^{2+}]_i$  raised and systolic  $[Ca^{2+}]_i$  dropped in cultured neonatal rat ventricular cells when stimulated with Ang II. At the same time, the ascending and descending time of  $[Ca^{2+}]_i$  was also delayed. Mibefradil  $1.25\sim 5 \mu\text{mol} \cdot \text{L}^{-1}$  reduced the change in  $[Ca^{2+}]_i$  induced by Ang II in a concentration-dependent manner. In ventricular myocytes of rat with hypertrophic heart, the maximum  $[Ca^{2+}]_i$  and increment of  $[Ca^{2+}]_i$  decreased significantly after stimulated with caffeine, while mibefradil ( $25 \text{ mg} \cdot \text{kg}^{-1} \cdot \text{d}^{-1}$ , ig, for 7~9 weeks) treatment increased that significantly after stimulated with caffeine. **CONCLUSION** The abnormal open of T-type calcium channel can induce calcium over-load in cardiomyocytes. Block of T-type calcium channel may inhibit the calcium over-load by improving the function of releasing and absorbing calcium of sarcoplasmic reticulum.

**Key words** [calcium channels](#) [T-type](#) [calcium channel blockers](#) [mibefradil](#) [hypertrophy](#) [ventricular](#) [calcium](#) [cytosolic](#)

DOI:

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(326KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ [本刊中 包含“钙通道, T型” 的相关文章](#)
- ▶ [本文作者相关文章](#)

- [徐东杰](#)
- [陈相健](#)
- [盛红专](#)
- [徐晋丹](#)
- [卞智萍](#)
- [杨笛](#)
- [曹克将](#)
- [张寄南](#)