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| Supplementary table S3. miRNAs examined in papers |
| miRNA | Tissue | Regulation with obesity/GWG | Associated with |
| Let-7a | Colostrum | ↓ with BMI↑ with GWG (1) | Cellular metabolism, apoptosis, stress response and organ and tissue development (1).Listed functions in miRBase are oncogenic by regulation of *RAS*-expression and inhibition of *HMGA2* , inhibition of components of DNA replication, transcription factors, tumor suppressor genes and checkpoint regulation, as well as regulation of apoptosis. Roles in immune-regulation by regulating IL-6 and IL-10, negative regulation of TLR4, and regulation of production of IL-13 (2). |
| Mature milk | ↓ with late pregnancy weight (1) |
| Let-7d | Maternal blood | ↑ with ppBMI (3, 4) | Adipogenesis, targeting *HMGA2 (5).* Listed functions in miRBase are oncogenic by regulation of *RAS*-expression and inhibition of *HMGA2* , inhibition of components of DNA replication, transcription factors, tumor suppressor genes and checkpoint regulation, as well as regulation of apoptosis. Roles in immune-regulation by regulating IL-6 and IL-10, negative regulation of TLR4, and regulation of production of IL-13 (2). |
| Amnion |
| -9 | Maternal plasma | Only in high GWG (6) | miRBase reports that the gene for this miRNA is repressed by hypermethylation in cancers (2). |
| -15a | Materna plasma | Only in high ppBMI (6) | miRBase reports these miRNAs are in family with miR-195. They are frequently deleted or down-regulated in chronic lymphotic leucaemia (2). The miRNAs are involved in proliferation of B-cells by modulating genes controlling cell-cycle progression, and functions as a tumor suppressor by targeting and downregulating the oncogene *BCL2*. Highly expressed in CD5+-cells (2).  |
| -16-1-3p | Placenta | Only expressed in controls (7) |
| -18a | Maternal plasma | Only in high GWG (6) | miRBase reports that this miRNA is a member of the miR-17 family, which are overexpressed in multiple cancer types and induces cell proliferation (2). |
| -19b | Maternal plasma | Only in high GWG (6) | Listed functions in miRBase are repression of CYLD, which represses CYLD and leads to NF-κB expression, involvement in oncogenesis (2). Target genes are *BCL2L11, PRKAA1, E2F1, PTEN, PP2A* and *DOCK5* (2). |
| -20a | Placenta | ↓ with ppBMI (8) | Inhibition of spheroid cell sprouting, network formation and tubulogensis in encothelial cell (9), and increased adipogenesis in mouse adipocytes (10). miRBase reports that this miRNA is a member of the miR-17 family, which are overexpressed in multiple cancer types and induces cell proliferation (2).  |
| Maternal plasma | Only in high GWG (6) |
| -22 | Maternal plasma | Only in high GWG (6) | Listed functions in miRBase are involvement in erythrocyte maturation and deregulation in oncogenesis. Can function as a tumor suppressor (2). |
| -23a | Maternal plasma | Only in high ppBMI (6) | miRBase reports that this miRNA co-operates with miR-24 and miR-27, but no known functions are listed (2). |
| -23b | Maternal plasma  | Only in controls (7) | miRBase reports that this miRNA co-operates with miR-24 and miR-27, but no known functions are listed (2). |
| Amnion | ↑ with ppBMI (4) |
| -24-2 | Maternal plasma | Only in high GWG (6) | miRBase reports that this miRNA co-operates with miR-23 and miR-27 (2). The miRNA suppresses expression of *E2F2* and *MYC* in hematopoietic differentiation, and also promote keratinocyte differentiation by repressing actin-cytoskeleton regulators *PAK4, TSK5* and *ARHGAP19* (2).  |
| -26a | Maternal plasma | Only in high GWG (6) | Listed functions in miRBase is roles in numerous tumors and involvement in smooth muscle cell differentiation (2).  |
| -26a-2-3p | Placenta | Only with high ppBMI (7) |
| -26b | Maternal blood | ↑ with ppBMI (3) | Listed functions in miRBase are involvement in suppression of cell apoptosis in hypoxia, neuronal differentiation and roles in oncogenesis (2). |
| Maternal plasma | Only in high GWG (6) |
| -27a | Maternal plasma | Only in high GWG (6) | miRBase reports that this miRNA co-operates with miR-23 and miR-24 (2).  |
| -28-3p | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase (2) |
