

论著

PKC和MMPs 在实验性大鼠动脉粥样硬化形成中的作用及丹参的作用机制

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摘要 目的:探讨基质金属蛋白酶(MMPs)在大鼠动脉粥样硬化形成中的作用,蛋白激酶C(PKC)在MMPs表达中的作用及丹参注射液治疗动脉粥样硬化的可能机制。方法:将大鼠随机分为正常对照组(C组)、动脉粥样硬化模型组(M组)、丹参注射液组(D组),检测血清胆固醇、甘油三酯、低密度脂蛋白水平,免疫组化法测定主动脉PKC、MMPs的表达,结合光镜、透射电镜等方法综合评价。结果:①血脂各成分含量M组和D组显著高于C组($P<0.01$);D组低于M组($P<0.01$)。②PKC、MMP-2、MMP-9的表达M组明显高于C组($P<0.01$);D组显著低于M组($P<0.01$)。PKC与MMP-2、MMP-9的表达存在正相关。③光镜下M组动脉内膜增厚,斑块形成,中膜平滑肌增厚,并有钙化、坏死;D组病变较轻。④电镜见M组胶原纤维明显增多,排列紊乱,平滑肌细胞坏死,内皮细胞大部分脱落;D组改变较轻。结论:①MMPs在动脉粥样硬化发生、发展中起着关键作用。②PKC信号转导途径参与了动脉粥样硬化的形成,其激活可能是MMPs表达的上游机制。③PKC、MMPs活性的降低可能是丹参防治动脉粥样硬化的机制之一。

关键词 [基质金属蛋白酶](#); [动脉硬化](#); [蛋白激酶C](#); [丹参](#)

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Role of PKC and MMPs in the pathogenesis of the rat experimental atherosclerosis and the action of Danshen injection

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Abstract

AIM: To study the effects of protein kinase C on the expression of MMPs that may play an important role in the formation of atherosclerosis and the possible mechanism of Danshen injection to treat atherosclerosis. METHODS: 50 Sprague-Dawley (SD) rats were divided into three groups randomly: control group (group C), model group (group M) and Danshen treatment group (group D). The serum was collected to measure the level of cholesterol, triglyceride, low density lipoprotein cholesterol (LDL-ch). The expression of PKC and MMPs were measured by immunohistochemistry. Light microscope and electron microscope were also used. RESULTS: ① The cholesterol, triglyceride, LDL-ch concentrations in group M and group D were significantly higher than those in group C ($P<0.01$), cholesterol, triglyceride and LDL-ch contents were lower in group D than group M ($P<0.01$). ② The expression of PKC, MMP-2, MMP-9 in group M were significantly higher than those in group C ($P<0.01$), and were significantly lower in group D than those in group M ($P<0.01$). The expression of PKC was correlated with MMP-2 and MMP-9. ③ Light microscope showed that there were plaques in intima and serious calcification, necrosis, obviously irregular thickness in media of group M, but slightly in group D. ④ Electron microscope showed that smooth muscle cells of group M were necrosed, collage grew abundantly and alined disorderly, most of the endothelial cells exfoliated, but slightly in group D. CONCLUSIONS: ① MMPs play an important role in the generation and development of atherosclerosis. ② The activation of PKC may take part in the formation of atherosclerosis and it may be the upstream mechanism of the expression of MMPs. ③ The reduced expression of MMPs and PKC is a part of mechanism for Danshen to prevent and treat atherosclerosis.

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