

High Intensity Swimming Exercise Decline Memory Retention of Young White Rats (*Rattus norvegicus*)

Raden Argarini, J. M. Harjanto, Choesnan Effendi, Lilik Herawati, and Irfiansyah Irwadi

Department of Physiology, Faculty of Medicine
University of Airlangga

The aim of this study was to test whether high intensity swimming exercise on young white mice affect memory retention. A Randomized Post-Test Only Control Group Design was used. Subjects were 20 male rats (*Rattus norvegicus wistar strain*), age 1 to 1.5 months, body weight 60-100 grams, which were divided randomly into 2 groups (each consist 10 rats). The treatment group got the high intensity swimming exercise (plus 9% of body weight added load). Each treatment was conducted once a day during 1 minute and 45 seconds, three sets with rest period three times the exercise time, for four weeks. Memory retention was measured through a Y-maze test in two sessions, each with six replications. Results showed that memory retention between groups on day 4, was $(65.00 \pm 31.38)\%$ in the control group, and $(30.56 \pm 26.68)\%$ in the treatment group. Independent t-test results revealed significant differences between the control group and the treated group ($p = .020$). The conclusion is that high intensity exercise decline memory retention in young white rats.

Keywords: swimming exercise, high intensity, memory retention, Y-maze

Tujuan penelitian ini adalah menguji apakah latihan renang intensitas berat pada tikus putih muda memengaruhi retensi memorinya. Desain penelitian adalah *Randomized Post-Test Only Control Grup*. Subjek adalah 20 ekor tikus putih (*Rattus norvegicus strain wistar*) jantan, umur 1-1,5 bulan, berat badan 60 – 100 gram. Melalui *random assignment* subjek dibagi menjadi kelompok kontrol dan kelompok perlakuan (masing-masing 10 ekor) Kelompok perlakuan (10 ekor) diberi latihan renang dengan intensitas berat (beban 9% berat badan). Perlakuan diberikan satu kali per hari selama 1 menit 45 detik, tiga set dengan waktu istirahat tiga kali lama waktu latihan, selama empat minggu. Retensi memori diukur melalui test *Y-maze* selama dua sesi, masing-masing enam kali pengulangan. Hasil setelah hari ke-empat, pada kelompok kontrol didapatkan rerata $(65.00 \pm 31.38)\%$, kelompok perlakuan (intensitas tinggi) adalah $(30.56 \pm 26.68)\%$. Hasil *independent t test* menunjukkan perbedaan yang bermakna antara kelompok kontrol dan perlakuan ($p = .020$). Simpulan penelitian ini adalah latihan renang dengan intensitas tinggi menurunkan retensi memori pada tikus putih muda.

Kata kunci: latihan renang, intensitas berat, retensi memori, *Y-maze*

The process of learning and memorizing are two important processes in determining intelligence, where the two processes are affected by the quality of the brain. The factors that affect the quality of the brain, especially during growth are the factors of genetics, nutrition, environment, and stimulation, including physical activity (Sibley & Etnier, 2003).

One of the physical activities that children are fond of is swimming. By swimming, children have the chance

to know and understand the environment. Also through swimming, children have the chance to move freely and in any condition, children must be able to move all of their limbs, in order to float and move on water. This freedom is an extraordinary stimulus, not just in the physical aspect but also in the mental aspect, as well. Results of a research conducted in Melbourne, Australia, showed that statistically, the IQ of children who were taught to swim since they were babies was higher compared to children who were not taught to swim or those who were taught after they were five years old. The children's IQ were measured at the age of ten. Other than that, their physical, emotional, and social growth was also better (Anna, 2010).

This article has been presented at the National Congress of the Indonesian Physiological Association in Manado on May, 17-19, 2012.

Correspondence concerning this article should be addressed to Raden Argarini, Department of Physiology, Faculty of Medicine, Airlangga University. Jl. Prof. Dr. Moestopo No.47 Surabaya, 60131. E-mail: rd_argarini@yahoo.com