

Adipocyte fatty acid binding protein (aFABP) is related to weight status and body composition as well as metabolic risk markers in childhood obesity

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Background:

Adipocyte fatty acid binding protein (aFABP) regulates intracellular transport of fatty acids and is thought to be involved in the pathogenesis of the Metabolic Syndrome (1). aFABP overproduction leads to increased cholesterol and triglyceride accumulation and to higher expression of pro-inflammatory markers. In adults, aFABP seems to promote insulin resistance and atherosclerosis, and aFABP levels are significantly higher in obese compared to lean subjects (2). Evidence suggests that aFABP is also associated to weight status and metabolic risk markers in childhood (3, 4).

Aims and Objectives:

We studied the association between circulating aFABP and several markers of weight status, glucose homeostasis and of metabolic risk in a well characterized cohort of overweight and obese adolescents who had just begun a fitness program (MoveHIT – High Intensity Intervall Training for obese adolescents).



Figure 1: The fitness program for obese adolescents (MoveHIT) who participated in our study

Relevant publications

- Hao Y, Ma X, Luo Y, Hu X, Pan X, Xiao Y, Bao Y, Jia W. Associations of serum adipocyte fatty acid binding protein with body composition and fat distribution in nondiabetic Chinese women J Clin Endocrinol Metab. 2015 May;100(5):2055-62
- B.P. Atshaves, G.G. Martin, H.A. Hostetler, A.L. McIntosh, A.B. Kier, and F. Schroeder Liver Fatty Acid Binding Protein and Obesity J Nutr Biochem. 2010 Nov; 21(11): 1015–1032
- Krzystek-Korpaczka M¹, Patryn E, Bednarz-Misa I, Mierzchala M, Hotowy K, Czapińska E, Kustrzeba-Wojcicka I, Gamian A, Noczynska A. Circulating adipocyte fatty acid-binding protein, juvenile obesity, and metabolic syndrome. J Pediatr Endocrinol Metab. 2011;24(11-12):921-8
- Reinehr T, Stoffel-Wagner B, Roth CL. Adipocyte fatty acid-binding protein in obese children before and after weight loss. Metabolism. 2007 Dec;56(12):1735-41

Methods:

Twenty-eight adolescents aged 13.5 – 18.5 years with a BMI \geq 90th percentile according to German reference values were included. Body weight, height, waist and hip circumferences were measured following standardized procedures, and a fasting blood sample was taken to measure insulin, glucose, transaminases, lipids, free fatty acids, uric acid several adipokines and aFABP. Pearson's correlation and linear models were determined using the R package.

Results:

aFABP correlated positively and significantly with the anthropometric measures of obesity BMI-SDS and waist-to-height ratio (WHtR). It also correlated significantly with a number of markers of metabolic risk such as HOMA-IR and γ GT, but not with other adipokines. aFABP did not depend on gender, age or pubertal stage in obese adolescents.

	correlation coefficient	95% CI	p-value
BMI-SDS	0.48	0.13 to 0.72	0.0095
WHtR	0.63	0.33 to 0.81	0.00036
HOMA-IR	0.52	0.19 to 0.75	0.0044
γ GT	0.48	0.13 to 0.73	0.0091
Uric acid	0.46	0.11 to 0.71	0.013
HDL-C	-0.39	-0.66 to -0.01	0.043
Triglycerides	0.38	0.01 to 0.66	0.047
Cholesterol	0.19	-0.19 to 0.53	0.32
LDL-C	0.30	-0.08 to 0.61	0.12
Free fatty acids	0.08	-0.30 to 0.44	0.68
Leptin	0.31	-0.07 to 0.61	0.11
Adiponectin	-0.21	-0.54 to 0.18	0.29
Visfatin	0.25	-0.15 to 0.58	0.22

Table 1: Correlation of aFABP with metabolic markers and adipokines

Conclusions:

Our data provide evidence that aFABP in obese adolescents – as in adults – is associated with weight status as well as insulin resistance and metabolic risk markers. It remains to be determined whether these associations remain observable following weight loss and whether aFABP might serve as a risk marker to determine metabolic risk in obese adolescents.

