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High-fat concentration diets provided by different sources. Effect on thymus fatty acids composition in adult rats

C. Silva, P. Perris, I. Fernandez, N. Pellegrino, C. Mambrin, N. H. Slobodianik and M. S. Feliu
Department of Nutrition, Faculty of Pharmacy and Biochemistry, University of Buenos Aires, Argentina

A balanced and varied diet is important to maintain optimal health status and prevent diseases. Dietary fatty acid profile has an essential function as an immune system regulator. Thymus is a biological marker of nutritional disorders[1]. The aim of this study was to analyze the effect of diets containing high fat levels from different dietary sources on thymus weight, total number of thymocytes, and fatty acid composition of the thymus in adult rats.

Wistar rats ($n = 18$; 50 days of age) were divided into three groups and fed during 40 days with diets containing 1) 50 kcal% fat provided by butter (group B), 2) 50 kcal% fat provided by sunflower oil (group S) and 3) normocaloric diet provided by soy oil (group C). All diets had 20% protein (casein) and were complete in all other nutrients according to AIN93. Dietary fatty acid profile was determined by gas chromatography (GC) and ω6/ω3 and unsaturated/saturated (U/S) ratios were calculated. At the end of the feeding period, animals were sacrificed and thymus was removed. Thymus weights (TW), total number of thymocytes (NC) and fatty acid profile of thymus were determined. ANOVA test was performed. Results expressed as mean(SD): ω6/ω3 diet ratio: B: 8.7/1, S: 250/1, C: 9/1; U/S diet ratio: B: 0.54, S: 9.2, C: 5.0; TW (mg): B:511.6(74.5), S:548.2(70.4), C:570.8(52.0); NC (cells $\times 10^{-7}$/organ) B:54.3(13.4)[a]; S:63.29(31.6); C:110.2(30.7).

Table. Some fatty acids of thymus expressed as percentage of total fatty acids

Fatty acid	B		S		C	
	Mean (%)	SD	Mean (%)	SD	Mean (%)	SD
C 16:0 (palmitic)	23.34	4.86	15.99[a]	1.17	24.77	3.16
C 17:0 (margaric)	0.59[a]	0.12	0.18	0.04	0.29	0.18
C 18:0 (stearic)	12.77	1.76	9.07	2.18	10.66	2.04
C 18:1 (oleic)	23.68	9.54	19.88	2.96	24.29	4.94
C 18:2 (linoleic)	3.84[a]	0.56	34.97[c]	6.73	12.74	1.90
C 18:3 (β-linolenic)	0.39[a]	0.09	0.27[b]	0.07	0.60	0.11
C 20:4 (arachidonic)	8.46	5.70	6.37	3.46	8.64	4.30
C 20:5 (eicosapentaenoic)	0.36	0.17	0.15	0.06	0.23	0.07
C 20:5 (docosapentaenoic)	0.42	0.23	0.07	0.05	0.33	0.09

(a = $p<0.05$; b = $p<0.01$; c = $p<0.001$)

Thymus weight was no statistically different in both experimental groups. Total number of thymocytes in B was lower than in C. Thymus cells from B group showed lower levels of α-linolenic and linoleic acids and higher levels of margaric acid than in C; whereas S group showed lower levels of palmitic and β-linolenic acids, and higher linoleic concentration than C. The differences on fatty acid composition of cell thymus in adults rats would be a consequence of the differences in these 3 dietary fatty acid profiles: altered ω6/ω3 ratio in S group and altered U/S ratio in group B, and a higher fat percentage in B and S diet in comparison with C.

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1. Marcos A (2012) Inmunonutrición en la salud y la enfermedad (Immunonutrition in Health and Disease) Ed. Médica Panamericana, Madrid, Spain.