

Histopathologic Alterations of Cerebellum in the VPA-Induced Autism Model of Rats

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Background

Autism Spectrum Disorder (ASD), classified under neurodevelopmental disorders, is characterized by persistent deficits in social communication and interaction, along with repetitive behavioral patterns. Histomorphological changes occur in various brain regions in ASD. This study aims to investigate pathophysiological alterations in the cerebellum of rats with valproic acid (VPA)-induced autism model.

Methods

Adult female and male Sprague-Dawley rats were allowed to mate overnight. Rats with confirmed vaginal plugs the following day were considered pregnant, and embryonic day 0 (E0) was recorded. VPA (500 mg/kg) was injected intraperitoneally (i.p.) on embryonic day 12 (E12). On postnatal day 21 (P21) the genders of the offspring were determined and weaned. Rats were sacrificed at P46, and cerebellar tissues were collected. The sections were firstly stained with cresyl violet, and then random micrographs of the cerebellar cortex were captured from three serial sections at three different areas for each section. Afterward, the number of Purkinje cells was divided by the line measurement expressed as μm between the molecular and granular layers.

Results

In light microscopic examination, the number of Purkinje cells per unit length was significantly lower in the VPA-treated groups compared to the control groups in both sexes ($p < 0.001$) (Female-control: $0,0296 \pm 0,00263$, male-control: $0,0286 \pm 0,00365$, Female-VPA: $0,0224 \pm 0,00280$, Male-VPA: $0,0216 \pm 0,00254$). There was no statistically significant difference between genders.

Conclusion

The number of Purkinje cells in cerebellum decreased in VPA-induced autism model. Additionally, there was no difference between genders. These results may consider that autism is also related with Purkinje cells.

Keywords:

Autism Model, cerebellum, Purkinje cell