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综述

重组腺相关病毒载体在心血管疾病基因治疗中的应用

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摘要:

目的: 方法: 结论: 腺相关病毒载体是一种有DNA缺陷的非致病性细小病毒, 重组腺相关病毒载体(rAAV)源于非致病的野生型腺相关病毒, 具有安全性好、宿主范围广等优点。rAAV已成为基因治疗研究的热点, 特别是在心血管疾病机制探讨和治疗研究中应用广泛。在过去几十年里, rAAV在高血压、心力衰竭、动脉硬化和心肌梗死等心血管疾病基因治疗中成果显著。

关键词: 重组腺相关病毒载体; 心血管疾病; 基因治疗

Recombinant-adeno-associated viral vector-mediated gene therapy for cardiovascular diseases

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Abstract:

ObjectiveMethodsResultsConclusionAdeno-associated virus is a kind of DNA defective parvovirus which is non-pathogenic. Recombinant-adeno-associated virus vector comes from wild-type non-pathogenic adeno-associated virus and is highly secure, and it also has the advantages of broad host range. Recombinant-adeno-associated virus vector has become a hot spot for gene therapy and is widely used in gene therapy for cardiovascular diseases, especially for hypertension, heart failure, arteriosclerosis, and myocardial infarction.

Keywords: recombinant-adeno-associated virus vector cardiovascular disease gene therapy

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参考文献:

- [1] Atchinson R W, Casto B C, Hammond W M. Adenovirus-associated defective virus particles [J]. Science, 1965, 149(1): 754-756.
- [2] Gene therapy clinical trials worldwide [DB/OL]. [2009-05-20]. <http://www.wiley.co.uk/genetherapy/clinical>.
- [3] Wang Z, Zhu T, Qiao C P. Adeno-associated virus serotype 8 efficiently delivers genes to muscle and heart [J]. Nat Biotechnol, 2005, 23(3): 321-328.
- [4] Wondering R S, Owens R A. The Rep68 protein of adeno-associated virus type-2 stimulates expression of the platelet-derived growth factor B c-sis proto-oncogene [J]. J Virol, 1996, 70(7): 4783-4786.
- [5] Phillips M I. Antisense inhibition and adeno-associated viral vector delivery for reducing hypertension [J]. Hypertension, 1997, 29(1): 177-187.
- [6] Sun Z, Bello-Roufai M, Wang X. RNAi inhibition of mineralocorticoid receptors prevents the development of cold-induced hypertension [J]. Am J Physiol Heart Circ Physiol, 2008, 294(4): 1880-1887.
- [7] Wang T, Hou L B, Liu Z J, et al. Intramuscular delivery of rAAV-mediated kallikrein gene reduces hypertension and prevents cardiovascular injuries in model rats [J]. Acta Pharmacol Sin, 2007, 28(12): 1898-1906.
- [8] Wang Y, Sun Z. Klotho gene delivery prevents the progression of spontaneous hypertension and renal damage [J]. Hypertension, 2009, 54(4): 810-817.
- [9] Xiao B, Li XL, Yan J, et al. Overexpression of cytochrome P450 epoxigenases prevents development of hypertension in spontaneously hypertensive rats by enhancing atrial natriuretic peptide [J]. J Pharmacol Exp Ther, 2010, 334(3): 784-794.
- [10] Belke D D, Glass B, Swanson E A, et al. Adeno-associated virus-mediated expression of thyroid hormone receptor isoforms-alpha 1 and -beta1 improves contractile function in pressure overload-induced cardiac hypertrophy [J]. Endocrinology, 2007, 148(6): 2870-2877.
- [11] Kawasi Y, Ly H, Pruner F, et al. Reversal of cardiac dysfunction after long-term expression of SERCA2a by gene transfer in a pre-clinical model of heart failure [J]. J Am Coll Cardiol, 2008, 51(1): 1112-1119.
- [12] Mi Y F, Li X Y, Tang L J, et al. Improvement in cardiac function after sarcoplasmic reticulum Ca²⁺-ATPase gene transfer in a beagle heart failure model [J]. Chin Med J, 2009, 122(12): 1423-1428.
- [13] 李小鹰, 惠海鹏, 鲁晓春, 等. 转基因过表达肌浆网钙ATP酶基因治疗慢性心力衰竭的实验研究 [J]. 中华医学杂志, 2006, 86(12): 86.

