DEVELOPMENTAL INTEGRATION OF THE CEREBRUM AND CEREBELLUM IN PRIMATE MODEL FOR SCHIZOPHRENIA

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The cerebellum, via its reciprocal connections with the cerebral cortex, plays an integral role in executive processes that are disrupted in individuals with schizophrenia, including memory, attention, and cognitive flexibility. Interference with neurogenesis during temporally limited spans of fetal development can selectively diminish neuronal populations, and potentially affect connectivity. Here we examine the long-term effects of disrupting neurogenesis during early gestation on the cerebello-thalamo-cerebral circuit in the Rhesus macaque (*Macaca mulatta*).

Magnetic resonance scans were collected at 0.5, 1, 3, and 5 years of age in Rhesus macaques exposed to x-irradiation during early gestation (X; N=5), at a time coinciding with thalamic neurogenesis (E30-41), and in sham-irradiated control animals (C; N=4). We compared cerebellar volume, and correlations between cerebellum and thalamus, and cerebellum and cerebrum at each time point.

Results show significant reduction of cerebellar volumes between X and C at each age group ($p<0.05$) as observed previously in volumes of the thalamus and cerebrum. Further, correlations between cerebellar volume and volume of the other two structures were reduced in X relative to C. These results suggest disruption of cerebellar development and its relationship with the cerebrum following altered neurogenesis. These findings may shed light on the deficits in executive function observed in individuals with schizophrenia, and suggests that changes in the development of cerebello-thalamo-cerebral circuit may be important in the multiple cognitive functions.

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