

Supporting information

Table S1. Correlation analysis between obesity (BMI) and insulin sensitivity (HOMA-IR) with variables.

Table S2. Characteristics of participants in response to BMI status.

Figure S1. Comprehensive miRNA abundance in adolescents with obesity. Well-known circulating miRNAs represented in adolescents with obesity. A total of 21 miRNA was determined in serum that has been mostly reported in human plasma or serum. Data on miRNA levels are presented in log transformation ($-\log_2$). Box and whiskers indicate Min to Max, and dot indicates Mean.

Figure S2. Newly discovered miRNAs in serum from adolescents with obesity. A total of 19 miRNAs was detected in adolescents that were not reported before. Data on miRNA levels are presented in log transformation ($-\log_2$). Box and whiskers indicate Min to Max, and dot indicates Mean.

Figure S3. The abundance of miRNAs specific to IR. The other 8 miRNA expressions ($-\log_2$ scale) are shown in A- H. Bar indicated mean $\pm$ SD. Labeled (a, b) means differ for comparison of two groups, $p < 0.05$.

Figure S4. miRNA expression associated with different phenotypes (obesity and IR) in adolescences. The Venn diagram shows differentially expressed miRNAs separated by BMI or HOMA-IR. A total of 40 miRNAs was represented in all individuals with obesity. The overlap between BMI-based and IR-based miRNAs shows differential expression in individuals with both obesity and IR.

Table S1. Correlation analysis between BMI and HOMA-IR with variables

Variables	BMI			HOMA-IR		
	n	r	<i>p</i> -value	n	r	<i>p</i> -value
Weight (kg)	33	0.8420	<0.0001	30	0.1961	0.2991
Height (cm)	33	0.1298	0.4715	30	0.0619	0.7452
WC (cm)	33	0.8752	<0.0001	30	0.2901	0.1199
Systolic BP (mmHg)	33	0.2324	0.1932	30	-0.0070	0.9706
Diastolic BP (mmHg)	33	0.2334	0.1910	30	-0.1505	0.4273
Percent body fat (%)	33	0.5530	0.001	30	0.2250	0.2330
Muscle mass (kg)	33	-0.4650	0.006	30	-0.2290	0.2230
Fasting insulin (μIU/mL)	30 ^{*a}	0.2197	0.2435	30	0.9923	<0.0001
Fasting glucose (mg/dL)	30 ^{*a}	0.0856	0.6529	30	0.4016	0.0278
Fasting leptin (ng/mL)	32 ^{*b}	0.5112	0.0028	29 ^{*b}	0.4016	0.8238
Fasting adiponectin (μg/mL)	32 ^{*b}	-0.2555	0.1581	29 ^{*b}	-0.2004	0.2972
TG (mg/dL)	30 ^{*a}	-0.0458	0.8100	30	0.5577	0.0014
HDL-C (mg/dL)	30 ^{*a}	0.0926	0.6264	30	-0.4288	0.0181
LDL-C (mg/dL)	30 ^{*a}	0.0650	0.7321	30	0.1220	0.5210
TC (mg/dL)	30 ^{*a}	0.0670	0.7320	30	0.2810	0.1320
BMI (kg/m ²)	33	-	-	30	0.2135	0.2573
HOMA-IR	30 ^{*a}	0.2135	0.2573	30	-	-

r: correlation coefficient. ^{*}missing data from a: n=3; b: n=1. The significance of relationships was determined by Pearson's correlation analysis for normally distributed data or Spearman correlation for not normally distributed data. The *p*-value less than 0.05 is shown in bold and italic. WC: waist circumference; TG: triglycerides; HDL-C: high-density lipoprotein-cholesterol; LDL-C: low-density lipoprotein-cholesterol; TC: total cholesterol.

Table S2. Characteristics of participants in response to BMI status

Variables	Obese status		
	OB-1	OB-2	OB-3
Number (n)	11	12	10
Age (years)	13.51 ± 1.90	14.52 ± 2.33	15.31 ± 1.54
Sex ⁺ Male/Female (%)	45.5/54.5	58.3/41.7	50.0/50.0
Ethnicity ⁺ AA/C/HA (%)	18.2/27.3/54.5	25.0/41.7/33.3	30.0/40.0/30.0
BMI (kg/m ²)	31.90 ± 1.38 ^a	36.30 ± 1.23 ^b	43.70 ± 1.71 ^c
z-BMI	2.20 ± 0.14 ^a	2.50 ± 0.14 ^b	2.70 ± 0.17 ^c
BMI percentile	98.60 ± 0.51	99.30 ± 0.25	99.60 ± 0.23
Weight (kg)	84.80 ± 5.85 ^a	104.30 ± 8.88 ^b	121.10 ± 13.93 ^b
Height (cm)	163.40 ± 4.30	169.30 ± 6.55	166.30 ± 9.27
WC (cm)	103.80 ± 5.42 ^a	115.70 ± 6.54 ^b	125.90 ± 5.72 ^b
Percent body fat (%)	40.22 ± 5.77 ^a	43.05 ± 4.94 ^b	48.39 ± 6.41 ^c

Data are expressed as mean ± SD. Significant differences were determined by one-way ANOVA followed by Tukey or Dunn *post hoc* analysis. ⁺ Group comparisons were examined using a Chi-square test. Labeled means in a row without a common letter differ, $p < 0.05$. WC: waist circumference. OB-1: $30 \text{ kg/m}^2 < \text{BMI} < 35 \text{ kg/m}^2$; OB-2: $35 \text{ kg/m}^2 \leq \text{BMI} < 40 \text{ kg/m}^2$; OB-3: $\text{BMI} \geq 40 \text{ kg/m}^2$. AA: African-American; C: Caucasian; HA: Hispanic American.