Abstract

The relationship between exercise and executive function has been generally studied in humans, which allows for a limited exploration of underlying mechanisms. Recently, our lab has shown that male rats show benefits in executive function (striatum-dependent discrimination learning) following exercise. In addition, we have shown that ovariectomized (OVX) female rats with estrogen replacement show benefits in executive function (prefrontal cortex-dependent set shifting). This study examined the effects of exercise (free access to a home cage running wheel) on executive functions (discrimination learning and set-shifting) in both cycling (CYC) and ovariectomized (OVX) female rats. There were 4 groups of female rats: exercising-cycling (E-CYC), exercising-ovariectomized (E-OVX), non-exercising-cycling (N-CYC), and non-exercising-ovariectomized (N-OVX). Testing was conducted using a T-maze task. On day 1 of testing, rats learned to discriminate between a rewarded and an unrewarded arm. On day 2 of testing, rats learned a new discrimination. Rats were allowed to exercise thirteen days prior to testing. Preliminary results indicate that Group E-CYC rats performed better on the initial discrimination (day 1) than Group N-CYC rats. There were no differences between Group E-CYC and N-CYC on day 2, nor were there differences between Group E-OVX and Group N-OVX on day 1 or day 2. These results suggest that exercise facilitates executive function in female rats, as in male rats, but that it also interacts with estrogen in female rats.