Chronic Administration of Fluvoxamine Alters Activity of Enzymes of Energy Metabolism in Adult Rat Brain

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INTRODUCTION: Major depression is the most prevalent mental disorder and pharmacological treatment is emphasized mainly on monoamine hypothesis. Studies support the hypothesis that metabolism impairment is involved in the pathophysiology of depression and some antidepressants act by modulating brain energy metabolism. We evaluated the activity of Krebs cycle enzymes, mitochondrial respiratory chain and creatine kinase in brain of rats submitted to chronic administration of fluvoxamine, an antidepressant from serotonin reuptake inhibitors class.

MATERIAL AND METHODS: Wistar rats received daily administration of fluvoxamine dissolved in saline (10, 30 and 60 mg/kg, intraperitoneal) at 1.0 mL/kg, for 14 days; control rats received an equivalent volume of saline. Twelve hours after the last administration, rats were killed and brain was rapidly removed.

DISCUSSION AND RESULTS: Results showed citrate synthase activity was inhibited in the hippocampus (30 mg/kg (24.43%) and 60 mg/kg (64.75%)), malate dehydrogenase was inhibited in the prefrontal cortex (10 mg/kg (55.34%)) and striatum (10 mg/kg (28.67%), 30 mg/kg (20.12%) and 60 mg/kg (42.51%)), Succinate dehydrogenase was increased in the prefrontal cortex (30 mg/kg (100%)), cerebellum (30 mg/kg (100%) and 60 mg/kg (100%)), hippocampus (30 mg/kg (100%)), striatum (30 mg/kg (100%)) and posterior cortex (10 mg/kg (100%), 30 mg/kg (45.76%) and 60 mg/kg (100%). Complex I activity was inhibited in the prefrontal cortex (10 mg/kg (64.49%)), hippocampus (10 mg/kg (44.58%)) and striatum (10 mg/kg (50.83%)). Complex II activity was increased in the prefrontal cortex (30 mg/kg (100%)), cerebellum (30 mg/kg (100%) and posterior cortex (10 mg/kg (67.33%)). Complex II-III activity was inhibited in the prefrontal cortex (10 mg/kg (40.83%)). Complex IV activity was inhibited in the prefrontal (10 mg/kg (36.58%) and 30 mg/kg (31.73%)) and hippocampus (30 mg/kg (49.58%) and 60 mg/kg (49.19%)). Creatine kinase was increased in the cerebellum (60 mg/kg (68.85%)).

CONCLUSION: This study showed an alteration in the energy metabolism enzymes activity in most brain areas analyzed.

Key words: brain; creatine kinase; fluvoxamine; Krebs cycle; mitochondrial respiratory chain.

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