SUPPLEMENTAL MATERIAL

Table S1. The levels of adipokines according pubertal development.

Adipokines	Normal weight healthy				Metabolically healthy obese				Metabolically unhealthy obese			
	Pre-puberty	Mid-puberty	Post-puberty	P	Pre-puberty	Mid-puberty	Post-puberty	P	Pre-puberty	Mid-puberty	Post-puberty	P
Leptin (ng/ml) [&]	0.26 ± 0.14	0.39 ± 0.05	$0.97 \pm 0.14^{*\#}$	**<0.001**	2.29 ± 0.20	2.25 ± 0.13	2.29 ± 0.44	0.964	2.63 ± 0.09	2.54 ± 0.05	2.69 ± 0.10	0.118
Adiponectin (ug/ml) [&]	1.84 ± 0.09	1.81 ± 0.03	$2.06 \pm 0.09^{\#}$	**0.001**	1.83 ± 0.14	1.48 ± 0.09	1.35 ± 0.31	0.129	1.65 ± 0.06	$1.40 \pm 0.03^{*}$	$1.34 \pm 0.07^{*}$	**<0.001**
Leptin/adiponectin[&]	-1.55 ± 0.18	-1.40 ± 0.06	-1.09 ± 0.17	0.243	0.46 ± 0.25	0.78 ± 0.16	0.94 ± 0.55	0.630	0.98 ± 0.10	1.14 ± 0.06	1.34 ± 0.12	0.207
FGF21 (pg/ml) [&]	6.84 ± 0.23	6.49 ± 0.08	6.22 ± 0.22	0.306	6.50 ± 0.29	6.23 ± 0.21	6.11 ± 0.67	0.785	6.33 ± 0.15	6.14 ± 0.08	6.47 ± 0.18	**0.030**
Resistin (ng/ml) [&]	2.76 ± 0.09	2.67 ± 0.03	2.66 ± 0.09	0.555	2.84 ± 0.14	2.88 ± 0.09	2.60 ± 0.31	0.287	2.72 ± 0.06	2.79 ± 0.03	2.84 ± 0.07	0.536
RBP-4 (ug/ml) [&]	3.41 ± 0.06	3.35 ± 0.02	3.28 ± 0.06	0.518	3.40 ± 0.07	3.52 ± 0.05	3.61 ± 0.161	0.538	3.56 ± 0.03	3.57 ± 0.02	3.58 ± 0.04	0.936
Osteonectin (ug/ml) [&]	0.01 ± 0.05	0.03 ± 0.03	-0.06 ± 0.05	0.235	-0.05 ± 0.06	0.09 ± 0.07	0.13 ± 0.12	0.364	0.17 ± 0.04	0.14 ± 0.03	0.10 ± 0.05	0.692

The puberty categories were defined as prepuberty (Tanner stage 1), midpuberty (Tanner stage 2-3), postpuberty (Tanner stage $\geq$ 4).

[&] Skewed distributions were natural logarithmically (ln) transformed.

Data were expressed as mean $\pm$ SEM. General liner model was used to assess the differences among the three groups after adjusting for age, sex, residence, diet score, and physical activity.

Where differences versus prepuberty group were indicated as $^{*}P < 0.05$, differences versus Midpuberty group were indicated as $^{\#}P < 0.05$.

Values in bold are significant at $P < 0.05$.

FGF21, Fibroblast growth factor 21; RBP-4, Retinol binding protein 4.

Table S2. The levels of adipokines according to sex.

Adipokines	Normal weight healthy			Metabolically healthy obese			Metabolically unhealthy obese		
	Male	Female	*P*	Male	Female	*P*	Male	Female	*P*
Leptin (ng/ml) [&]	0.034 ± 0.05	0.91 ± 0.04	**<0.001**	2.14 ± 0.08	2.49 ± 0.10	**0.010**	2.46 ± 0.04	2.90 ± 0.05	**<0.001**
Adiponectin (ug/ml) [&]	1.83 ± 0.03	1.95 ± 0.03	**0.005**	1.57 ± 0.05	1.76 ± 0.07	**0.048**	1.48 ± 0.02	1.47 ± 0.03	0.700
Leptin/adiponectin [&]	-1.79 ± 0.06	-1.03 ± 0.05	**<0.001**	0.57 ± 0.09	0.73 ± 0.12	0.329	0.97 ± 0.04	1.43 ± 0.06	**<0.001**
FGF21 (pg/ml) [&]	6.52 ± 0.08	6.50 ± 0.06	0.835	6.43 ± 0.11	6.25 ± 0.15	0.378	6.24 ± 0.06	6.40 ± 0.08	0.153
Resistin (ng/ml) [&]	2.65 ± 0.03	2.73 ± 0.03	0.099	2.80 ± 0.05	2.80 ± 0.07	0.987	2.74 ± 0.02	2.84 ± 0.03	**0.020**
RBP-4 (ug/ml) [&]	3.34 ± 0.02	3.35 ± 0.02	0.839	3.44 ± 0.03	3.52 ± 0.04	0.090	3.58 ± 0.01	3.54 ± 0.02	0.116
Osteonectin (ug/ml) [&]	-0.003 ± 0.03	-0.016 ± 0.02	0.738	0.08 ± 0.04	-0.06 ± 0.06	0.095	0.15 ± 0.02	0.13 ± 0.03	0.621

[&] Skewed distributions were natural logarithmically (ln) transformed.

