

Supplemental Material 2a. Summary of included studies.

Study	Cohort	Overexpressed miRNAs Obesity vs Lean	Subexpressed miRNAs Obesity vs Lean	miR profiling methods	Comments
Murri 2018 (Spain)	Serum samples. Adults. 12 women with PCOS (lean n=6, 27 sd 4 yr, BMI 22 sd 2; obese n=6, 27 sd 2 yr, BMI 39 sd 9), 12 control women (lean n= 5, 28 SD 3 yr, BMI 22 SD 2: obese n=6, 31 sd 6 yr, BMI 37 sd 3) and 12 men (lean n=6, 29 sd 3 yr, BMI 24 sd 1: obese n=6, 33 sd 6 yr, BMI 42 sd 8).	let-7b-3p (2.60), let-7g-3p (2.28), miR-16-1-3p (1.68), miR-23a-3p (1.39), miR-24-3p (1.29), miR-29c-3p (3.41), miR-30e-5p (1.33), miR-122-3p (2.55), miR-140-5p (1.66), miR-142-5p (1.50), miR-143-3p (1.67), miR-148a-3p (1.94), miR-181c-3p (4.92), miR-192-5p (1.68), miR-193a-5p (2.10), miR-197-3p (1.95), miR-203a (2.31), miR-223-3p (1.96), miR-223-5p (2.17), miR-302c-5p (2.96), miR-338-3p (1.87), miR-345-5p (1.65), miR-361-5p (1.47), miR-365a-3p (3.13), miR-378a-3p (1.47), miR-378a-5p (3.75), miR-424-5p (1.66), miR-425-3p (1.23), miR-425-5p (1.33), miR-582-5p (2.96), miR-651 (3.77), miR-671-5p (1.95), miR-877-5p (1.47), miR-1537 (2.77), miR-1539 (2.12)	let-7a-5p (0.73), let-7c (0.77), let-7d-5p (0.65), let-7f-5p (0.69), miR-18a-5p (0.82), miR-30b-5p (0.77), miR-30c-5p (0.79), miR-98-5p (0.62), miR-103a-3p (0.71), miR-107 (0.78), miR-151a-3p (0.74), miR-151a-5p (0.69), miR-181a-2-3p (0.42), miR-199a-5p (0.61), miR-331-3p (0.67), miR-379-3p (0.50), miR-431-5p (0.41), miR-744-5p (0.70).	miRCURY LNA™ Universal RT microRNA PCR, 4x Human panel I+II (Exiqon, Denmark) (752). miRNA-specific real-time PCR (RT-PCR) using a LightCycler® 480 II	Results in fold-change Normalized to 5 reference miRNAs: miR-191-5p, miR-30c-5p, miR-423-3p, miR-423-5p and miR-93-5p.
Cui 2018 (China)	Serum samples. discovery study: 9 children with obesity and 9 controls with normal weight were pooled into 3 pools, for miRNA profiling experiments cross-sectional validation study: the miRNAs of interest were validated in 352 individuals (100 children with obesity (61 sd 10.4 months, 51-5% girls, BMI 20.3 sd 2.20), 106 children with overweight (59.6 sd 11 months, 52.8% girls, BMI 17.4 sd 0.60) and 146 controls (60.4 sd 11.1 months, 49.6% girls, BMI 15.1 sd 1.06) 3) longitudinal validation study: the candidate miRNAs were estimated in newly diagnosed patients with T2D (n = 101, 57.5 sd 12.2 yr; BMI 26.8 sd 4.19) and controls with normal glucose tolerance (NGT) (n = 82, 49.3 sd 7.73 yr, BMI 24.3 sd 3.22)	miR-146a-5p (+1.01) miR-130b-3p (+1.07) miR-222-3p (+1.15) miR-486-5p (+1.21) miR-148a-3p (+1.28) miR-21-5p (+1.55) miR-375 (+1.73) miR-146b-5p (+1.94) miR-99b-5p (+1.96) miR-30a-3p (+2.17) miR-27a-3p (+2.58) miR-30d-5p (+2.67) let-7d-5p (+2.85) miR-26b-5p (+3.43) miR-15b-5p (+8.79) miR-19a-3p (+9.06) miR-20a-5p (+9.64)	miR-197-3p (-1.41)	microRNA sequencing platform (Illumina Inc). FASTX-Toolkit software. RT-qPCR: ViiA7 Real-Time PCR System (Applied Biosystems)	Normalized to cel-miR-39. 177 miRNAs were detected in pooled samples. 94 miRNAs exhibited a >2-fold difference between groups. Based on the fold change and expression abundance, they selected 18 miRNAs as candidates for further study.
Ghorbani 2017	Serum samples. 45 T2D (29 female, 47.6 sd 5.8 yr, BMI		miR-21 (0.81)	RT-qPCR: Rotogene Q (3)	Normalized to cel-mir-39 and miR-16 as internal

