

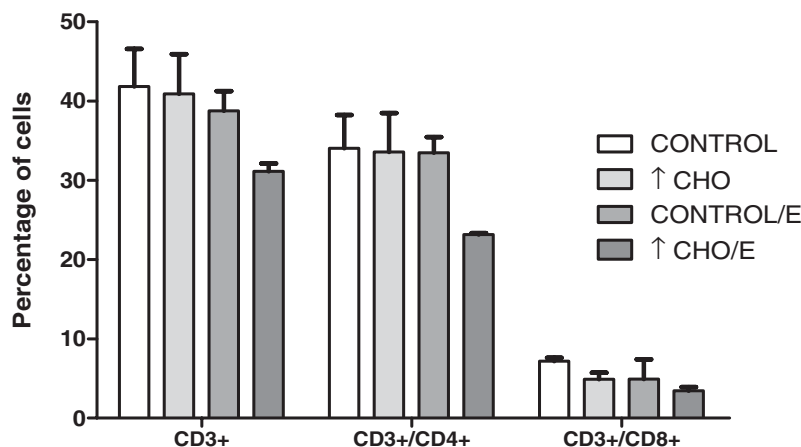
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## Effect of exercise and high carbohydrates diet in the T-lymphocytes of Peyer’s patches of Balb/c mice

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It has been shown that exercise induces considerable changes in the body, particularly in the mucosal immune system<sup>(1)</sup>; the current lifestyles have promoted an increase in the consumption of high carbohydrate diets (↑CHO); these two factors result in particular effects on Peyer’s patches (PP)<sup>(2)</sup>. The objective of this study was to evaluate the effect of moderate exercise and ↑CHO on PP’s T-cells (Tlc) in Balb/c young mice. Thirty-two 21-d-old male mice were divided into four groups, two groups were taught to swim for 30 min 5 d per week during 9 weeks; one of which was fed a commercial control diet (CONTROL/E) and the other was fed a high carbohydrate diet (↑CHO/E) (DIO Rodent Purified Diet, Cat. 58Y2; energy: 4.65 kcal/g (19.4556 kJ/g), the other two groups were fed the same diets but were not made to swim (CONTROL and ↑CHO). Small intestines were dissected, PP were cut, macerated, filtered and centrifuged to obtain the lymphocyte pellet; cells were stained with anti-CD3+, CD4+ and CD8+ antibodies and analysed by flow cytometry (Facs Diva, BD<sup>®</sup>). The experimental diet increased the weight of mice who exercised (23.5, SD 1.3) compared with the non-exercise group (19.4, SD 1.8) and the control group (20.2, SD 1.4),  $P \leq 0.005$ . CD3+ Tlc were decreased in the ↑CHO/E group (31.1, SD 1.0) compared with the CONTROL/E group (38.8, SD 2.5),  $T = 8.103$ ,  $P \leq 0.001$ ; CD3+/CD4+ (23.2, SD 0.2), CD3+/CD8+ (3.5 ± 0.5) also decreased compared with CONTROL/E group (33.5, SD 1.97 and 4.9, SD 0.5;  $t = 14.8$  and  $t = 6.014$  respectively,  $P \leq 0.001$ ). The combination of exercise and ↑CHO decreased significantly PP Tlc, we can conclude that the intake of a high carbohydrate diet together with exercise attenuates lymphocytes transit, as well as increasing the weight of the mice (Fig. 1).



**Fig. 1.** Percentage of lymphocytes CD3+, CD3+/CD4+ and CD3+/CD8+ from PP from Balb/c mice, feeding with standard diet (CONTROL) or high carbohydrate diet (↑CHO); with or without 30 min of exercise (E). Values are shown in means and standard deviations (SD)  $n = 8$ , differences were statistically significant by Student’s  $t$  test at  $P \leq 0.001$ . CONTROL: group with standard diet without exercise; ↑CHO: group with high carbohydrate diet; CONTROL/E: group with standard diet with exercise; ↑CHO/E: group feeding with high carbohydrate diet, and with exercise.

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2. Rogers CJ, Berrigan D, Zaharoff DA *et al.* (2008) *J Nutr* **138**, 115–122.