| -28-5p | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase (2) |
| -29c | Maternal blood | ↑ with ppBMI (3) | Adipogenesis, targeting *HDAC4* (3)No known functions listed in miRBase (2). |
| Maternal plasma | ↓ with GWG (6) |
| -30a-5p | Maternal plasma | ↑with GWG (6) | Listed functions in miRBase are involvement in gene silencing, enabling of mRNA binding involved in posttranscriptional gene silencing and being a part of extracellular space (2). |
| -30b | Colostrum | ↓ with BMI↑ with GWG (1) | Cellular metabolism, apoptosis, stress response and organ and tissue development (1).miRBase reports that this miRNA is highly expressed in heart cells (2). |
| -33a | Maternal plasma | Only expressed in controls (6) | miRBase reports that this miRNA is located within the intronic regions within protein-coding genes for sterol regulatory element-binding protein-2 (2). |
| -34a | Placenta | ↓ with ppBMI (8) |  Increase leads to inhibition of angiogenesis by suppressing SIRT1 in rats (11), adipogenesis in human adipocytes (12) and inhibits browning of fat tissue in murines by suppressing FGF21 and SIRT1 (13).miRBase reports that this miRNA is a part of the p53 tumor suppressor network (2).  |
| -92b-5p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase (2) |
| -96 | Amnion | ↑ with ppBMI (4) | miRBase reports that genes targetes by miR-96 are involved in hair cells, and especially cochlear hair cells (2). |
| -99b | Maternal plasma | ↓with GWG (6) | No known functions listed in miRBase (2) |
| -103 | Maternal plasma | ↓with GWG (6) | miRBase reports this miRNA to be homologous to miR-107 (2). Up-regulated in obese mice and has been found to have a key role in insulin sensitivity (2). miR-103 has also been linked to chronic pain and intestinal cell proliferation.miR-103-2 (2) targets *ARNT*, *FZD1*, *RUNX1T1*, *ETO*, *MTG8*, *PDK1* and *WNT3A* (3) |
| -103-2 | Maternal blood | ↑ with ppBMI (3) |
| -107 | Maternal plasma | Only in high ppBMI (6) | miRBase reports this miRNA to be homologous to miR-103 (2). Up-regulated in obese mice and has been found to have a key role in insulin sensitivity (2). |
| Amnion | ↑ with ppBMI (4) |
| -122 | Maternal plasma | ↓with both ppBMI and GWG (6) | miRBase treprts that miR-122 expression is liver specific and is implicated as a regulator of fatty-acid metabolism (2). Reduced levels are associated with hepatocellular carcinoma (2). The miRNA also plays an important positive role in regulation of replication of hepatitis C virus replication (2). |
| -124-5p | Placenta | Only with high GWG (7) | No known functions listed in miRBase (2) |
| -128 | Maternal blood | ↑ with ppBMI (3) | Targeting TXNIP (3)No known functions listed in miRBase (2) |
| -128-1 | Maternal plasma | Associated with lower GWG (6) | No known functions listed in miRBase, renamed from miR-128a (2) |
| -130a | Maternal plasma | ↑with GWG (6) | miRBase reports that this miRNA is expressed in the hematopoietic stem/progenitor cell compartment, but not in mature blood cells (2). |
| -130b | Maternal blood | ↑ with ppBMI (3) | Targeting PPARG (3)No known functions listed in miRBase (2) |
| -136 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase (2) |
| -138 | Maternal plasma | Only expressed in controls (6) | miRBase reports that this miRNA is a precursor expressed everywhere, while the mature miRNA is found only in specific cell-types (2).  |
| -138-5p | Amnion mesenchymal stem cells | ↑ with ppBMI (14) | Listed functions in miRBase are involvement in negative regulation of cell adhesion, proliferation, migration, osteoblast proliferation and gene silencing (2). |
| -139 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase (2) |
| -139-3p | Placenta | Only with high GWG (7) | No known functions listed in miRBase (2) |
| -139-5p | Maternal blood | ↑ with ppBMI (3) | Adipogenesis targeting *FOXO1* (3)No known functions listed in miRBase (2) |
| -144 | Maternal plasma | Only in high GWG (6) | miRBase reports that this miRNA is a common miRNA signature of a number of different tumours (2). |
| -144-3p | Placenta | Only with high ppBMI (7) |
| -146a | Placenta | ↓ with ppBMI (8) | Inflammation (8)Listed functions in miRBase are primarily involvement in regulation of inflammation and functions in the innate immune system (2).  |
