Methylphenidate Improves Attention in Rats made Iron Deficient in Early Infancy

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AIMS

*First aim of this work was to show that rats made iron deficient in early infancy (PND4) exhibit deficits in attention at adolescence.

*A second aim was to investigate whether the deficit could be treated successfully pharmacologically.

METHODS

*The subjects for this study were Sprague-Dawley rats that were bred in our vivarium. At birth, pups were out-fostered to dams fed either an iron-sufficient diet or to dams fed an iron deficient diet beginning prior to conception. At weaning, all pups were placed on an iron-sufficient diet (normal rodent chow) for the remainder of the study. At 45 days of age, the animals were subjected to attention set shifting testing consisting of 5 consecutive tasks. The test was performed on three consecutive days.

*After the final test, the animals were assigned to one of 3 methylphenidate dose groups for 15 days prior to a second round of attention set shifting testing.

RESULTS

Attention Set Shifting Baseline Performance

Conclusions & Future Work

*Our results showed that iron deficient rats showed impaired attention and that methylphenidate effectively improved this deficit.

*Our next task will be to track down the neurobiological mechanism by which early iron deficiency affects attention. Our first investigation will be to measure dopamine receptors in the striatum and in the mesocorticolimbic pathway.

*Possible implications taken from these results include the possibility that iron deficiency alters the response to not only methylphenidate but others, including illicit substances.

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