

论著

丙氨酰谷氨酰胺二肽对人脐静脉内皮细胞ECV304缺氧缺糖损伤的保护作用

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摘要

目的 观察丙氨酰谷氨酰胺二肽(丙谷二肽)对人脐静脉内皮细胞ECV304缺氧缺糖损伤的保护作用,并探讨其可能的作用机制。方法 在以低氧低糖培养人脐静脉内皮细胞ECV304为细胞损伤模型的基础上,以噻唑蓝(MTT)比色法优化丙谷二肽的最佳作用浓度,显微镜观察细胞形态变化,流式细胞术检测线粒体膜电位。自动生化分析仪测定乳酸脱氢酶(LDH)活性,比色法检测谷胱甘肽(GSH)、丙二醛(MDA)的浓度,RT-PCR方法检测细胞内肿瘤坏死因子- α (TNF- α)、白细胞介素-6(IL-6)、热休克蛋白70(HSP70)、葡萄糖调节蛋白78(GRP78)和缺氧诱导因子-1 α (HIF-1 α) mRNA的表达。结果 丙谷二肽能够使细胞在缺氧缺糖应激下存活率增加,线粒体损伤减轻,LDH分泌降低,GSH产生增加,HSP70和HIF-1 α mRNA的表达增加。结论 丙谷二肽对细胞缺氧缺糖损伤有明显的保护作用,这种保护作用可能与保护线粒体、维持细胞膜结构完整、上调细胞中应激基因HSP70和HIF-1 α 的表达有关。

关键词 [丙谷二肽](#); [缺氧](#); [缺糖](#); [人脐静脉内皮细胞](#)

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Protective effect of alanyl-glutamine dipeptide against hypoxic/hypoglycemic injury in human umbilical vein vascular endothelial ECV304 cells

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Abstract

Objective To investigate the effect of alanyl-glutamine dipeptide (Ala-Gln) on hypoxia/ hypoglycemia injury in cultured human umbilical vein vascular endothelial cell line (ECV304). **Methods** ECV304 cells were cultured in normal and hypoxia with hypoglycemia condition. Firstly, the optimal concentration of Ala-Gln exerting protective effect against hypoxic/ hypoglycemic injury was determined by 3-(4, 5-dimethylthiazol-2yl)-2, 5-diphenyltetrazolium bromide (MTT) assay. Then, the changes in mitochondrial membrane potential (MMP) were measured by flow cytometry. The morphological changes of the cells were observed with light microscope. Furthermore, the lactate dehydrogenase (LDH) release from ECV304 was measured with automatic biochemistry analyses, and the reduced glutathione (GSH) and malondialdehyde (MDA) production was determined by colorimetric analyses. In addition, the expression of tumor necrosis factor- α (TNF- α), interleukin-6 (IL-6), heat shock protein 70 (HSP70), glucose regulated protein 78 (GRP78) and hypoxia-inducible factor-1 α (HIF-1 α) mRNA was measured by reverse transcription polymerase chain reaction (RT-PCR). **Results** Administration of Ala-Gln in the concentration of 0.05 mol·L⁻¹ could protect ECV304 cells against hypoxic and hypoglycemic injury. The production of GSH and the expression of HSP70 and HIF-1 α mRNA were increased, while the release of LDH was decreased. **Conclusion** Significant benefit of Ala-Gln dipeptide on hypoxia/ hypoglycemia injury in ECV304 cells is observed, and the potential mechanisms involved might be correlated with protecting mitochondrion function, maintaining the integrity of cellular membrane, and enhancing the expression of stress protein HSP70 and HIF-1 α .

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