| -146b-5p | Maternal blood | ↑ with ppBMI (3) | Adipogenesis, targeting *NFKB* (3)Listed functions in miRBase are gene silencing, posttransctiptional gene silencing by mRNA binding, being a part of extracellular space and negative regulation of cell migration in sprouting angiogenesis (2). |
| -149-3p | Placenta | Only with high GWG (7) | No known functions listed in miRBase (2) |
| -150 | Maternal plasma | ↑with GWG (6) | Listed in miRBase are functions in hematopoiesis by regulating genes whose downstream products mediate differentiating stem cells towards becoming megakaryocytes and not erythrocytes, and controlling B- and T-cell differentiation (2).  |
| -151-3p | Maternal blood | ↑ with ppBMI (3) | Listed in miRBase is that this miRNA is a part of extracellular space (2). |
| -181 | Placenta | ↓ with both ppBMI and GWG (7) | No known functions listed in miRBase  |
| -181a-3p | Maternal plasma | Only in high ppBMI (6) | This miRNA was previously annotated miR-213, but it has been corrected to miR-181a-3p (2)No known functions listed in miRBase |
| -181c | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -185 | Placenta | ↓ with high GWG (7) | No known functions listed in miRBase |
| -188-3p | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -191 | Maternal blood | ↑ with ppBMI (3) | miRBase reports this miRNA is dysregulated in a number of different tumours.Target genes have not been characterized (2).  |
| Maternal plasma | Only in high GWG (6) |  |
| -194-3p | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -195 | Maternal plasma | Only in high GWG (6) | miRBase reports this miRNA to be in family with miR-15a and miR-16-1, and refers to their functions (2).  |
| -199a-5p | Maternal blood | ↑ with ppBMI (3) | Adipogenesis targeting *HIF1A* and *SIRT1* (3)Listed functions in miRBase are involvement in gene silencing, negative regulation of receptor internalization, autophagy, low-density lipoprotein particle clearance and positive regulation of TOR signaling and cytosolic calcium ion concentration (2).  |
| -200b-5p | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase for this miRNA in particular, but members of the miR-200 family is frequently silenced in cancer cells (2). |
| -205 | Maternal plasma | Only expressed in controls (6) | miRBase reports that this miRNA is involved in epitherlial to mesenchymal transition and tumor incasion by targeting transcriptional repressors of E-cadherin, ZEB1 and ZEB2 (2). Members of the miR-200 family is frequently silenced in cancer cells (2). |
| -208a-3p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -210 | Placenta | ↑with ppBMI (15, 16) | Upregulated in pregnancies with female fetuses and high ppBMI (15, 16)*BDNF* (15), *NDUFA4* and *ISCU* (16) are target genes.miRBase reports that this miRNA is strongly linked to the hypoxia pathway and is upregulated in response to hypoxia-inducible factors (2). Cells affected by cardiac disease and tumors display higher levels of the miRNA (2). Effects in rescuing cardiac function after myocardial infarcts via the up-regulation of angiogenesis and inhibition of cardiomyocyte apoptosis (2).  |
| -211 | Maternal plasma | Only expressed in controls (6) | No known functions listed in miRBase |
| -212 | Maternal plasma | Only in high ppBMI (6) | miRBase reports that this miRNA is clustered with mir-132, and targets for miR-132 are mediators in neurological development, synaptic transmission, inflammation and angiogenesis (2).  |
| -214 | Placenta | ↓with both ppBMI and GWG (7) | No known functions listed in miRBase |
| Maternal plasma | Only expressed in controls (6) |
| -219 | Amnion | Only with high ppBMI (4) | Listed function in miRBase is linkage to NMDA receptor signaling (2). Dysregulation of this miRNA can lead to mental disorders such as schizophrenia (2).  |
| -221 | Maternal blood | ↑ with ppBMI (3) | Targeting CDKN1B and p27 (3)Listed functions in miRBase are angiogenesis, tumor angiogenesis in liver cancer cells and oncogenic functions by targeting CD117 to prevent cell migration and proliferation in endothelial cells (2). |
| Maternal plasma | ↓with GWG (6) |
| -222-3p | Amnion mesenchymal stem cells | ↑ with ppBMI(14) | No known functions listed in miRBase |
