

## 槲皮素联合白藜芦醇对小鼠Lewis肺癌细胞生长的抑制作用

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### Inhibitory Effects of Quercetin in Combined with Resveratrol on Growth of Lewis Lung Cancer in Mice

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#### 摘要

#### 目的

观察槲皮素联合白藜芦醇对小鼠Lewis肺癌细胞生长的作用及机制。方法建立C57BL/6小鼠Lewis肺癌移植瘤模型,随机分为对照组、槲皮素组、白藜芦醇组和联合用药组,每组10只,连续用药20天,于接种后第24天处死全部小鼠,比较各组肿瘤体积、肿瘤质量和抑瘤率,并用免疫组织化学、Western blot、TUNEL分别检测血管内皮生长因子(VEGF)、基质金属蛋白酶-2(MMP-2)表达及凋亡指数(AI)。结果各用药组肿瘤的生长明显受到抑制,肿瘤体积和肿瘤质量明显低于对照组( $P<0.05$ 或 $0.01$ ),联合用药组较单独用药组抑瘤作用显著增强( $P<0.05$ )。各用药组较对照组VEGF、MMP-2表达降低( $P<0.05$ 或 $0.01$ ),AI升高( $P<0.05$ 或 $0.01$ )。与单独用药组比较,联合用药组VEGF、MMP-2表达下调,AI升高,差异均有统计学意义( $P<0.01$ )。结论槲皮素联合白藜芦醇对小鼠Lewis肺癌细胞生长具有明显的抑制作用,其机制可能与下调VEGF和MMP-2表达、促进细胞凋亡有关。

关键词: 肺癌 槲皮素 白藜芦醇 血管内皮生长因子 基质金属蛋白酶-2

#### Abstract:

#### Objective

To explore the inhibitory effects and mechanism of quercetin plus resveratrol on the growth of lewis lung cancer in mice. Methods Forty C57BL/6 mice with transplanted Lewis lung cancer were randomly divided into 4 groups with 10 mice in each group: control group, quercetin group, resveratrol group and combined group. Different treatments were served from day 4 and all mice were sacrificed on day 24 after transplantation. Tumor volume, weight and inhibitory rate were compared among the 4 groups. The expression levels of vascular endothelial growth factor(VEGF), matrix metalloproteinase-2(MMP-2) and apoptosis index(AI) were detected by immunohistochemistry, western blot and TUNEL, respectively. Results Tumor growth was significantly inhibited in drug-treated groups. Tumor volume and weight in drug-treated groups was lower than that of the control group ( $P<0.05$  or  $0.01$ ). The anti-tumor efficacy of quercetin plus resveratrol was significantly higher compared with quercetin or resveratrol alone ( $P<0.05$ ). Expression levels of VEGF and MMP-2 were decreased in drug-treated groups compared with the control group ( $P<0.05$  or  $0.01$ ). AI increased in drug-treated groups compared with the control group ( $P<0.05$  or  $0.01$ ). There was significant difference in the VEGF and MMP-2 expression as well as AI between combined group and drug-treated alone group ( $P<0.01$ ). Conclusion Quercetin in combination with resveratrol had a strong inhibitory effect on the growth of lung cancer which might be related to the down-regulation of VEGF and MMP-2 and as well as the induction of cell apoptosis.

Key words: Lung cancer Quercetin Resveratrol Vascular endothelial growth factor Matrix metalloproteinase-2

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