

# Region-Specific Reduction of BDNF Protein and Transcripts in the Hippocampus of Juvenile Rats Prenatally Treated With Sodium Valproate

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Autism is a neurodevelopmental disorder characterized by a deep deficit in language and social interaction, accompanied by restricted, stereotyped and repetitive behaviors. The use of genetic autism animal models has revealed that the alteration of the mechanisms controlling the formation and maturation of neural circuits are points of convergence for the physiopathological pathways in several types of autism. Brain Derived Neurotrophic Factor (BDNF), a key multifunctional regulator of brain development, has been related to autism in several ways. However, its precise role is still elusive, in part, due to its extremely complex posttranscriptional regulation. In order to contribute to this topic, we treated prenatal rats with Valproate, a well-validated model of autism, to analyze BDNF levels in the hippocampus of juvenile rats. Valproate-treated rats exhibited an autism-like behavioral profile, characterized by a deficit in social interaction, anxiety-like behavior and repetitive behavior. In situ hybridization (ISH) experiments revealed that Valproate reduced BDNF mRNA, especially long-3'UTR-containing transcripts, in specific areas of the dentate gyrus (DG) and CA3 regions. At the same time, Valproate reduced BDNF immunoreactivity in the suprapyramidal and lucidum layers of CA3, but improved hippocampus-dependent spatial learning. The molecular changes reported here may help to explain the cognitive and behavioral signs of autism and reinforce BDNF as a potential molecular target for this neurodevelopmental disorder. © Copyright © 2019 Fuentealba, Fiedler, Peralta, Avalos, Aguayo, Morgado-Gallardo and Aliaga.

autism

BDNF

hippocampus

long-3'UTR-bdnf

valproate

brain derived neurotrophic factor

valproic acid

animal experiment

animal model

animal tissue

anxiety

Article

autism

compulsion

controlled study

dentate gyrus

experimental behavioral test

hippocampus

immunohistochemistry

immunoreactivity

in situ hybridization

juvenile

memory

nonhuman

prenatal period

rat

RNA probe

social interaction

spatial memory

spatial memory test

transcription regulation

Y-maze test