(Iran)	27.3 sd 3.9), 42 non-T2D (21 female, 56.5 sd 8.1 yr, BMI 28.2 sd 4.8)				control.
Thompson 2017 (USA)	Plasma samples. Children; 10 healthy controls (13.8 yr, 60% girls, BMI 20.11) vs 20 children with obesity (13.2 yr, 30% girls, BMI 34.7)	15b-5p(+3.42), 199a-5p (+17.18), 222-3p(+2.14), 223-3p(+6.72), 181b-5p (+3.29), 122-5p(+12.48), 23a-3p (+5.3), 27b-3p (+6.74), 21-5p (+4.89), 34a-5p (+5.09), 192-5p (+3.78), 29a-3p (+2.81), 214-5p (+2.73), 155-5p (+2.63), 191-5p (+7.21), 103a-5p (+3.38)		RT-qPCR: Exiqon Pick and Mix miRNA PCR panel (20)	Normalized to UniSp2. Reported data: fold change
Wander 2017 (USA)	Plasma samples. Among participants in the Omega study. Pregnant woman; 36 GDM cases, 34.3 yr, 16.5 weeks GA, ppBMI 25.5, 80 normal controls, 32.9 yr, 15.1 weeks GA, ppBMI 21.7.	GDM 155-5p (+2.11); 21-3p (+3.59); 146b-5p (+2.79); 223-3p(+1.89); 517-5p (+1.93); 29a-3p (+1.43) Obese + GDM 1210-3p (+1.53)		RT-qPCR: 10 selected miR: Custom targeted panel Exiqon LNA primers (10)	Normalized to cel-miR-39; and endogenous miR-423-3p.
Zhao 2017 (USA)	Plasma samples. 300 Mexican American women, mean 40 yr. Training set (arrays) n= 40, 47.5% with obesity at baseline, 72.5% at 5 yr of follow-up Testing set 1, n=160, 47.5% with obesity at baseline, 54.4% at 5 yr. Testing set 2: n=100, 57% with obesity at baseline, 63% at 5 yr.	Obesity at baseline (rho) 142(+0.374), 122(+0.405), 30a(+0.411), 519d (+0.313),	125b(-0.316)	Arrays: TaqMan Array Human Microarray Card Set v3.0 (384) RT-qPCR: Individual TaqMan miRNA Assays	Normalized to cel-miR-39 y cel-miR-54. Reported data: Cox-regression coefficient
Xiong 2017 (China)	Serum samples. Women from East China. 18 women with PCOS (25.8 yr, BMI 24) and 30 healthy women (25.5 yr, BMI 20)	+23a (obese women with PCOS) +23b (obese women)		RT-qPCR: miRcute miRNA qPCR detection kit (2)	Groups divided accordingly endometrial cycle. Normalized to U6.
Shah 2017 (USA)	Plasma samples. FHS Offspring Cohort, n=2317, 65.8 yr, 56% women, BMI 27.7. Validation youth cohort: n= 90 ob/ow, 15.5 yr, 60% women, BMI 33.8. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	122-5p(+0.046), 16-5p (+0.024), 191-5p(+0.037), 192-5p (+0.053), 194-5p (+0.033), 197-3p (+0.038), 19b-3p (+0.037), 24-3p (+0.032), 301b-3p (+0.029), 30d-5p (+0.033), 320a (+0.035), 342-3p (+0.045), 486-5p (+0.030), 574-3p (+0.035), 616-5p (+0.040), 664b-3p (+0.015); snoRNA-1210: (+0.016)	320b (-0.016), 4446-3p (-0.033), piRNA-48383(-0.027)	Small-RNA sequencing: Ion Torrent Proton Sequencer High-throughput RT-PCR: miScript assay technologies, Fluidigm Biomark system (391 ex-RNA, 297 miR, 36 snoRNA, 58 piRNA)	122 and 192 validated in youth cohort Reported data: B-estimates p/HOMA-IR.
Willeit 2017 (Italy)	Serum and plasma samples. Bruneck Study: n= 810 Caucasian patients, 50% female, 63 yr; BMI 26, free of preexisting disease at baseline. 136 developed metabolic syndrome, 57 T2D after 10 years:1995-2005)	122 (+1.6)		RT-qPCR: TaqMan miRNA assays (1)	Normalized to U6 and cel-miR-39. They measure miR-122 at baseline and after 5 years. 100% follow-up.
Hubal	Plasma and serum samples. 6	1227-3p (+2.23), 4691-5p (+1.98), 3926 (-1.52), 224-5p (-1.53), 4723-5p		Affimetrix GeneChip	In circulating adipocyte-

