DOI: 10.16016/j.1000-5404.1998.01.012

nmol/L(100 mu/L)相当于 Ins抵抗时的餐后血 Ins高峰水平。高浓度 Ins使 VSMC内 Ca^{2+} 水平增高,使蛋白激酶 C保持最大活性[5],导致 DNA及蛋白质合成,VSMC增殖 Ver是 Ca^{2+} 通道阻滞剂,通过抑制高 Ins的促 Ca^{2+} 内流作用,而起到抑制细胞增殖的作用。因而细胞膜上 Ca^{2+} 通道开放、Ca^{2+} 内流增加使细胞内游离 Ca^{2+} 水平增高在高 Ins促培养的 VSMC增殖中起着重要作用。

参考文献

1 Haffner S M. The insulin resistance syndrome revisited. Diabetes Care, 1996; 19(3): 275

2 Stout R W. Insulin as a mitogenic factor: role in pathogenesis of cardiovascular disease. Am J Med, 1990; (Suppl 2A): 62S

3 熊静波,彭永正,康格非.人脐动脉平滑肌细胞贴块培养法.重庆医科大学学报, 1996; 21(4): 311

4 Copalakrishnan V, Xu Y, Sulakhe P V *et al*. Vasopression (V_1) receptor characteristics in rat aortic smooth muscle cells. Am J Physiol, 1991; 261(6): H1927

5 孙志贤.现代生物化学理论与研究技术.北京.军事医学科学出版社, 1995 317~338

(收稿: 1997-06-16;修回: 1997-12-17)

(编辑 汪勤俭)

Role of Ca^{2+} in proliferation of vascular smooth muscle cells promoted by high concentration of insulin

Zhang Xueliang, Shu Changda (Department of Endocrinology, Xinqiao Hospital, Third Military Medical University, Chongqing, 400037)

Abstract Objective: To explore the role of Ca^{2+} in proliferation of vascular smooth muscle cells promoted by high concentration of insulin and the effects of calcium channel blocker on it. Methods: Human umbilical arterial smooth muscle cells (HVSMCs) were respectively cultured in DMEM with high concentration of insulin (Ex I), DMEM with high concentration of insulin plus 10^{-6} mol/L verapamil (Ex II) and DMEM with 5.6 mmol/L glucose (Control). Cell count and free Ca^{2+} level of HVSMCs were determined. Results: The cell count and free Ca^{2+} level of HVSMCs were significantly higher in Ex I and Ex II than in the control ($P < 0.05$). Conclusion: Elevation of free Ca^{2+} level in HVSMCs caused by opening of calcium ionic channel on cellular membrane and increase of calcium flowing into the cells plays an important role in the proliferation of vascular smooth muscle cells promoted by high concentration of insulin.

Key words Ca^{2+}; proliferation vascular smooth muscle; insulin; verapamil

骨形态发生蛋白修复骨缺损实验研究

An experimental study on the repairment of bone defect with bone morphogenetic protein

谭祖键* 李起鸿 (第三军医大学附属西南医院骨科)重庆, 400038

骨缺损修复是骨科一大难题,多年来一直采用骨传导方法。1965年 Urist骨诱导实验的成功及其后骨诱导理论的提出为骨缺损治疗提供了一种新的思路及方法。但因成骨因子 BMP的诱导成骨机制、免疫排斥反应以及理想载体等问题尚未得到根本解决,应用受到很大限制。本研究针对以上问题设计,采用原位杂交、X线片、胶原氨基酸分析、组织学及电镜观察等手段,初步探讨了 BMP诱导成骨过程中 TGFβ1的 mRNA表达,从氨基酸水平观察了诱导成骨的组织衍化过程,检测了异种 BMP的免疫排斥反应及 TGFβ1的免疫抑制作用,进行了聚乳酸 PLA作为 BMP载体的可行性研究及成骨效果观察,结论如下。

(1) TGFβ1是一种重要的骨生长调节因子,其在缺损内的含量可以间接反应成骨能力的强弱,本实验发现在骨缺损修复早期,组织内有 TGFβ1的 mRNA高效表达,BMP可使这种表达明显增强,但其能否翻译、以蛋白形态发挥生物功能有待于进一步研究。但这至少给我们以下揭示:在 BMP诱导成骨过程

(下转 36页)