|  -296 | Placenta | ↓with both ppBMI and GWG (7) | Modulating growth of fetus (7)Associated with high-molecular weight adiponectin and HOMA-IR (7)Listed functions in miRBase are regulation of angiogenesis, promoting tumor angiogenesis and targets sites in the transcription factor NANOG, which can contribute to carcinogenesis by p5-dysregulation (2) |
| Maternal plasma | ↓with both ppBMI and GWG (7) |
| -298 | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -302a | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -302c | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -302d-3p | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -318 | Marernal plasma | Only expressed in controls (6) | No known functions listed in miRBase |
| -324-3p | Maternal plasma | ↓ with both ppBMI and GWG(6) | No known functions listed in miRBase |
| -325 | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -330 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -337 | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase |
| -338 | Amnion | ↑ with ppBMI (4) | MiRBase lists this as a brain-specific miRNA in mammals and is predicted to have a downstream negative effect on apoptosis-associated tyrosine kinase (2). |
| -338-3p | Maternal plasma | Only in high ppBMI (6) |
| -340 | Maternal plasma | ↓with GWG (6) | No known functions listed in miRBase |
| -361-5p | Maternal blood | ↑ with ppBMI (3) | Listed functions in miRBase are involvement in gene silencing, mRNA binding involved in posttransctiptional gene silencing and negative regulation of angiogenesis, cell migration and regulation of blood vessel endothelial cell proliferation in sprouting angiogenesis (2). |
| -367-5p | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -372 | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -375 | Maternal plasma | ↓with both ppBMI and GWG (6) | Listed in miRBase are expression in the pancreas and pituitary gland, and the expression levels increase during pancreas organogenesis (2). Essential for β-cell formation in zebrafish and knock-out mice have decreased number of β-cells and increased number of α-cells and thereby contributes to hyperglycemia (2).  |
| -376a | Maternal blood | ↑ with ppBMI (3) | Targeting ATG4C and BECN1 (3)No known functions listed in miRBase |
| -377 | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase |
| -378 | Colostrum | ↓ with BMI↑ with GWG (1) | Adipogenesis and metabolism (1)Listed functions in miRBase are negative regulation of monooxygenase (CYP2E1) activity, positive regulation of angiogenesis, posttranscriptional gene silencing, miRNA mediated inhibiton of translation, RNA polymerase II complex binding (2). |
| -380-3p | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -412 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -422b | Amnion | Only with high ppBMI (4) | No known functions listed in miRBase |
| -423-3p | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase, but expression in human promyelocytic leukemia (HL-60) cells is found (2).  |
| -423-5p | Maternal blood | ↑ with ppBMI (3) | Targeting CD1C (3)No known functions listed in miRBase |
| -424 | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase, but expression in human promyelocytic leukemia (HL-60) cells is found (2).  |
| -425 | Maternal blood | ↑ with ppBMI (3) | Targeting *PTEN* (3)No known functions listed in miRBase |
| -449b | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -452 | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase |
| -454 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -483 | Maternal plasma | Only in controls (7) | No known functions listed in miRBase |
| -487 | Placenta | ↓ with high GWG (7) | Modulating growth of fetus (7)No known functions listed in miRBase |
| -487b | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase |
| -488-5p | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -492 | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -493 | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -497 | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -504 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -513a-5p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -518d | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase |
