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Presentation Abstract

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Title: The effects of withdrawal of enriched environment on emotional behavior and adult hippocampal neurogenesis in mice

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Abstract: Physical activity is known to promote brain health and function, on the contrary, inactivity by hindlimb unloading or immobilization are suggested to increase anxiety- and depression-like behavior and down-regulate adult hippocampal neurogenesis. In this study, we investigated whether a reduction of physical activity by withdrawal of enriched environment would also affect anxiety- and depression-like behavior and adult hippocampal neurogenesis in mice. Male C57BL/6 mice (4 weeks of age) were randomly assigned to a sedentary (Sed) group or withdrawal (WD) group. The Sed mice were reared in a standard plastic cage throughout the experiment (5 mice per cage). The WD mice were reared in an enriched environment (10 mice per cage) until 12 weeks of age and subsequently in a standard cage. At 12 weeks of age (just before the withdrawal) and 20 weeks of age (8 weeks after the withdrawal), behavioral test battery consisted of open field test, elevated-plus maze, light-dark box test, forced swim test, and rotarod test were performed to assess emotional behavior and motor performance. Bromodesoxyuridine (BrdU, 50 mg/kg, 2 days) was injected intraperitoneally after the second behavioral test. The mice were sacrificed two weeks after the BrdU injection to assess survival of newly born progenitor cells. As expected, an improved motor performance gained by the environment enrichment was abolished 8 weeks after the withdrawal of environmental enrichment. No difference was found in a number of BrdU positive cells in the dentate gyrus between the groups. These results suggest that the effects of environmental enrichment on motor performance and hippocampal neurogenesis are reversible. Although no difference was found in the open field test and the elevated-plus maze, WD mice showed a significantly greater latency to enter a light compartment in the light-dark box test than Sed mice after the withdrawal of environmental enrichment. This result led us to speculate that the reduction of physical activity due to the withdrawal of habituated enriched environment would be a risk of inducing anxiety, although the effect would not be crucial.

Disclosures: **T. Nishijima**, None; **T. Hayakawa**, None; **S. Amemiya**, None; **N. Kubota**, None; **I. Kita**, None.

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ENVIRONMENTAL ENRICHMENT

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