* 谭祖健,男,34岁,主治医师,博士研究生

?1994-2016 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

pt 2): F1032
7 Nyengard J R. Number and dimensions of rat glomerular capillaries in normal development and after nephrectomy. Kidney Int, 1993; 43(5): 1049
8 Floege J, Burns M W, Alpers C E *et al*. Glomerular cell proliferation and PDGF expression precede glomerulosclerosis in the remnant kidney model. Kidney Int, 1992; 41(2): 297
9 Orisio S, Benigni A, Bruzzi I *et al*. Renal endothelin gene expression is increased in remnant kidney and correlates with disease progression. Kidney Int, 1993; 43(2): 354
10 Nakamura T, Ebihara I, Fukui M *et al*. Altered glomerular steady-state levels of tumor necrosis factor-alpha mRNA during nephrotic and sclerotic phase of puromycin aminonucleoside nephrosis in rats. Clin Sci, 1993; 84(3): 349
11 Mayer G, Lafayette R A, Oliver J *et al*. Effects of angiotensin II receptor blockade on remnant glomerular perm selectivity. Kidney Int, 1993; 43(2): 346
12 Pavenstad H. The podocyte a neglected player in glomerular injury. Nephrol Dial Transplat, 1995; 10(2): 147
13 袁发焕,史景泉,王仁鹏.超高分辨率扫描电镜在肾小球基底膜研究中的应用.中华物理医学杂志, 1994; 16(2): 124
14 Neilson E G. Tubulointerstitial injury and its role in progressive renal damage. summary and concluding remarks. Kidney Int, 1994; 45(suppl 45): S116

(收稿: 1997-02-15;修回: 1997-07-25)
(编辑 冷怀明)

Quantitative study of morphological evolution of remnant kidney after 5/6 nephrectomy in rats

Yuan Fahuan, Shi Jingquan, Guang Lixia, Xu Pingqing, Ke Jinxing (Department of Nephrology, Xinqiao Hospital, Third Military Medical University, Chongqing, 400037)

Abstract Objective: To clarify the evolution rule of remnant kidney during chronic renal failure. Methods: After the rats were undergone 5/6 nephrectomy, the morphological and functional evolution of the remnant kidneys were dynamically observed with morphometry. Results: Remarkable proliferation of the glomerular capillary and the progressive hypertrophy and destruction of the nephron were seen in the remnant kidneys. Conclusion: The morphological compensation and progressive destruction of the remnant nephrons affect the function of the remnant kidneys.

Key words renal failure, chronic; kidney; morphometry; rat

(上接20页)

中,有其它生长因子参与;BMP诱导成骨过程中可刺激其它生长因子的合成及分泌。所以,我们认为 BMP的诱导成骨实际上是一个由多因子参与和协同的复杂生物过程。

(2) TGFβ1可以明显增强 BMP的诱导成骨能力,TGFβ1主要通过促进间充质细胞分裂增殖为 BMP提供丰富的靶细胞;促进软骨细胞、骨细胞的分裂增殖;促进骨细胞产生 I型胶原、抑制软骨细胞产生II 型胶原;抑制破骨细胞生成以及金属蛋白酶活性以减少组织的破坏;促进骨连接素、骨桥素及碱性磷酸酶的合成以增强基质钙化等作用而使 BMP诱导成骨能力增强。同时,我们还发现 TGFβ1可以改变 BMP的软骨内成骨方式。

(3)宿主对异种 BMP是存在免疫排斥反应的,本实验发现兔对牛 BMP的植入产生了明显的免疫排斥反应,表现为植入局部有大量的炎细胞浸润,血清中产生了抗 BMP的抗体,抗体的效价于异种 BMP植入后第3、4周达最高,以后逐渐下降。而 TGFβ1可以通过抑制 T、B淋巴细胞的分裂增殖、直接抑制抗体产生、抑制淋巴因子激活的杀伤细胞及 T淋巴细胞的传代、拮抗其它炎性介质的作用而有效地降低异种 BMP的免疫排斥反应。

(4)本实验探讨了 PLA作为 BMP载体的可行性及成骨效果观察,我们认为一定分子量及一定孔径的 PLA可以用作 BMP的载体,虽然本实验所用分子量为4.2×10⁴的 PLA作为 BMP的载体,其成骨效果尚不如用牛松质骨载体,但我们认为 PLA载体主要有以下优点:可以在骨缺损修复过程中逐渐释放 BMP,使骨损伤局部 BMP维持在有效浓度;PLA能随骨缺损的修复而逐渐降解,从而对骨损伤起到弹性固定的目的;可以根据骨损伤的性质及类型采用不同强度的 PLA及将其制成不同的形状以满足固定及载体的双重需要等。因此,我们认为对其有作进一步研究的必要。

关键词 骨形态发生蛋白;诱导成骨;免疫反应;载体
中图法分类号 R336; R68
(收稿: 1997-10-10;修回: 1997-11-14)
(编辑 冷怀明)

?1994-2016 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net