

Caffeine suppresses exercise-enhanced long-term and location memory in middle-aged rats: Involvement of hippocampal Akt and CREB signaling

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The cognitive function decline is closely related with brain changes generated by age. The ability of caffeine and exercise to prevent memory impairment has been reported in animal models and humans. The purpose of the present study was to investigate whether swimming exercise and caffeine administration enhance memory in middle-aged Wistar rats. Male Wistar rats (18 months) received caffeine at a dose of 30 mg/kg, 5 days per week by a period of 4 weeks. Animals were subjected to swimming training with a workload (3% of body weight, 20 min per day for 4 weeks). After 4 weeks, the object recognition test (ORT) and the object location test (OLT) were performed. The results of this study demonstrated that caffeine suppressed exercise-enhanced long-term (ORT) and spatial (OLT) memory in middle-aged and this effect may be related to a decrease in hippocampal p-CREB signaling. This study also provided evidence that the effects of this protocol on memory were not accompanied by alterations in the levels of activated Akt. The [3H] glutamate uptake was reduced in hippocampus of rats administered with caffeine and submitted to swimming protocol. © 2014 Elsevier Ireland Ltd. All rights reserved.

Akt

Caffeine

CREB

Exercise

Memory

Middle-aged

caffeine

cyclic AMP responsive element binding protein

protein kinase B

caffeine

cyclic AMP responsive element binding protein

glutamic acid

protein kinase B

adult

animal experiment

Article

body weight

controlled study

exercise

experimental test

location memory

long term memory

male

memory

middle aged

nonhuman

novel object recognition test

object location test

rat

short term memory

signal transduction

swimming

workload

aging

animal

drug effects

exercise

hippocampus

long term memory

Memory Disorders

metabolism

physiology

psychology

spatial memory

Wistar rat

Aging

Animals

Caffeine

Cyclic AMP Response Element-Binding Protein

Glutamic Acid

Hippocampus

Male

Memory Disorders

Memory, Long-Term

Physical Exertion

Proto-Oncogene Proteins c-akt

Rats

Rats, Wistar

Signal Transduction

Spatial Memory

Swimming