Data were expressed as mean ± SEM. General liner model was used to assess the differences between the two groups after adjusting for age, pubertal stages, residence, diet score, and physical activity.
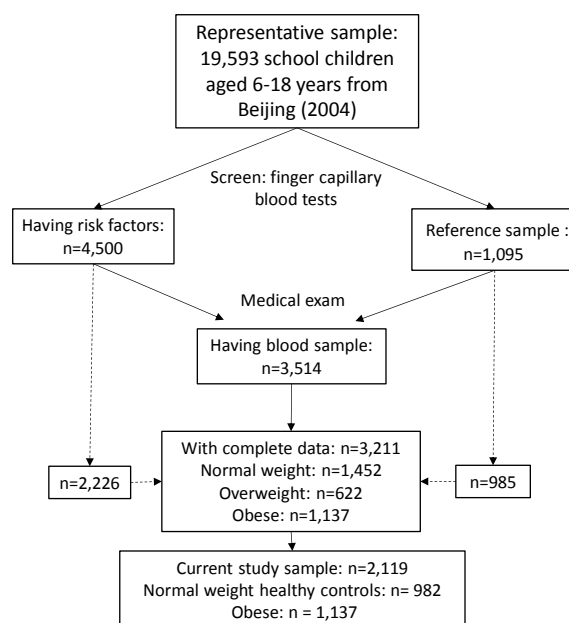
Values in bold are significant at *P* < 0.05.

FGF21, Fibroblast growth factor 21; RBP-4, Retinol binding protein 4.

Table S3. Area under ROC curves and optimal cut-offs of adipokines in predicting MUO.

Adipokines	AUC	95%CI	Optimal cut-offs	Sensitivity	Specificity	Youden index
RBP-4	0.604	0.564-0.643	37.08	0.441	0.741	0.182
Osteonectin	0.573	0.532-0.614	1.11	0.527	0.595	0.122
Leptin/adiponectin						
Male	0.653	0.592-0.694	2.44	0.594	0.633	0.227
Female	0.686	0.626-0.746	2.78	0.674	0.624	0.298

ROC, Receiver operating characteristic curve; MUO, Metabolically unhealthy obesity; RBP-4, Retinol binding protein 4.

Figure S1. Consort Diagram of the study sample.

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          ┌────────────────────────┐
          │ Representative sample:  │
          │ 19,593 school children  │
          │ aged 6-18 years from    │
          │ Beijing (2004)          │
          └────────────────────────┘
                Screen: finger capillary
                     blood tests
   ┌──────────────────┐        ┌──────────────────┐
   │ Having risk       │       │ Reference sample :│
   │ factors:          │       │ n=1,095           │
   │ n=4,500           │       └──────────────────┘
   └──────────────────┘
                   Medical exam
             ┌──────────────────┐
             │ Having blood      │
             │ sample:           │
             │ n=3,514           │
             └──────────────────┘
           ┌────────────────────────┐
 ┌───────┐ │ With complete data:     │ ┌───────┐
 │n=2,226│ │ n=3,211                 │ │ n=985 │
 └───────┘ │ Normal weight: n=1,452  │ └───────┘
           │ Overweight: n=622       │
           │ Obese: n=1,137          │
           └────────────────────────┘
         ┌──────────────────────────────┐
         │ Current study sample: n=2,119 │
         │ Normal weight healthy controls:│
         │ n= 982                         │
         │ Obese: n = 1,137               │
         └──────────────────────────────┘
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A representative sample of 19,593 children (aged 6–18 years, 50% boys) was recruited from the Beijing area between April and October, 2004. Within this cohort, a total of 4,500 subjects were identified to be at risk for metabolic syndrome based on having one or more of the following conditions: overweight, elevated blood pressure (BP) (systolic and/or diastolic BP $\geq$ 90th percentile), increased total cholesterol $\geq$ 5.2 (mmol/L), triglyceride $\geq$ 1.7 (mmol/L) or fasting blood glucose $\geq$ 5.6 (mmol/L) based on initial finger capillary blood tests. Further, all children at risk for metabolic syndrome, together with a parallel reference population of 1,095 schoolchildren, were invited to participate in a medical examination including venepuncture blood sample tests. Finally, 3,211 subjects (2,226 from subjects with risk of metabolic syndrome and 985 from reference school children) completed the full examination. The current study includes 1,137 obese participants and 982 normal weight healthy controls who had complete data for analysis.