| -519e | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -520g | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -520h | Maternal plasma | ↑with both ppBMI and GWG (7) | No known functions listed in miRBase |
| -522 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -523 | Amnion | Only with high ppBMI (4) | No known functions listed in miRBase |
| -541-5p | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -543 | Maternal plasma | Only expressed in controls (6) | No known functions listed in miRBase |
| -548d-3p | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -549 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -550 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -551b | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase |
| -554 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -557 | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -567 | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -572 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -575 | Amnion | Only with high ppBMI (4) | No known functions listed in miRBase |
| -577 | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -579 | Amnion | Only with high ppBMI (4) | No known functions listed in miRBase |
| -581 | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -582-5p | Placenta | Only expressed in controls (7) | Listed functions in miRBase are gene silencing and mRNA binding involved in posttranscriptional gene silencing (2) |
| -584 | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase |
| -586 | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -590-3p | Placenta | Only with high GWG (7) | Listed functions in miRBase are involvement in cholesterol homeostasis and negative regulation of inflammatory response, lipoprotein lipase activity, chemokine secretion and cellular senescence (2) |
| -591 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -609 | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -615 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -618 | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase |
| Amnion | Only with high ppBMI (4) |
| -624 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -625 | Maternal plasma | ↑ with both ppBMI and GWG (6) | No known functions listed in miRBase |
| -626 | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -627 | Amnion | ↑ with ppBMI (4) | No known functions listed in miRBase |
| -633 | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -636 | Maternal plasma | Only in high GWG (6) | No known functions listed in miRBase |
| -639 | Maternal plasma | Only in high ppBMI (6) | No known functions listed in miRBase |
| -648 | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -652 | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase. |
| Maternal plasma | ↓with both ppBMI and GWG (6) |
| -653 | Amnion | ↓ with ppBMI (4) | No known functions listed in miRBase |
| -653-5p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -659 | Amnion | Only with high ppBMI (4) | No known functions listed in miRBase |
| -659-3p | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -672 | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -887-3p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -891a | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase |
| -891b | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -1225-3p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -1226-5p | Placenta | Only expressed in controls (7) | No known functions listed in miRBase |
| -1227-3p | Placenta | Only with high GWG (7) | No known functions listed in miRBase |
| -1269 | Placenta | ↓with both ppBMI and GWG (7) | Associated with high-molecular weight adiponectin (7)No known functions listed in miRBase |
| -1285 | Placenta | ↓ with both ppBMI and GWG (7) | Modulating growth of fetus (7)No known functions listed in miRBase |
| -1292-5p | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -1823 | Placenta | Only with high ppBMI (7) | No known functions listed in miRBase |
| -3137 | Maternal blood | ↑with ppBMI(3) | No known functions listed in miRBase |
| -4286 | Maternal blood | ↑ with ppBMI (3) | No known functions listed in miRBase |
| ↑- Upregulated; ↓- Downregulated |  |

