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基础医学

GLP-1对3T3-L1前脂肪细胞分化过程中FABP-4、CPT-1A水平的影响

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摘要:

目的 探讨胰高糖素肽-1(GLP-1)对3T3-L1前脂肪细胞分化过程中游离脂肪酸结合蛋白4(FABP-4)、肉碱脂酰转移酶1A(CPT-1A)表达水平的影响。**方法** 采用传统“鸡尾酒”法诱导3T3-L1前脂肪细胞分化,并在分化过程中加入 1×10^{-8} mol/L GLP-1进行干预。在诱导分化的第6、8天,用油红O染色检测细胞内脂质聚集,RT-PCR及Western blotting法检测FABP-4、CPT-1A的mRNA及蛋白水平。**结果** ①在诱导分化第6天,大约40%的细胞出现脂滴聚集,第8天时大约80%的细胞已分化成熟;②油红O染色结果显示,与对照组相比,GLP-1组脂质总量在分化第6天略有增加,在分化第8天轻度下降($P > 0.05$);③RT-PCR结果显示,GLP-1组FABP-4的mRNA水平在分化第6、8天都明显增加;CPT-1A的mRNA水平在分化第8天增加明显($P < 0.05$);④Western blotting结果显示,GLP-1显著增加了FABP-4的蛋白表达($P < 0.05$)。对照组CPT-1A的蛋白水平在分化第6、8天无显著变化;而GLP-1组CPT-1A蛋白水平显著增加,尤其在分化第8天,与对照组相比增加了3.57倍($P < 0.01$)。**结论** 在3T3-L1前脂肪细胞分化过程中,GLP-1显著促进了FABP-4和CPT-1A的mRNA及蛋白水平,提示GLP-1同时促进脂肪细胞对游离脂肪酸的吸收及分解,能有效改善游离脂肪酸介导的胰岛素抵抗。

关键词: GLP-1; 前脂肪细胞分化; FABP-4; CPT-1A

Effect of glucagon-like peptide-1 on the levels of FABP-4 and CPT-1A during the process of 3T3-L1 preadipocyte differentiation

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Abstract:

Objective To examine the effect of glucagon-like peptide-1 (GLP-1) on the levels of fatty acid binding protein 4 (FABP-4) and carnitine palmitoyltransferase 1A (CPT-1A) during 3T3-L1 preadipocyte differentiation process. **Methods** In this paper, the traditional “Cocktail method” was adopted to induce the 3T3-L1 preadipocyte differentiation and 1×10^{-8} mol/L GLP-1 was added to the medium. At the 6th day and the 8th day of differentiation, Oil Red O staining was used to examine the lipid accumulation; RT-PCR and Western blotting were employed to test the levels of FABP-4 and CPT-1A. **Results** ①It is found that about forty percent of the cells appeared lipid droplets at the 6th day; about eighty percent of the cells had differentiated to mature adipocytes at the 8th day. ②The results of Oil Red O staining showed that the lipid accumulations in GLP-1 group were slightly increased at the 6th day while modestly decreased at the 8th day (both $P > 0.05$), as compared to the control group. ③RT-PCR results indicated that the mRNA level of FABP-4 in GLP-1 group was significantly increased at the 6th day and the 8th day. And the mRNA level of CPT-1A was also enhanced at the 8th day ($P < 0.05$). ④Western blotting results showed that the protein expression of FABP-4 in GLP-1 group was improved markedly at the 6th day and the 8th day ($P < 0.05$). The protein level of CPT-1A in control group was not changed significantly. While it was greatly increased in the cells treated with GLP-1, which was increased 3.57 times as compared to control group at the 8th day ($P < 0.01$). **Conclusion** GLP-1 can significantly promote the expressions of FABP-4 and CPT-1A during the process of 3T3-L1 preadipocyte differentiation, which indicates that GLP-1 can simultaneously promote the fatty acid absorption and decomposition and it has played an important role in improving the free fatty acid induced insulin resistance.

Keywords: Glucagon-like peptide-1 (GLP-1); Preadipocyte differentiation; FABP-4; CPT-1A

收稿日期 2013-01-08 修回日期 网络版发布日期

DOI:

基金项目:

扩展功能

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Supporting info

PDF(13156KB)

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GLP-1; 前脂肪细胞分化;
FABP-4; CPT-1A

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2011年山东省医药卫生科技发展计划重点项目(2011HD005); 国家科技支撑计划(2009BAI80B04); 山东省自然科学基金面上项目(ZR2012HM014); 中华医学会糖尿病分会重点项目(07020470055); 山东省科技攻关国际科技合作项目(2010GHZ20201); 济南市科技局科技明星项目(20100318); 山东大学自主创新基金(2009TS054); 国家自然科学基金(81100617); 济南留学人员创业计划(20110407)

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