2017 (USA)	African-American women with obesity (38.5 yr, BMI 51.2)	219a-5p (+1.8), 4728-3p (+1.64), 103-3p (+1.59), 3622a-3p (+1.54), 4749-3p (+1.53), <u>125b-3p</u> (+1.50)	(-1.58), 16-5p (-1.59), 3690 (-1.73), 208a-3p (-1.82), 4716-3p (-1.87), 4525 (-1.91), 2355-5p (-1.93), 4782-5p (-2.29)	microRNA 4.0 arrays (2578)	derived exosomes. 168miR differentially expressed after one year post-surgery (gastric bypass). They found 168 miR with differential expression, 56 human mature miR, and reported those associated with insulin signaling.
Enquobahrie 2017 (USA)	Plasma samples. Among participants from two cohorts: Omega and POUCH studies: Omega study: n=20, 29.75 yr, 16.62GA, BMI <18 n=1, 18-25 n=12, >25 n=7. POUCH study: n=20, 26.01 yr, 22.40GA, BMI<18 n=1, 18-25 n=9, >25 n=10	Pregestational Ob/ow (+) 28-3p(0.115, 0.101), let-7d*(0.117, 0.081), 3137(0.125, 0.105), 584(0.120, 0.110), 28-5p(0.130, 0.118), 4286(0.096, 0.104), 376a(0.174, 0.141), 423-5p(0.082, 0.079), 425(0.138, 0.099), 199a-5p(0.185, 0.147), 652(0.133, 0.117), 151-3p(0.130, 0.115), 221(0.185, 0.124), 891a(0.116, 0.093), 103-2(0.080, 0.076), 361-5p(0.126, 0.112), 151-5p(0.164, 0.145), <u>130b</u> (0.119, 0.103), 146b-5p(0.161, 0.160), 377(0.153, 0.129), 128(0.129, 0.121), 139-5p(0.090, 0.070), 423-3p(0.116, 0.100), 487b(0.130, 0.114), 191(0.130, 0.130), 29c(0.112, 0.120), 26b(0.060, 0.165)		Arrays: Microarray based epigenome wide miRNA profiling (319)	Reported data: B-estimates from both cohorts (Omega and Pouch). All positively correlated.
Nunez-Lopez 2016 (USA)	Serum samples. From ORIGINS trial. Subjects Lean vs with obesity; health or with prediabetes or T2D; lean+healthy (n=10, 8 female, 32 yr, BMI 21.8); lean+prediabetes (n=10, 6 female, 42.5 yr, BMI 21.7); lean+T2D (n=2, 1 female, 41 yr, BMI 23.1); obesity+healthy (n=9, 7 female, 34 yr, BMI 35); obesity+prediabetes (n=11, 5 female, 42 yr, BMI 35.1); obesity+T2D (n=15, 5 female, 51 yr, BMI 36.5).	Obesity vs lean(logFC) 21 (+0.33), 24.1(+0.74), 27a (+0.6), 34a (+1.18), 126 (+0.32), 146a (+0.73), 148a (+0.87), 152 (+0.66), 223(+0.58)	25 (-0.44), 93 (-0.48), 150 (-0.67)	RT-qPCR: TaqMan Universal Master Mix and TaqMan microRNA Assay. (23)	A diabetes-related human miRNA panel was used. Normalized to cel-mir-39 and 3 endogenous miR: 191, 423-3p and 451. Reported data: differential abundant in circulation, logFC, median and interquartile rank.
August 2016 (Spain)	Serum samples. Women. 62 with morbid obesity MO; 30 with moderate obesity ModO; 30 normal weight (41 yr, BMI 22.1). Both obesity groups divided according to liver disease. In -ModO: normal (n=9, 49.8 yr, BMI 35.4), SS (N=9, 49.06 yr, BMI 36.2, NASH n=12, 52.23 yr, BMI 35.1). In MO: normal (n=22,	33b* MO vs ModO 122 MO vs ModO		RT qPCR:miRNeasy Serum/Plasma kit (Qiagen) (3)	MO + NASH >122 than MO with SS Normalized to cel-mir-39 Reported data: arbitrary units