# References

1. Xi Y, Jiang X, Li R, Chen M, Song W, Li X. The levels of human milk microRNAs and their association with maternal weight characteristics. European Journal of Clinical Nutrition. 2016;70(4):445-9.

2. miRBase [Database]. Manchester: Griffiths-Jones lab, Faculty of Biology, Medicine and Health, University of Manchester; 2018 [updated 19.09.2018.

3. Enquobahrie DA, Wander PL, Tadesse MG, Qiu C, Holzman C, Williams MA. Maternal pre-pregnancy body mass index and circulating microRNAs in pregnancy. Obesity Research and Clinical Practice. 2017;11(4):464-74.

4. Nardelli C, Iaffaldano L, Ferrigno M, Labruna G, Maruotti GM, Quaglia F, et al. Characterization and predicted role of the microRNA expression profile in amnion from obese pregnant women. International Journal of Obesity. 2014;38(3):466-9.

5. Sun T, Fu M, Bookout AL, Kliewer SA, Mangelsdorf DJ. MicroRNA let-7 regulates 3T3-L1 adipogenesis. Molecular endocrinology (Baltimore, Md). 2009;23(6):925-31.

6. Carreras-Badosa G, Bonmati A, Ortega FJ, Mercader JM, Guindo-Martinez M, Torrents D, et al. Altered circulating miRNA expression profile in pregestational and gestational obesity. Journal of Clinical Endocrinology and Metabolism. 2015;100(11):E1446-E56.

7. Carreras-Badosa G, Bonmat A, Ortega FJ, Mercader JM, Guindo-Martnez M, Torrents D, et al. Dysregulation of placental miRNA in maternal obesity is associated with pre-and postnatal growth. Journal of Clinical Endocrinology and Metabolism. 2017;102(7):2584-94.

8. Tsamou M, Martens DS, Winckelmans E, Madhloum N, Cox B, Gyselaers W, et al. Mother's Pre-pregnancy BMI and Placental Candidate miRNAs: Findings from the ENVIRONAGE Birth Cohort. Sci Rep. 2017;7(1):5548.

9. Doebele C, Bonauer A, Fischer A, Scholz A, Reiss Y, Urbich C, et al. Members of the microRNA-17-92 cluster exhibit a cell-intrinsic antiangiogenic function in endothelial cells. Blood. 2010;115(23):4944-50.

10. Wang Q, Li YC, Wang J, Kong J, Qi Y, Quigg RJ, et al. miR-17-92 cluster accelerates adipocyte differentiation by negatively regulating tumor-suppressor Rb2/p130. Proc Natl Acad Sci U S A. 2008;105(8):2889-94.

11. Zhao T, Li J, Chen AF. MicroRNA-34a induces endothelial progenitor cell senescence and impedes its angiogenesis via suppressing silent information regulator 1. American journal of physiology Endocrinology and metabolism. 2010;299(1):E110-6.

12. Ortega FJ, Moreno-Navarrete JM, Pardo G, Sabater M, Hummel M, Ferrer A, et al. MiRNA expression profile of human subcutaneous adipose and during adipocyte differentiation. PLoS One. 2010;5(2):e9022.

13. Fu T, Seok S, Choi S, Huang Z, Suino-Powell K, Xu HE, et al. MicroRNA 34a inhibits beige and brown fat formation in obesity in part by suppressing adipocyte fibroblast growth factor 21 signaling and SIRT1 function. Molecular and cellular biology. 2014;34(22):4130-42.

14. Nardelli C, Granata I, Iaffaldano L, D'Argenio V, Del Monaco V, Maruotti GM, et al. MiR-138/miR-222 Overexpression Characterizes the miRNome of Amniotic Mesenchymal Stem Cells in Obesity. Stem Cells and Development. 2017;26(1):4-14.

15. Prince CS, Maloyan A, Myatt L. Maternal obesity alters brain derived neurotrophic factor (BDNF) signaling in the placenta in a sexually dimorphic manner. Placenta. 2017;49:55-63.

16. Muralimanoharan S, Guo C, Myatt L, Maloyan A. Sexual dimorphism in MIR-210 expression and mitochondrial dysfunction in the placenta with maternal obesity. International Journal of Obesity. 2015;39(8):1274-81.