

论著

## 蛋白酶体抑制剂对T淋巴细胞增殖活化的影响

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**摘要** 目的: 探讨蛋白酶体 (proteasome) 抑制剂LAC (lactacystin) 和 $\beta$ -LAC ( $\beta$ -lactacystin) 对外周血T淋巴细胞增殖、活化的影响。方法: 以植物血凝素 (phytohemagglutinin, PHA) 作为刺激剂, 经流式细胞仪检测T淋巴细胞增殖 (BrdU掺入率), 检测CD3+CD25+/CD3+及CD3+CD69+/CD3+细胞比例, 同时用RT-PCR检测蛋白酶体11S调节蛋白PA28及细胞因子IL-2 mRNA的表达。结果: (1) 对预先活化的T淋巴细胞, LAC和 $\beta$ -LAC降低 T淋巴细胞BrdU掺入率 ( $P < 0.05$ ); (2) LAC和 $\beta$ -LAC不影响T淋巴细胞CD69的表达 (各时点,  $P > 0.05$ ), 而显著抑制T细胞表面抗原CD25表达 (48 h、72 h,  $P < 0.05$ ); (3) 与对照组相比, LAC和 $\beta$ -LAC明显下调T淋巴细胞PA28、IL-2 mRNA的表达 (48 h、72 h,  $P < 0.05$ )。结论: LAC和 $\beta$ -LAC能够显著抑制T淋巴细胞增殖, 这一效应与其抑制T淋巴细胞表面早期活化抗原CD25表达, 下调PA28、IL-2 mRNA的表达有关。

**关键词** [蛋白酶体抑制剂](#); [T淋巴细胞](#); [免疫抑制](#)

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## Effect of lactacystin and $\beta$ -lactacystin on the activation and proliferation of T-lymphocytes

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### Abstract

AIM: To evaluate the effects of lactacystin (LAC) and  $\beta$ -lactacystin ( $\beta$ -LAC), proteasome inhibitor, on the proliferation and activation of T lymphocytes. METHODS: Flow cytometry was used to analyse the proliferation and the expression of CD69, CD25 and CD3 in PHA activated T-lymphocytes. Furthermore, the expression of PA28 and IL-2 mRNA were assayed by competitive RT-PCR. RESULTS: (1) LAC and  $\beta$ -LAC significantly decreased the incorporation in PHA activated T-lymphocytes. (2) Although LAC and  $\beta$ -LAC did not affect the expression of CD69 at any time, they significantly inhibited the expression of CD25 (48 h, 72 h,  $P < 0.05$ ). (3) In comparison with control, LAC and  $\beta$ -LAC significantly down-regulated the expression of PA28 and IL-2 mRNA (48 h, 72 h,  $P < 0.05$ ). CONCLUSIONS: LAC and  $\beta$ -LAC significantly inhibit the proliferation and activation of T lymphocytes. Mechanisms involved are inhibition of CD25 and down-regulation of PA28 and IL-2 mRNA expression.

**Key words** [Proteasome inhibitors](#); [T-lymphocytes](#) [Immunosuppression](#)

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