

## 论著

### 重症肌无力患者外周血中IL-21的表达及其与血清抗AChR抗体类别转换的关系

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#### 摘要:

目的: 探讨白细胞介素(IL)-21在重症肌无力(MG)发病中的作用及其对血清抗乙酰胆碱受体(AChR)抗体类别转换的影响。方法: 采集26例MG患者和18例健康对照者的外周血, 应用ELISA技术检测外周血血清中抗AChR-IgG及其亚型IgG1, IgG2, IgG3的水平以及IL-21的浓度, 利用RT-PCR技术检测外周血单个核细胞上IL-21R mRNA的表达水平, 采用流式细胞学技术检测其中8例患者B细胞上IL-21R的表达水平, 并分析它们之间的关系。结果: MG患者组血清中IL-21浓度( $31.686 \pm 8.499$  pg/mL)高于正常对照组( $15.147 \pm 6.366$  pg/mL), 差异具有统计学意义( $P < 0.01$ ); MG患者组PBMCs上IL-21R mRNA的表达( $0.139 \pm 0.052$ )高于正常对照组( $0.101 \pm 0.022$ ), 差异具有统计学意义( $P < 0.05$ ); 但二者在眼肌型和全身型亚组中差异均无统计学意义( $P > 0.05$ )。8例MG患者B细胞上的IL-21R的表达水平( $1.074 \pm 0.375$ )高于正常对照组( $0.389 \pm 0.391$ ), 差异具有统计学意义( $P < 0.05$ )。抗AChR-Ab阳性患者血清IL-21浓度与抗AChR-IgG水平呈正相关, 相关系数为0.689 ( $P < 0.05$ ), 但其与IgG1, IgG2, IgG3亚型的水平均无相关性( $P > 0.05$ ); PBMCs上IL-21R mRNA的表达与血清抗AChR-IgG及其IgG1, IgG2, IgG3亚型的水平均无相关性( $P > 0.05$ ); B细胞上IL-21R的表达与抗AChR-IgG及IgG1, IgG3亚型水平呈正相关(分别为 $P < 0.05$ ,  $P < 0.01$ ,  $P < 0.05$ ), 而与抗AChR-IgG2的水平无相关性( $P > 0.05$ )。结论: IL-21可能通过作用于B细胞上的IL-21R, 影响MG患者血清中抗AChR抗体向IgG1和IgG3亚型转换, 从而对MG发病起促进作用。

关键词: 重症肌无力 白细胞介素21 白细胞介素21受体 抗乙酰胆碱受体抗体 抗体类别转换

### Expression of IL-21 in the peripheral blood of myasthenia gravis patients and its correlation with anti-AChR-Ab class switch

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#### Abstract:

Objective To explore the role of IL-21 in the pathogenesis of myasthenia gravis (MG) and its influence on the the class switch of anti-AChR antibodies. Methods Blood was taken from 26 patients and 18 healthy controls, and the expression of IL-21R mRNA in peripheral blood mononuclear cells (PBMCs) was detected by RT-PCR. The expression of IL-21R on B lymphocytes was measured by flow cytometry, while the concentrations of serum IL-21 and the levels of anti-AChR-IgG and its isotype IgG1, IgG2, and IgG3 were tested by ELISA. Results The serum concentration of IL-21 in the MG group was higher than that in the control group ( $31.686 \pm 8.499$  pg/mL,  $15.147 \pm 6.366$  pg/mL) and the difference was significant ( $P < 0.01$ ). IL-21R mRNA expressed on PBMCs in the MG group was higher than that in the control group ( $0.139 \pm 0.052$ ,  $0.101 \pm 0.022$ ), and the difference was significant ( $P < 0.05$ ). There was no difference between ocular MG and generalized MG subgroup ( $P > 0.05$ ). Compared with the control group, the expression of IL-21R on B lymphocytes also increased in the MG group ( $P < 0.05$ ). In the anti-AChR-Ab positive MG group, the serum concentration of IL-21 showed positive correlation with anti-AChR-IgG ( $P < 0.05$ ), but no correlation with its isotype IgG1, IgG2, and IgG3, respectively ( $P > 0.05$ ). Expression of IL-21R mRNA in the PBMCs showed no correlation with the level of serum anti-AChR-IgG and its isotype IgG1, IgG2, and IgG3, respectively ( $P > 0.05$ ); however the expression of IL-21R in B lymphocytes showed positive correlation with anti-AChR-IgG and its isotype IgG1 and IgG3 ( $P < 0.05$ ,  $P < 0.01$ ,  $P < 0.05$ ), but no correlation with IgG2 ( $P > 0.05$ ). Conclusion IL-21 might induce the class switch of anti-AChR antibodies to IgG1 and IgG3 isotype through IL-21R on B lymphocytes which promotes the pathogenesis of the MG.

Keywords: myasthenia gravis; interleukin-21; interleukin-21 receptor; anti-AChR-Ab; class switch of antibody

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