

尼古丁预防帕金森氏综合症和老年痴呆症的分子机理研究

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吸烟有害健康,吸烟产生的自由基,亚硝胺和多环芳烃等是主要有害物质,而尼古丁(烟碱)是吸烟造成吸烟依赖的主要物质。流行病学统计显示,吸烟者患帕金森氏综合症(PD)和老年痴呆症(AD)的概率远低于不吸烟者;实验和人群结果表明尼古丁可以预防PD和AD,但是其机理还不清楚。机理研究发现:(1)尼古丁可以有效清除活性氧自由基,能够抑制多巴胺自氧化,是一个抗氧化剂。(2)尼古丁能够有效抑制6-OHDA和MPP⁺诱导的细胞色素C(Cyt.C)释放。(3)尼古丁可以保护海马神经元抵抗 β 淀粉样蛋白诱导的凋亡。(4)尼古丁可以防止淀粉样蛋白在转基因AD鼠脑沉淀。(5)尼古丁可以络合金属铜和锌,防止其在脑中积聚。(6)尼古丁可以通过烟碱型乙酰胆碱受体(nAChRs) $\alpha 7$ 和MAPK的激活抑制NF- κ B和C-Myc信号通路、抑制炎症和诱导型NOS表达和NO生成,预防AD。这对于解释烟碱防治神经退行性疾病AD和PD机理具有重要意义。

The mechanism of preventive effect of nicotine on Parkinson's disease and Alzheimer's disease

Cigarette smoke is harmful for human, free radicals, nitrosoamine and polyaromatic compounds are the toxicity, nicotine is the compound which causes addiction of smoker. Epidemic result shows that cigarette smoker has been associated with decreased risk of developing Parkinson's disease (PD) and Alzheimer's disease (AD) and experiment result also shown nicotine is benefit for PD and AD but the mechanism is not clear. Studies show that (1) nicotine can effectively scavenge free radical and inhibit auto-oxidation of 6-OHDA; (2) Nicotine can inhibit the release of Cytochrome C (Cyt.C) from mitochondria induced by 6-OHDA/MPP⁺; (3) Nicotine can protect neuron against apoptosis induced by b-amyloid; (4) nicotine can inhibit the deposit of b-amyloid in brain; (5) nicotine inhibit deposit of copper and zinc in the brain and (6) Nicotine can prevent neurodegenerative diseases by inhibiting NF- κ B, NOS expression and NO generation through nAChRs $\alpha 7$, MAPK and C-Myc pathway. This is significant for explaining the mechanisms of nicotine's neuroprotective effects.

关键词

尼古丁(Nicotine); 线粒体(Mitochondria); 细胞色素C(Cytochrome C); 铜(Copper); 锌(Zinc); 信号通路(Signal pathway)