

论文

低剂量氯胺酮对食蟹猴行为、海马和前额叶皮质超微结构的影响

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摘要:

目的 研究新型毒品氯胺酮长期低剂量应用对食蟹猴行为学、海马和前额皮质超微结构的影响。方法 12只食蟹猴随机分为氯胺酮组(8只)和对照组(4只)。氯胺酮组每日静脉注射氯胺酮(1mg/kg), 对照组每日静脉注射生理盐水(1mL/kg), 定期对12只猴进行行为学分析, 6个月后处死取材, 透射电镜下观察海马及前额皮质超微结构的变化。结果 与对照组相比, 氯胺酮组运动行为无统计学意义(P>0.05); 海马区出现神经细胞坏死, 胶质细胞凋亡及大量脂褐素堆积; 前额皮质区呈现大量自噬体, 粗面内质网数量明显减少, 神经元坏死和胶质细胞凋亡, 而对照组两区域电镜超微结构正常。结论 氯胺酮低剂量长期应用可导致海马及前额皮质超微结构的变化, 主要表现为神经细胞的变性、坏死和凋亡, 这一变化较行为学变化更为敏感。

关键词: 氯胺酮; 食蟹猴; 行为学; 超微结构; 细胞死亡

Effects of low-dose ketamine administration on behavior and ultrastructures of the hippocampus and prefrontal cortex in Cynomolgus monkeys

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Abstract:

Objective To explore effects of long-term low-dose ketamine on behavior and ultrastructures of the hippocampus and prefrontal cortex in Cynomolgus monkeys. Methods 12 male Cynomolgus monkeys were randomly divided into the ketamine group (n=8) and the control group (n=4). The ketamine group was daily intravenously injected with ketamine (1mg/kg), while the control group injected with normal saline(1mL/kg). Observations on behavior were regularly made and ultrastructural changes of the hippocampus and prefrontal cortex were observed by a transmission electron microscope after 6 months. Results There was no statistically significant difference in locomotor activities between the two groups (P>0.05). Ultrastructural changes in the ketamine group, including neuron necrosis, glial cell apoptosis and lipofuscin accumulation, appeared in the hippocampus; a mass of autophagosomes, reduction of the rough endoplasmic reticulum, neuron necrosis, and glial cell apoptosis were observed in the prefrontal cortex in the ketamine group, while not observed in the control group. Conclusion Long-term low-dose ketamine induces ultra structural changes in the hippocampus and prefrontal cortex, including neuron degeneration, necrosis and apoptosis, which appear earlier than behavioral changes do.

Keywords: Ketamine; Cynomolgus monkey; Behavior; Ultrastructure; Cell death

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