	46.3 yr, BMI 48.5), SS (n=18, 47.2 yr, BMI 48.9) NASH n=22, 48.8 yr, BMI 47.2)				
Iacomino 2016 (Italy)	Plasma samples. IDEFICS Cohort; 20 children selected from the Italian cohort of the "I.Family project": 2 groups: 1) normal weight girls, 5 boys, 10.5 yr, BMI 16.45), 2) ow/ob (4 girls, 6 boys, 10.7 yr, BMI 31.68)	Arrays 26b-5p (+25.3723), 31-5p(+4.9499), 2355-5p(+6.5213) RT-qPCR 531-5p (+1.92), 2355-5p (+2.93)	206 (-0.52) With differences in microarray but without RT-qPCR validation: 1231 (-8.7217), 361-3p (-4.8918), 136-5p (-4.8356), 320a (-9.9692), 206 (-6.0515)	Arrays: Serum and Plasma 384HC miScript miRNA PCR Arrays (Qiagen) RTqPCR: SYBR Green PCR kit (Qiagen) (372)	Normalized to cel-miR-39-3p, SNORD61, SNORD68, SNORD72, SNORD95 and SNORD96A Reported data: fold change expression
Masotti 2017 (Italy)	Serum samples. 12 children with obesity selected from the cohort "Origin study" whose BMI switched from normal weight to ow/ob in the year prior to enrolment. 6 insulin-resistant (4.63 yr, BMI 20.87), 6 insulin-sensitive (4.35 yr, BMI 18.52). Age, sex and BMI matched.	505-3p(+3.11), 122-5p(+2.82), 34a-5p(+2.41), 26b-5p(+1.63), 320a(+1.55), 146a-5p(+1.48), 148b-3p(+1.47), 342-3p(+1.46)	660-5p(-1.50), 19a-3p(-1.55), 95(-1.72), 205-5p(-2.60), 200c-3p(-2.78), 190a(-3.04)	Arrays: Serum/Plasma Focus microRNA PCR Panel (Exiqon) (179)	Comparison between obese children, with or without insulin resistance. With differences statistically significant in weight, height, ALT and HDL-cholesterol between groups. Reported data: mean fold change expression. Normalized: two artificial spike-in miRNAs
Liu 2016 (China)	Serum samples. 25 control subjects (51.12 yr, BMI 21.94); 24 subjects with obesity, (46.96 yr, BMI 30.81). 50% women in both groups, sex and age matched.		-1934(-32.5%)	RT-qPCR: miScript SYBR Green PCR kit (1)	Normalized to RNU6B. Reported data: Relative expression
Carreras-Badosa 2015 (Spain)	Plasma samples. 70 pregnant Caucasian women, 24-32 sdg; 3 groups: 20 pregestational obesity (31 yr, BMI 1st to 3rd trim 29.4-32.3), 25 gestational obesity (30 yr, BMI 1st to 3rd trim 23-29.2), 25 normal pregnancies (30 yr, BMI 1st to 3rd trim 23-26.7). Arrays: 6 women were randomly selected, from each group. Validation RT-qPCR in the complete cohort.	GestOb vs control 30a-5p (+1.89), 130a(+1.63), 150(+1.75) Ob vs control 625(+1.82, +1.30) PregestOb vs GestOb 221(+1.78)	GestOb vs control 29c(-1.32), 99b (-1.43), 103(-1.64), 221(-1.65), 340(-3) PregestOb vs GestOb 130a(-1.76) Ob vs control 122(-2.07,-1.45), 324-3p(-1.75,-2.00), 375(-2.08, -1.56), 652(-1.19, -1.70)	TaqMan Low Density Arrays human mRNA Card Set version 3.0 RT-qPCR: Individual TaqMan miRNA Assays (723)	Normalized to U6 snRNA and 3 miR endogenous. 18 miR deregulated in microarrays, 13 confirmed by RT-qPCR Reported data: relative expression
Pek 2016 (China)	Whole blood samples. N=32 men, 4 groups n=8: 1) non-T2D, lean (42.3 yr, BMI 21.3), 2) non-T2D with, obesity (36.6 yr, BMI 33.3), 3 T2D-lean (50.5 yr, BMI 22.4), 4) T2D-obesity(38.0, BMI 37.0)		-125b, -181a, -210, -378 -100 (obese and diabetic vs control)	Arrays: Agilent SurePrint G3 Human miRNA microarray v.16 RT-qPCR: LNA-qPCR individual primers (Exiqon) (1205)	215 detected in microarrays; 31 significantly different between the 4 groups; 8 validated by RT-qPCR Reported Data: relative expression Normalized to SNORD48
Khalyfa 2016 (USA)	Plasma samples. 16 children with obesity/overweight , 8 with endothelial dysfunction,	365b-3p (+1.41, +1.52)	125a-5p (-1.33, -1.27), 342-3p (-1.41, -1.22)	Pathway specific for human CVD miRNA PCR Array Qiagen	Comparisons in obese/overweight children with or without endothelial