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(17): 1174-1178.
LI Xiaoying, HUI Haipeng, LU Xiaochun, et al. Treatment of chronic heart failure by overexpressing sarcoplasmic reticulum calcium ATPase through gene therapy: an experiment with rats [J]. National Medical Journal of China, 2006, 86(17): 1174-1178.

[14] Zhao XY, Hu SJ, Li J, et al. rAAV-asPLB transfer attenuates abnormal sarcoplasmic reticulum Ca²⁺-ATPase activity and cardiac dysfunction in rats with myocardial infarction [J]. Eur J Heart Fail, 2008, 10(1): 47-54.

[15] Fu Z, Li X, Liu X, et al. Current study on sarcoplasmic reticulum Ca²⁺-ATPase—a gene transfer to severe heart failure [J]. Chin J Cardiol, 2008, 36(3): 260-265.

[16] Rengo G, Lymperopoulos A, Zincarelli C, et al. Myocardial adeno-associated virus serotype 6-BARKct gene therapy improves cardiac function and normalizes the neurohormonal axis in chronic heart failure [J]. Circulation, 2009, 119(2): 89-98.

[17] Jaski B, Jessup M, Mancini D, et al. Calcium upregulation by percutaneous administration of gene therapy in cardiac disease(CUPID Trial), a first-in-human phase 1/2 clinical trial [J]. J Cardiac Failure. 2009, 15(3): 171-181.

[18] Williams P T, Feldman D E. Prospective study of coronary heart disease vs HDL2.HDL3.and other lipoproteins in Gofman's Livermore Cohort [J]. Atherosclerosis, 2010, 214(1):196-202.

[19] Laitinen M, Pakkanen T, Luoma J, et al. VEGF gene transfer reduces intimal thickening via increased production of nitric oxide in carotid arteries [J]. Human Genetics, 1997, 20(4): 121-127.

[20] Liu Y, Li D, Chen J, et al. Inhibition of atherosclerosis in LDLR knockout mice by systemic delivery of adeno-associated virus type 2-hIL-10 [J]. Atherosclerosis, 2006, 188(1): 19-27.

[21] Li D, Liu Y, Chen J, et al. Suppression of atherosclerosis by delivery of TGFbeta1ACT using adeno-associated virus type2 in LDLR knockout mice [J]. Biochem Biophys Res Commun, 2006, 344(3): 701-707.

[22] Dandapat A, Hu CP, Chen J, et al. Over-expression of angiotensin II type 2 receptor(agtr2) decreases collagen accumulation in atherosclerotic plaque [J]. Biochem Biophys Res Commun, 2008, 366(4): 871-877.

[23] Cimmino G, Chen W, Speidl W S, et al. Safe and sustained overexpression of functional apolipoprotein A-I/high-density lipoprotein in apolipoprotein A-I-null mice by muscular adeno-associated viral serotype 8 vector gene transfer [J]. J Cardiovasc Pharmacol, 2009, 54(5): 405-411.

[24] Vaessen S F, Veldman R J, Comijn E M, et al. AAV gene therapy as a means to increase apolipoprotein(Apo) A-I and high-density lipoprotein-cholesterol levels: correction of murine ApoA-I deficiency [J]. J Gene Med, 2009, 11(8): 697-707.

[25] Lebherz C, Sanmiguel J, Wilson J M, et al. Gene transfer of wild-type apoA-I and apoA-I Milano reduce atherosclerosis to a similar extent [J]. Cardiovasc Diabetol, 2007, 3(2): 153-159.

