

脑安胶囊对糖尿病大鼠海马Tau蛋白超磷酸化及氧化应激的影响

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中文摘要:目的: 研究脑安胶囊对糖尿病大鼠氧化应激、海马Tau蛋白过度磷酸化和认知功能改变的影响。方法: 利用链脲佐菌素(STZ) ip造成糖尿病大鼠模型后按体重随机分为3组: 糖尿病对照组, 脑安胶囊高、低剂量治疗组(200, 30 mg · kg⁻¹ · d⁻¹), Y-型电迷宫检测认知功能, 免疫组化方法检测海马Tau蛋白过度磷酸化, 检测血浆及海马中超氧化物歧化酶(SOD)、丙二醛(MDA)及谷胱甘肽过氧化物酶(GSH-Px)等氧化应激指标。结果: 与正常对照组相比, 在8, 12, 16周时的Y-型电迷宫测定, 糖尿病组总反应时间(total reaction time, TRT)和训练出错的次数(error number)增多, 海马中存在Tau蛋白的过度磷酸化, 16周时血浆及海马中SOD, GSH-Px活性下降, MDA升高。脑安胶囊可显著提高糖尿病大鼠血浆和海马中的SOD, GSH-Px活性、降低MDA含量, 提高学习记忆功能, 降低海马内Tau蛋白过度磷酸化。结论: 糖尿病导致认知功能下降, 可能与海马中Tau蛋白的过度磷酸化以及糖尿病时自由基的损伤和抗氧化能力下降有关。早期预防性使用脑安胶囊能有效抑制糖尿病大鼠的氧化应激反应, 改善海马中Tau蛋白的过度磷酸化及改善认知功能的下降。

中文关键词: [脑安胶囊](#) [糖尿病](#) [认知功能](#) [Tau蛋白](#) [氧化应激](#)

The Effects of Naoan Capsule on Oxidative Stress and Tau Protein Hyperphosphorylated in Hippocampal Neurons of Diabetic Rats

Abstract: Objective: To investigate the effects of nao-an capsule (a traditional Chinese medicine) on oxidative stress and Tau protein hyperphosphorylated in hippocampal neurons of diabetic rats. Method: Thirty-six-4-week-old Male SD rats were randomly divided into 3 group: the diabetic model group(untreated). Naoan capsule 1 Group, treated with Naoan atonin (30 mg · kg⁻¹ · d⁻¹) by gavage, Naoan 2 Group, treated with Naoan atonin (200 mg · kg⁻¹ · d⁻¹) by gavage. Rat diabetic model was produced by streptozotocin, 12 normal rats were assigned to the normal control group. The Y-electrical-maze test was used to verify the changes of learning and memory functions of the two groups at 8-week, 12-week and 16-week. The hippocampus of rats were tested by immunohistochemical method. After 16-weeks the contents malondialdehyde (MDA), activity of glutathione peroxidase (GSH-Px), and superoxide dismutase (SOD) of plasma and the hippocamp were measured. Result: The total reaction time and error number of diabetic rats in Y-electrical-maze was prolonged significantly. The contents of Tau hyperphosphorylation in the hippocampal neurons of the diabetic rat brain increased. Compared with the control group, plasma and hippocampal MDA of DM group rats increased, both GSH-Px and SOD activity decreased. Naoan capsule atonin increased reamakabli superoxide dismutase and glutathione peroxidase activities and reduced malonaldehyde levels in plasma and hippocamp, and increased ability of learning and memory, reduced Tau hyperphosphorylation in the hippocampal neurons than DM group $P < 0.05$. Conclusion: The cognitive dysfunctions may be caused by diabetes, which might be associated to increasing the Tau hyperphosphorylation in the hippocampal neurons of the rat brain. Overproduction of reactive oxygen species and deficiency in antioxidant enzymes may contribute to the development of the diabetes' s pathological changes central nervous system. Naoan capsule may inhibit oxidative stress in plasma and hippocamp, amendment the cognition and Tau protein hyperphosphorylated in

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