- - -▶ : Indicating sample source.

Figure S2. Comparison of adipokines levels between MHO and MUO after adjusting for waist circumference.
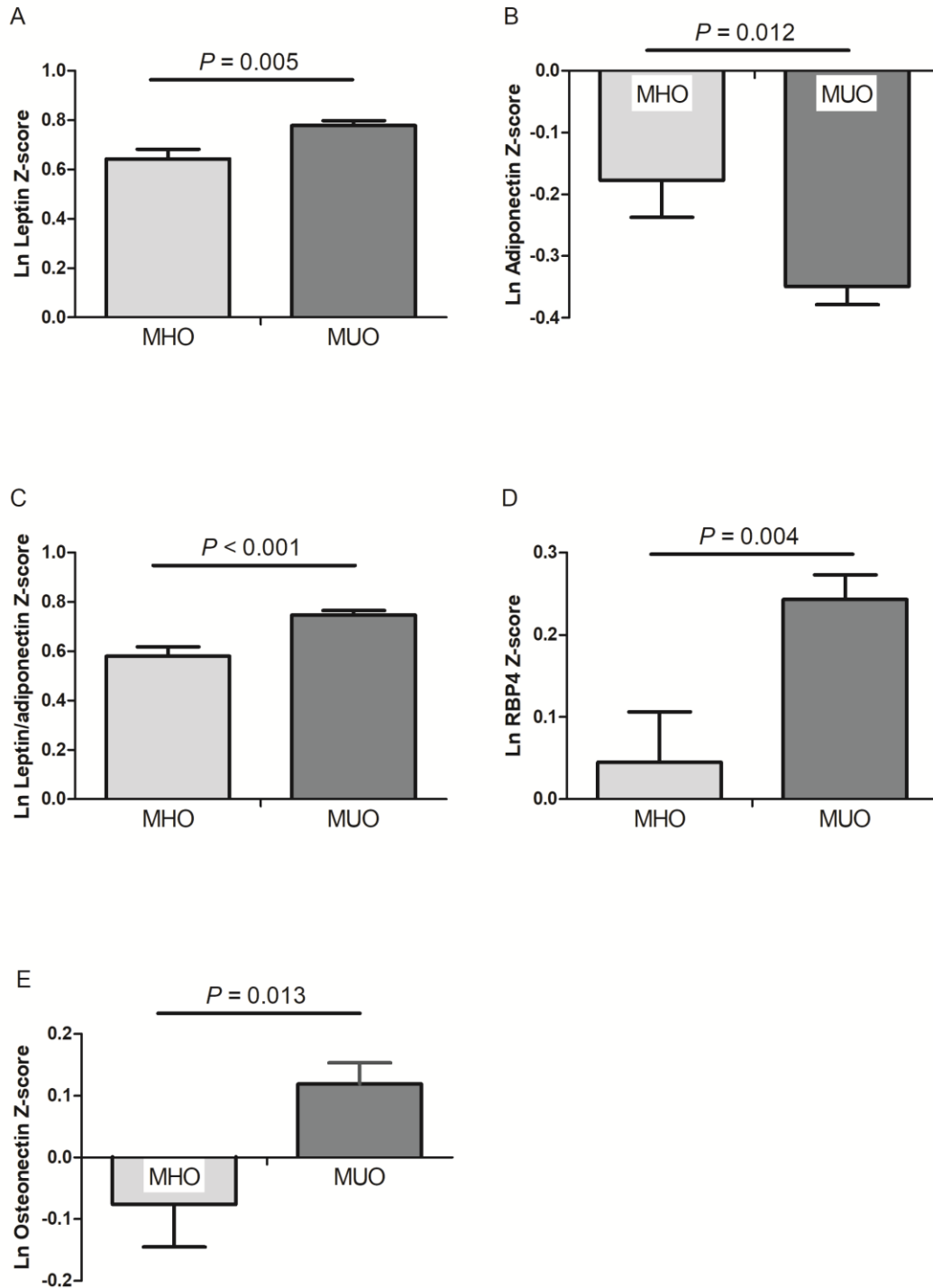
Data were analysed after natural logarithmic (ln) transformation and expressed in each SD units

after adjusting for age, pubertal stages, residence, diet score, physical activity and waist circumference. Comparisons between MHO and MUO for Ln Leptin Z-score (A), Ln Adiponectin Z-score (B), Ln Leptin/adiponectin Z-score (C), Ln RBP4 Z-score (D) and Ln Osteonectin Z-score (E). RBP-4, Retinol binding protein 4.