	8 with normal endothelial function; (8.41 yr and 7.59 yr) Matched for age, sex, ethnicity and BMI (74% white, 60% male)			RT-qPCR: SYBR Green Real-Time PCR (84)	function. No lean control. Normalized: cel-mir-39 and SNORD68
Can 2016 (Turkey)	Whole blood samples. Turkish children. 45 children with obesity (19 male, 26 female) and adolescents vs 41 controls (17 male, 24 females) (14.71 yr and 14.44 yr; BMI 41.31 and 18.94, respectively). Matched for age and sex.	27(+1.61), 378(+3), 370(+3.37)	335-5p(-4.46), 143(-3.78), 758-3p(-2.75)	RT-qPCR: miRCURY LNA Universal RT PCR kit (Exiqon) (7)	Reported data: medians; analysis ROC.
Thomé 2015 (Brazil)	Plasma samples. 57 age and gender matched subjects: 40 patients with heart-failure (65% men, 20 with obesity: 54.9yr, BMI 37.3; 20 lean: 54.9 yr BMI 21.8). 17 healthy controls (52.1 yr, BMI 24.7, 71% men).		-130b	RT-qPCR: TagMan miR Expression Array Probes (4)	miR-423-5p elevated in heart failure vs control; 221 and 21 ns Normalized: cel-miR-39 Reported data: fold change
Wen 2015 (China)	Serum samples. Asian population. 41 normal-weight (50.5 yr, BMI 21.7); 40 Ob (51.6 yr, BMI 25.7); 40 Ob (50.4 yr, BMI 30.2). 50% women each group		223(ow -7.11, ob -1.65)	RT-qPCR: SYBR Premix DimerEraser kit (1)	Normalized: cel-miR-39 miR-223 increased after 3-months lifestyle intervention Reported data: median and interquartile rank
Párrizas 2015 (Spain)	Serum samples. 92 men, 29 control group (54.39 yr, BMI 29.11), 22 individuals with prediabetes IFG (53.62 yr, BMI 29.46), and 21 individuals with prediabetes IGT, 56.79 yr, BMI 28.98 and 20 newly diagnosed T2D, 55.68 yr, IMC 30.08 A second cohort (exercise intervention, n=18, both sexes, 12 control, 6 with prediabetes (3 with IGT, 3 with IFG)	+192, +193b With differences in microarrays but without RT-qPCR validation: +125a-5p, +150	With differences in microarrays but without RT-qPCR validation: -191, -15b, -128	Arrays: Exiqon panels (176) RT-qPCR: Exiqon SYBRGreen primers	Reported data in dCt value. Normalized with endogenous miR (let-7b, let-7g and let-7i). All participants Ow/Ob. miR-192 and 193b overexpressed in prediabetes; 2 nd cohort: baseline expression post-exercise intervention.
Wang 2015 (China)	Serum samples. In Chinese people. Arrays: 56 patients with obesity (24.31 yr, 50% women, BMI 39.03) and 56 control subjects (24.47 yr, 50% women, BMI 20.97) RT-qPCR Validation: 107 lean control (23.97 yr, 53.3% women, BMI 20.79). 123 subjects with obesity (24.02 yr, 50% women, BMI 37.73)	122(+3.22), 636(+6.19), 933(+4.26), 574-5p(+3.05)	140-3p(-0.33), 20b(-0.31), 19b(-0.29), 550a(-0.29), 361-5p(-0.29), 17(-0.28), 30a(-0.27), 654-5p(-0.27), 324-3p(-0.24), 148b(-0.21), 10a(-0.19), 151-3p(-0.18), 335(-0.18), 126*(-0.18), 142-5p(-0.17), 494(-0.17), 151-5p(-0.15), 223*(-0.13), 331-3p(-0.11), 144*(-0.10), 199a-5p (-0.049), 195(-0.04), 301-a(-0.04), 338-3p(-0.04), 590-5p(-0.03), 186(-0.03), 30c(-0.029), 30b(-0.020), 140-5p(-0.015)	Microarray: Agilent Human miRNA 8*60K v.16 (1205) RT-qPCR miRCURY LNA Universal RT kit (Exiqon)	Reported data: quartile normalized fluorescence intensities. Normalized with algorithm Quantile miR-122 was the only miR validated in RT-qPCR 4 initial pools, 28 patients each (for microarrays)

