Maternal dietary macronutrient composition alters serum lipid profiles in female offspring at adolescence

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Background & aim: A number of experimental studies have shown that not only the energy intake, but also the macronutrient composition of the diet may play an important role in lipid disturbances associated with obesity. The present study investigated the lasting effects of maternal supplementation with Low Fat-High Carbohydrate (LF-HC) or High Fat- Low Carbohydrate diet during pregnancy and lactation on the weight, serum glucose and lipid profiles of the male and female offspring at adolescence.

Material & methods: Eight-week-old female C57BL/6 mice were randomly assigned into two isocaloric diet: LF-HC group (standard AIN93G diet: 20% of calories from protein, 64% from carbohydrate and 16% from fat) and HF-LC group (20% of calories from protein, 35% from carbohydrate and 45% from fat) during gestation and lactation. After weaning, all pups received standard AIN93G diet and killed at 6 wk.

Results: Female offspring of HF-LC diet have lower serum triglycerides and weight at adolescence but higher serum HDL.C than LF-HC group.

Table 1. Effects of maternal dietary composition on weight, serum glucose and lipid profiles in offspring at adolescence

Variables	Sex	HF-LC (mean±SD)	LF-HC (mean±SD)	p value*
Weight at birth (g)	Male Female	1.28±0.12 1.3±0.13	1.71±0.23 1.28±0.32	**<0.0001*** 0.9
Weight at adolescence (g)	Male Female	21.9±0.79 17.4±1.4	21.3±1.2 19.7±1.05	0.33 **0.002***
Serum TC (mg/dl)	Male	205.4±51.9 146.1±16.5	207.5± 81.3 177.1± 61.3	0.95

	Female			0.18
Serum TG (mg/dl)	Male Female	271.3±69.6 176.7±24.8	266.8± 132.8 259.6±97.3	0.9 **0.03***
Serum LDL.C (mg/dl)	Male Female	101.5±31.5 62.9±20	111.2± 65.6 93.02± 51	0.71 0.14
Serum HDL.C (mg/dl)	Male Female	42.9±18.9 48±9.5	42.8±11.6 31.8±10.4	0.4 **0.006***
Serum glucose (mg/dl)	Male Female	253±67.6 218.7±33.1	283.8±32.8 236±23.5	0.26 0.25

HF-LC: High Fat- Low Carbohydrate, LF-HC: Low Fat- High Carbohydrate

(p value*)Comparison between two groups of male and female valued by independent t-test

Discussion and conclusion: maternal high fat-low carbohydrate consumption during pregnancy and lactation has more benefits than low fat-high carbohydrate diet on weight gain and lipid profiles of offspring at adolescence.

Key words: isocaloric diet, pregnancy, lactation, adolescence