[26] Baumgartner I, Pieczek A, Manor O, et al. Constitutive expression of phVEGF165 after intramuscular gene transfer promotes collateral vessel development in patients with critical limb ischemia [J]. Circulation, 1998, 97(12): 1114-1123.

[27] Kusano K, Tsutsumi Y, Dean J, et al. Long-term stable expression of human growth hormone by rAAV promotes myocardial protection post-myocardial infarction [J]. J Mol Cell Cardiol, 2007, 42(2): 390-399.

[28] Zuo H J, Liu Z X, Liu X C, et al. Assessment of myocardial blood perfusion improved by CD151 in a pig myocardial infarction model [J]. Acta Pharmacol Sin, 2009, 30(1): 70-77.

[29] Zuo H, Liu Z, Liu X, et al. CD151 gene delivery after myocardial infarction promotes functional neovascularization and activates FAK signaling [J]. Mol Med, 2009, 15(9): 307-315.

[30] 左后娟, 刘正湘, 刘晓春, 等. 重组腺相关病毒载体介导CD151转染心肌梗死小猪促进心肌功能性血管形成 [J]. 中华心血管病杂志, 2009, 37(6): 537-541.

ZUO Houjuan, LIU Zhengxiang, LIU Xiaochun, et al. Arteriogenesis induced by intramyocardial recombinant adeno-associated virus vector encoding human CD151 cDNA gene transfer in swines with coronary artery occlusion [J]. Chinese Journal of Cardiology, 2009, 37(6): 537-541.

[31] 袁洪, 黄志军, 吴小兵, 等. 重组腺相关病毒载体介导成纤维细胞生长因子2基因诱导缺血性心肌血管新生 [J]. 中国动脉硬化杂志, 2004, 12(6): 648-650.

YUAN Hong, HUANG Zhijun, WU Xiaobin, et al. Recombinant adeno-associated viral vector 2-mediated fibroblast growth factor 2 gene transfer induces angiogenesis in ischemic heart [J]. Chin J Arterioscler, 2004, 12(6): 648-650.

[32] 黄志军, 袁洪, 曾钧发, 等. 重组腺相关病毒载体介导人血管内皮生长因子对缺血性心肌血管新生的影响 [J]. 中国动脉硬化杂志, 2004, 12(6): 627-631.

HUANG Zhijun, YUAN Hong, ZENG Junfa, et al. Recombinant adeno-associated viral vector2-mediated human vascular endothelial growth factor 165 gene transfer induces angiogenesis in ischemic heart [J]. Chin J Arterioscler, 2004, 12(6): 627-631.

[33] 陈光慧, 宋良文, 朱小君, 等. 腺相关病毒携带低密度脂蛋白受体基因对实验性高胆固醇血症的治疗作用 [J]. 中国科学: C辑, 1998, 28(5): 470-476.

CHEN Guanghui, SONG Liangwen, ZUI Xiaojun, et al. Effect of adeno-associated virus-mediated transfer of low density lipoprotein receptor gene on treatment of hypercholesterolemia [J]. Science in China. Series C, 1998, 28(5): 470-476.

[34] Ross C J, Twisk J, Bakker A C, et al. Correction of feline lipoprotein lipase deficiency with adeno-associated virus serotype 1-mediated gene transfer of the lipoprotein lipase S447X beneficial mutation [J]. Hum Gene Ther, 2006, 17(5): 487-499.

[35] Mingozzi F, Meulenbergh J J, Hui D J, et al. AAV1-mediated gene transfer to skeletal muscle in humans results in dose-dependent activation of capsid-specific T cells [J]. Blood, 2009, 114(10): 2077-2086.

[36] Li X, Millar J S, Brownell N, et al. Modulation of HDL metabolism by the niacin receptor GPR109A in mouse hepatocytes [J]. Biochem Pharmacol, 2010, 80(9): 1450-1457.

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