Pescador 2013 (Spain)	Serum samples. 13 patients with T2D (46% women, 69.4 yr, BMI 24.86); 20 patients with obesity (85% women, 41.7 yr, BMI 42.73); 16 patients with obesity+T2D (40% women, 67.55 yr, BMI 33.38), 20 controls (50% women, 42.9 yr, BMI 22.7).	+15b	-138, -376a, -503	Arrays: miRCURY LNA Universal RT cDNA Synthesis kit Human Panel I and II (742) RT-qPCR: miRCURY LNA microRNA PCR System (Exiqon)	(Initial pools for arrays) Reported data: ROC-AUC for each miRNA. Normalized to miR-30c, 103, miR-191 and miR-423-3p.
Murri 2013 (Spain)	Whole blood samples. 12 control women, 12 with PCOS, 12 men. 6 subjects per group with normal weight and 6 with obesity. Control: 29 yr, BMI 22 vs 37, PCOS: 27 yr, BMI 22 vs 39. Men: 30 yr, BMI 24 vs 43.		-21, -276, -103, -155	RT-PCR: TaqMan MicroRNA Reverse Transcription kit (4)	Reported data: B-estimates In whole blood, uncertain cellular origin of this miR. Normalized to exogenous miR: RNU44 and RNU6b
Prats-Puig 2013 (Spain)	Plasma samples. TaqMan array - discovery study: , 10 Caucasian boys, 5 with obesity (8.8 yr) vs 5 control (9.9 yr) RT-PCR - cross-sectional validation study: 85 control (9 yr, 49% girls) and 40 with obesity (9.2 yr, 55% girls) Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	+486-5p, +486-3p, +142-3p, +130b, +532-5p, +140-5p, +16-1, +222, +363, +122	-221, -28-3p, -125b, -328	TaqMan miRNA Low Density Arrays (754) RT-PCR: TaqMan hydrolysis probes	Reported data: relative Log10-ratios, correlation coefficients and B-estimates Normalized to 4 endogenous miR-106a, miR-146a, miR-19b and miR-223 (geometric mean)
Wang YC 2013 (China)	Serum samples. 21 Chinese lean men (48.95 yr, BMI 22.03) and 23 Chinese men with ow/ob (52.22 yr, BMI 27.25)	+130b		RT-PCR. Prime Script RT reagent kit. (1)	Normalized to miR-223. The study includes a validation in mouse and cell culture. Reported data: correlation coefficient and AUC-ROC.
Ortega 2013 (Spain)	Plasma samples. TaqMan array: , 32 white men (12 lean, 50 yr, BMI 23.7; 12 with obesity, BMI 33.1, 51 yr, 42% with T2D, 8 with morbid obesity, BMI 45.3, 46 yr, 50% T2D) (BMI 20-60) RT-qPCR: Replication in 80 patients: white men (49 lean: 49 yr, BMI 25.4; 19 with obesity: 51 yr, BMI 33.0, 37% with T2D; 12 with morbid obesity: 42 yr, BMI 45.5, 33% T2D). Longitudinal study: 5 men, 17 women, age 44 yr, BMI 42.9 (treated with surgery) and 9 treated with diet 5 men, 4 woman, age 47 yr, BMI 34.4.	Obese vs Lean +140-5p, +142-3p, +222, +532-5p, +221, +423-5p, +21, +590-5p, +122, +483-5p, +636 Morbid obese vs Lean +140-5p, +142-3p, +126, +222	Obese vs Lean -125b, -15a, -520c-3p, -193a-5p, -126, -625, -130b Morbid obese vs Lean -532-5p, -221, -423-5p, -21, -590-5p, -122, -483-5p, -636, -125b, -130b, -15a, -520c-3p, -193a-5p, -625	TaqMan miRNA Arrays (754) TaqMan Low Density Arrays RT-qPCR: TaqMan Hydrolysis Probes.	Normalized to 6 endogenous miR, analysing geometric means. Reported data: base log2-transformation. Results were validated in 80 patients, and in a longitudinal cohort, in obese patients treated with diet or surgery. We report results from comparisons in cross-sectional studies between obese (BMI 30-40) vs non-obese (BMI<30)

With statistical significance $p < 0.05$ in all cases.

Yr= years, BMI = body mass index, ppBMI: pre-pregnancy body mass index, GA: gestational age, GDM: gestational diabetes, PCOS: Polycystic ovarian syndrome, FHS: Framingham Heart Study, T2D: type 2 diabetes, NASH: non-alcoholic hepatic steatosis, SS: simple steatosis, IFG: impaired fasting glucose, IGT: impaired glucose tolerance, CVD: cardiovascular disease, RT-qPCR: real-time polymerase chain reaction.

