

The Effect of 7,12-dimethylbenz[a]-anthracene (DMBA) on Physical Activity in Female Mice

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ABSTRACT

BACKGROUND: Regular exercise has been shown to reduce the risk of occurrence for certain cancers. In animal models, DMBA is a synthetic carcinogen that has been established as the gold standard for inducing cancerous tumors in rodents. However, it has yet to be established whether DMBA has an effect on voluntary wheel running in mice. If there is an effect, it would confound any experiment which investigates exercise effects on tumor growth. **PURPOSE:** The overall purpose of this project was to determine if DMBA altered voluntary wheel running in mice. **METHODS:** All procedures were approved by TAMU IACUC. SENCAR mice breeder pairs (Charles River) and offspring at 3 weeks of age were group housed and randomly assigned to a group receiving the DMBA (n=69) or not receiving the DMBA treatment (n=22). At 4 weeks of age, two running wheels were placed inside the cages and connected to a computer that measured distance and time. The running wheels were mounted to the cage tops of standard rat cages and equipped with a cycling computer (BC8.12, Sigma Sport) to record running distance and duration. The running wheels were plastic and had a 410mm circumference with a solid running surface. From 8 to 14 weeks of age, mice in the DMBA group were gavaged daily with a DMBA dose (20 µg/mouse) dissolved in corn oil. A two way ANOVA was employed to determine the effect of DMBA on activity with factors of time and treatment. **RESULTS:** DMBA had no effect on the distance (p=0.51) or duration ran (p=0.12), but significantly decreased the speed at which the mice ran (p=0.02). A *post-hoc* analysis indicated that significant decreases in speed occurred at weeks 12 (35.2 ±9.2 vs. 46.4 ± 14.6; p=0.0002) and 20 (35.4 ±10.3 vs. 46.2 ± 14.1; p<0.0001) of age. **CONCLUSION:** Our data suggest that DMBA does not affect the distance or time spent running on a wheel, but does affect the speed at which the mice run. While DMBA decreased speed, the significant effects on speed are minor given that neither distance nor duration were different between the groups. Therefore, we can conclude that DMBA does not prevent voluntary wheel running in mice.

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