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## 不同时段社交应激对小鼠肺癌生长的影响

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## Effect of social stress in different time periods on the growth of lung cancer in mice

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## 摘要

**目的** 观察不同时段社交应激对小鼠肺癌生长的影响。**方法** 将36只C57BL/6J小鼠随机分为A组(正常对照组)、B组(单纯抑郁组)、C组(瘤前应激组)、D组(单纯肿瘤组)、E组(瘤后应激组)、F组(5天应激组),每组6只。在10天社交应激模型的基础上,C、D、E组分别在应激前、应激5天和10天后给予皮下种瘤。ELISA方法检测各组小鼠血清中血管内皮生长因子(vascular endothelial growth factor, VEGF)蛋白的表达,Western blot方法检测肺组织中磷酸化细胞外信号调节激酶(phosphorylated extracellular regulated protein kinases, pERK)、基质金属蛋白酶-2 (matrix metalloproteinase-2, MMP-2)、基质金属蛋白酶-9 (matrix metalloproteinase-9, MMP-9)蛋白的表达,real time PCR方法检测血管内皮生长因子受体2 (VEGFR2)mRNA%和L1细胞黏附分子(L1 cell adhesion molecule, L1CAM)等参数。**结果** C组和F组与其他各组比较,皮下肿瘤结节的重量、体积及与肿瘤生长有关的上述细胞因子的表达均明显升高( $P < 0.05$ )。E组与D组比较,两者在肿瘤结节的重量、体积及相关细胞因子的表达上差异不大( $P > 0.05$ )。**结论** 发生在肿瘤发生之前及发生过程中的社交应激对小鼠肺癌有显著的促生长作用,其内在机制有待进一步研究。

**关键词** : 社交应激, 肿瘤生长, 社会心理因素, 细胞因子

## Abstract :

**Objective** To observe the effect of social stress in different time periods on the growth of lung cancer in mice.

**Methods** Thirty-six C57BL/6J mice were randomly and equally divided into group A (normal control), group B (depression group), group C (tumor before social stress group), group D (tumor group), group E (tumor after social stress group), and group F (5 days' social stress before tumor then another 5 days' social stress). On the basis of 10 days' social stress modeling, just before, during and after the social stress, we inoculated the lung cancer cells subcutaneously in C, D and E group. ELISA was used to measure the expression of vascular endothelial growth factor (VEGF) in the serum, while Western blot was used to measure the amount of phosphorylated extracellular regulated protein kinases (pERK), matrix metalloproteinase-2 (MMP-2) and matrix metalloproteinase-9 (MMP-9). Real-time PCR was used to measure the amount of VEGF receptor 2 (VEGFR2) mRNA% and L1 cell adhesion molecule (L1CAM). **Results** The weight and volume of tumor nodules, as well as the expression of the above cytokines that related with tumor growth and metastasis in group C and F were much more higher than any other groups ( $P < 0.05$ ). On the other hand, there was no significant difference on the weight or volume of tumor nodules, or the expression of the cytokines between group D and E ( $P > 0.05$ ). **Conclusions** Social stress that occurred before and among the process of lung cancer in mice has significant effect on the growth of lung cancer, while the inner mechanism needs further research.

**Key words** : social stress tumor growth psychosocial factors cytokines

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