Supplemental material 2b. miRNAs reported dysregulated in obesity.

miRNA		Sample	Population	Reference
let-7a-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
let-7b-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
let-7c	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
let-7d-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
let-7f-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
let-7g-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-10a	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-15a	d	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-15b	o	Serum	13 patients with T2D, 20 patients with obesity; 16 patients with obesity+T2D, 20 controls	Pescador 2013
miR-15b-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-16-1	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
miR-16-1-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-16-5p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-17	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-18a-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-19a-3p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	d	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-19b	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-19b-3p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-20a-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
miR-20b	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-21	d	Serum	Adults. 45 T2D, 42 non-T2D	Ghorbani 2017
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	o	Serum	57 adults, lean vs obesity groups; healthy or with prediabetes or T2D	Nunez-Lopez 2016
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-21-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-23a	o	Serum	Women from East China. 18 women with PCOS, 30 control	Xiong 2017
miR-23a-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-23b	o	Serum	Women from East China. 18 women with PCOS, 30 control	Xiong 2017
miR-24	o	Serum	57 adults, Lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-24-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-25	d	Serum	57 adults, lean vs obesity groups; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-26b-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-27a	o	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-27a-3p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
miR-27b-3p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-28-3p	d	Plasma	Discovery study:10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
miR-29a-3p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-29c-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-30a	o	Plasma	300 Mexican-American women, mean 40 yr. Training set (arrays) n= 40, 47.5% obese at baseline, 72.5% at 5 yr of follow-up. Testing set 1, n=160, 47.5% obese at baseline, 54.4% at 5 yr. Testing set 2: n=100, 57% obese at baseline, 63% at 5 yr.	Zhao 2017

	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-30a-3p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
miR-30b	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-30b-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-30c	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-30c-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-30d-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-30e-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-31-5p	o	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
miR-33b	o	Serum	62 Women with morbid obesity, 30 with moderate obesity and 30 normal weight	Auguet 2016
miR-34a	o	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-34a-5p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-93	d	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-95	d	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-98-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-99b-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
miR-103a-5p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-103a-3p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-107	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-122	o	Plasma	300 Mexican-American women, mean 40 yr. Training set (arrays) n= 40, 47.5% obese at baseline, 72.5% at 5 yr of follow-up. Testing set 1, n=160, 47.5% obese at baseline, 54.4% at 5 yr. Testing set 2: n=100, 57% obese at baseline, 63% at 5 yr.	Zhao 2017
	o	Serum	62 Women with morbid obesity, 30 with moderate obesity and 30 normal weight	Auguet 2016
	o	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
	o	Plasma	Discovery study: , 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-122-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
	o	S/P	810 Caucasian adults, 50% female, 63 yr; BMI 26, free of preexisting disease at baseline. 136 developed metabolic syndrome, 57 T2D after 10 years:1995-2005	Willeit 2017
	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
	d	Plasma	70 pregnant Caucasian women; 20 pregestational obesity, 25 gestational obesity, 25 normal pregnancies	Carreras-Badosa 2015
miR-125b	d	Plasma	300 Mexican-American women. Training set (arrays) n= 40, 47.5% obese at baseline, 72.5% at 5 yr of follow-up Testing set 1, n=160, 47.5% obese at baseline, 54.4% at 5 yr. Testing set 2: n=100, 57% obese at baseline, 63% at 5 yr.	Zhao 2017
	d	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	d	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-126	o	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
	o	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-126*	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-130b	d	Plasma	57 age and gender matched subjects: 40 heart-failure patients, 17 healthy controls	Thomé 2015
	d	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Serum	21 Chinese men with normal weight, 23 Chinese men with ow/ob	Wang YC 2013
miR-130b-3p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study); 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018

miR-136-5p	d	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
miR-138	d	Serum	13 patients with T2D, 20 patients with obesity; 16 patients with obesity+T2D, 20 controls	Pescador 2013
miR-140-3p	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-140-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-142	o	Plasma	300 Mexican-American women. Training set (arrays) n= 40, 47.5% obese at baseline, 72.5% at 5 yr of follow-up. Testing set 1, n=160, 47.5% obese at baseline, 54.4% at 5 yr. Testing set 2: n=100, 57% obese at baseline, 63% at 5 yr.	Zhao 2017
miR-142-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-142-3p	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-143-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-144*	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-146a	o	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-146a-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study). 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-146b-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study). 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
miR-148a	o	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-148a-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study). 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
miR-148b	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-148b-3p	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-150	d	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-151-3p	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-151-5p	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-151a-3p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-151a-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-152	o	Serum	57 adults, lean vs obesity groups ; healthy or with prediabetes or T2D	Nunez-Lopez 2016
miR-155-5p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-181a-2-3p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-181b-5p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-181c-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-186	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-190a	d	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-191-5p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-192-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-193a-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	d	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-194-5p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-195	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-197-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-199a-3p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-199a-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015

