

Effect of the herbicide glufosinate-ammonium exposure on central nervous system

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Exposure to pesticides can induce neurobehavioral effects in humans, as well as in other mammals, including rodents. However, the effects of the toxicity of pesticides on the central nervous system (CNS) remain largely unclear. We previously developed *Arc*-promoter-driven luciferase transgenic (Tg) mouse strains for non-invasive monitoring of the neuronal-activity-dependent gene expression in mouse brain under physiological and pathological conditions. In this study, we examined the effects of glufosinate-ammonium (GLA), one of herbicides used in a variety of crops, on neuronal activity using *Arc-Luc* Tg mice and detected a decrease in bioluminescence signal at juvenile stage after chronic treatment with GLA. Next, we performed transcriptome analysis of primary cultured neurons and identified differentially expressed genes related to axonal guidance signaling between GLA-treated and saline-control neurons. Linked to these results, we further found disturbance of synapse formation after low dose exposure to GLA. Our results provide valuable evidence to understand the mechanistic basis for the effect of GLA on the CNS.