The Effect of Chronic Corticosterone-Induced Treatment in Pre- and Post-Pubescent Female Rats

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Background: Exogenous administration of corticosterone (CORT) has been shown to induce depressive-like symptoms in male and female adult rats. However, there is limited data on the effect of exogenous CORT in juvenile and adolescent rats. Further, it has not been demonstrated whether the effects of CORT in rats is different before or after puberty. The aim of this study is to determine the effect of chronic CORT administration on juvenile (pre-pubescent) and adolescent (post-pubescent) rats in order to develop a rat model of depression in these age groups.

Methods: Female rats (n=48) were divided into juvenile (PND 7-27) or adolescent (PND 28-48) groups and administered daily injections of CORT for twenty-one days. Depressive-like behavior was assessed using the modified forced swim test (FST), where increased duration of immobility during the FST is depressive like behavior. After assessment, rats were sacrificed and the brains were processed to determine if there were associated changes in neurogenesis in the dentate gyrus of the hippocampus.

Results: We found that chronic CORT treatment of 15 mgkg⁻¹ did not produce significant changes in time spent immobile in the FST. There were no significant changes in neurogenesis in the overall dentate gyrus of the hippocampus. However, rats injected with CORT showed a significant increase in neurogenesis in the granule cell layer of the dentate gyrus as well as a significant decrease in the hilus of the dentate gyrus.

Conclusion: These results suggest that either CORT does not induce depressive like behavior, or that the FST may not be a good measure of depressive-like behavior in juvenile rats. Moreover, exogenous CORT may have different physiological and anatomical effects during different stages of rat development.

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