miR-200c-3p	d	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-203a	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-205-5p	d	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-206	d	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
miR-210-3p	o	Plasma	Pregnant women, 36 with GDM, 80 normal controls	Wander 2017
miR-214-5p	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-221	d	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-222	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-222-3p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study). 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-223-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	o	Plasma	10 healthy children; 20 children with obesity	Thompson 2017
miR-223-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-223	o	Serum	57 adults, lean vs obesity groups; healthy or with prediabetes or T2D	Nunez-Lopez 2016
	d	Serum	41 Asian adults with normal-weight; 40 with overweight; 40 with obesity	Wen 2015
miR-223*	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-301a	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-301b-3p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-302c-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-320a	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
	d	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-320b	d	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-324-3p	d	Plasma	70 pregnant Caucasian women; 20 pregestational obesity, 25 gestational obesity, 25 normal pregnancies	Carreras-Badosa 2015
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-328	d	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
miR-331-3p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-335	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-338-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-342-3p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-345-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-361-3p	d	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
miR-361-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-363	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
miR-365a-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-375	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study). 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	d	Plasma	70 pregnant Caucasian women; 20 pregestational obesity, 25 gestational obesity, 25 normal pregnancies	Carreras-Badosa 2015
miR-376a	d	Serum	13 patients with T2D, 20 patients with obesity; 16 patients with obesity+T2D, 20 controls	Pescador 2013
miR-378a-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-378a-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-379-3p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-423-5p	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013

	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-424-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-425-3p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-425-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-431-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-483-5p	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-486-5p	o	Serum	9 children with obesity and 9 controls (discovery); 352 children with obesity, 106 with overweight, 146 controls (cross-sectional validation study), 101 adults with T2D and 82 controls (longitudinal validation study)	Cui X 2018
	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
miR-486-3p	o	Plasma	Discovery study: 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
miR-494	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-503	d	Serum	13 patients with T2D, 20 patients with obesity; 16 patients with obesity+T2D, 20 controls	Pescador 2013
miR-505-3p	o	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-519d	o	Plasma	300 Mexican-American women. Training set (arrays) n=40, 47.5% obese at baseline, 72.5% at 5 yr of follow-up Testing set 1, n=160, 47.5% obese at baseline, 54.4% at 5 yr. Testing set 2: n=100, 57% obese at baseline, 63% at 5 yr.	Zhao 2017
miR-520c-3p	d	Plasma	Array: , 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-532-5p	o	Plasma	Discovery study: , 10 Caucasian boys, 5 with obesity. Cross-sectional validation study: 85 control and 40 with obesity. Longitudinal evaluation: same children, 23 boys and 22 girls, lean at baseline	Prats-Puig 2013
	o	Plasma	Array: , 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-550a	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-574-3p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-574-5p	o	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-582-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-590-5p	d	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-616-5p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-625	o	Plasma	70 pregnant Caucasian women; 20 pregestational obesity, 25 gestational obesity, 25 normal pregnancies	Carreras-Badosa 2015
	d	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-636	o	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
	o	Plasma	Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
	d	Plasma	*in morbid obesity vs control. Array: 32 white men (12 control; 12 with obesity, 8 with morbid obesity). RT-qPCR: Replication in 80 patients: white men: 49 control; 19 with obesity; 12 with morbid obesity. Longitudinal study: 5 men, 17 women treated with surgery and 9 treated with diet 5 men, 4 woman.	Ortega 2013
miR-651	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-652	d	Plasma	70 pregnant Caucasian women; 20 pregestational obesity, 25 gestational obesity, 25 normal pregnancies	Carreras-Badosa 2015
miR-654-5p	d	Serum	Chinese adults.. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-660-5p	d	Serum	12 Italian children with obesity, 6 with insulin resistance, 6 with insulin sensitivity	Masotti 2017
miR-664b-3p	o	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017
miR-671-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-744-5p	d	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-877-5p	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-933	o	Serum	Chinese adults. Arrays: 56 patients with obesity and 56 control. RT-qPCR Validation: 107 control and 123 subjects with obesity	Wang R 2015
miR-1231	d	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino

				2016
miR-1537	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-1539	o	Serum	12 women with PCOS, 12 control women, 12 men	Murri 2018
miR-2355-5p	o	Plasma	20 Italian children, 10 with normal weight, 10 ob/ow	Iacomino 2016
miR-4446-3p	d	Plasma	FHS Offspring Cohort, n=2317, Validation youth cohort: n= 90 ob/ow. Initial study RNAseq: n=40, 68.8 yr, BMI 28.2, 50% female, 50% with CVD	Shah 2017

o= overexpressed

d= downregulated