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Analysis of the effect of drugs and alcohol on adult differentiated neuronal stem cells.

The objective of this study is to determine the effect of drug and alcohol on the proliferation and differentiation process of neuronal stem cells exposed both before and after induction of differentiation in culture. In addition, we examine the surviving neuron population for synaptic connections and GABA receptor expression to define gabaergic functionality. We previously found that alcohol decreased the overall amount of neuronal stem cells through increased cell death and altered the pattern of differentiation for neurons with little effect on astrocytes and oligodendrocytes. In this study, differentiated neuronal stem cells were treated with alcohol, methamphetamine, and a synthetic opioid drug, DAMGO, to compare the effects in the cell proliferation and differentiation process after exposure. After exposure we demonstrate a substantial decrease in neuron differentiation in all tested models. Examination of postsynaptic density of the surviving neurons were examined using Shank3 antibody as a postsynaptic marker. GABAR1, an inhibitory neurotransmitter receptor, was also examined for alterations in the ability of the cells to communicate within neuron populations. Research sponsored by WV-INBRE grant P20GM103434