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<AT>Alterations in behaviour, cerebral cortical morphology and cerebral oxidative stress markers following aspartame ingestion

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<ABS-HEAD>HIGHLIGHTS► The artificial sweetener, aspartame, is an important component of many low-calorie and sugar-free food. ► If and how repeated administration of aspartame affects neurobehaviour, brain structure and oxidative stress have been the subject of a number of studies. ► The rationale for this study was the need to determine changes in behaviour, markers of oxidative stress, aspartate levels as well as morphological changes associated with acute and repeated administration of aspartame below and above the recommended dietary intake of 40 mg/kg.

<ABS-HEAD>Abstract
<ABS-P><ST>Objective</ST> The study evaluated changes in open field behaviours, cerebral cortical histomorphology and biochemical markers of oxidative stress following repeated administration of aspartame in mice.
<ABS-P>**Methodology:** Adult mice were assigned into five groups of twelve each. Vehicle (distilled water), or aspartame (20, 40, 80 and 160 mg/kg body weight) were administered orally for 28 days. Horizontal locomotion, rearing and grooming were assessed after the first and last dose of aspartame. Sections of the cerebral cortex were processed and stained for general histology, and also examined for neuritic plaques using the Bielschwosky's protocol. Glial fibrillary acidic protein (GFAP) and neuron specific enolase (NSE) immunoreactivity were assessed using appropriate antibodies. Aspartate and antioxidant levels were also assayed from cerebral cortex homogenates. Data obtained were analysed using descriptive and inferential statistics.
<ABS-P><ST>Results</ST> Body weight and food consumption decreased significantly with aspartame consumption. Locomotion, rearing and grooming increased significantly after first dose, and with repeated administration of aspartame. Histological changes consistent with neuronal damage were seen at 40, 80 and 160 mg/kg. Neuritic plaque formation was not evident; while GFAP-reactive astrocytes and NSE-reactive neurons increased at 40 and 80 mg/kg but decreased at 160 mg/kg. Superoxide dismutase and nitric