

高压对体外培养动脉中膜平滑肌细胞增殖及增殖相关蛋白和生长因子的影响

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为了探讨力学因素在血管重建中的作用和机制,观察了在高压条件下血管平滑肌细胞增殖及其相关蛋白和生长因子的变化。本文应用血管体外应力培养系统,分别在100mmHg和160mmHg压力条件下,培养猪颈总动脉1、4和7d,以未经培养的新鲜血管为对照组。应用免疫组织化学方法检测动脉中膜平滑肌细胞 α -actin、PCNA、PDGF-A、TGF- β 1和P53蛋白的变化。结果显示,随着动脉培养时间的延长,其中膜平滑肌细胞的 α -actin呈减少的趋势;PCNA、TGF- β 1、P53阳性结果持续增加;PDGF-A的表达为先增加而后有所减少。结果表明,高压可明显促进血管平滑肌细胞的表型转变和增殖。高压可能通过调节PDGF-A、TGF- β 1、P53蛋白的表达来调控血管平滑肌细胞的增殖。

EFFECTS OF HIGH PRESSURE ON PROLIFERATION AND PROLIFERATION-ASSOCIATED PROTEINS OF VASCULAR SMOOTH MUSCLE CELLS OF ORGAN-CULTURED ARTERY IN VITRO

To explore the changes of proliferation and proliferation-associated proteins (such as P53 protein and growth factor PDGF-A, TGF- β 1) expression of vascular smooth muscle cells (VSMCs) in an intact artery under high pressure condition exclusively. Common carotid arteries of pigs were cultured at 37°C with Dulbecco's Modified Eagle Medium containing 10% newborn calf serum at a constant flow rate of no more than 6ml/h within 1, 4 and 7 days under high pressure (160mmHg) and middle pressure (100mmHg) in a new vascular organ-cultured system in vitro. The expressions of α -actin, PCNA, P53 protein and growth factors PDGF-A, TGF- β 1 were tested by immunohistochemical method. The expression of α -actin decreased continuously. The expressions of PCNA, P53 protein and TGF- β 1 increased within 7 days in group of high pressure. The expression of PDGF-A increased at first and then decreased slightly within 7 days. VSMCs of organ-cultured artery in vitro underwent transformation from contractile phenotype to synthetic phenotype. The proliferation rate of VSMCs enhanced under high pressure. PDGF-A, TGF- β 1 and P53 protein expression may play an important role on proliferation of VSMCs of organ-cultured artery in vitro.

关键词

高压(high pressure); 血管培养(organ-cultured artery); 血管平滑肌细胞(vascular smooth muscle cells); 增殖(proliferation); α -actin; PCNA; PDGF-A; TGF- β 1; P53 蛋白(P53 protein)