DYSREGULATION OF PLACENTAL miRNA IN MATERNAL OBESITY IS ASSOCIATED WITH PRE-AND POST-NATAL GROWTH

Judit Bassols1, Gemma Carreras-Badosa2, Alexandra Bonmati3, Francisco-Jose Ortega3, Josep-Maria Mercader2, Anna Prats-Puig3, Francis de Zegher1, Lourdes Ibáñez4, Jose-Manuel Fernandez-Reali3, Abel López Bermejo1

1Girona Biomedical Research Institute (IDIBGI), Dr. Trueta University Hospital, Girona, Spain; 2Barcelona Supercomputing Center, Barcelona, Spain; 3EUSES University School, University of Girona, Spain; 4University of Leuven, Belgium; 5Hospital Sant Joan de Déu, Barcelona, Spain.

Authors have nothing to declare.

Background:
Human placenta exhibits a specific miRNA expression pattern. Some of these miRNAs are dysregulated in pregnancy disorders like preeclampsia and intrauterine growth restriction (IUGR), and are potential biomarkers for these pathologies. No studies have been performed in maternal obesity.

Objective and hypotheses:
(1) Define the placental miRNA profile in pregnant women with: a) pre-pregnancy (preOB) or gestational obesity (gestOB), b) gestational diabetes (GDM) and c) small for gestational age children (SGA).
(2) Explore the associations of circulating miRNAs dysregulated in maternal obesity with pre- and post-natal growth.

Methods:
TaqMan Low-Density Arrays (TLDAs) were used to profile the placental miRNAs in 30 pregnant women [6 preOB, 6 gestOB, 6 GDM, 6 SGA and 6 controls]. The miRNAs differentially expressed in maternal obesity were validated in 80 pregnant women (25 preOB, 25 gestOB and 30 control). Placentas and newborns were weighed at delivery and at 1 year of life.

Results:
9 miRNAs were specific of placentas from women with preOB; 8 miRNAs of placentas from women with gestOB, 8 miRNAs of placentas from GDM women; 13 miRNAs of placentas from women with SGA children, and 386 miRNAs were common in all groups (Fig 1). Among the common miRNAs, 8 miRNAs were decreased in preOB or gestOB (miR-100, miR-1269, miR-1285, miR-181, miR-185, miR-214, miR-296 and miR-487) (all p <0.05) (Fig 2). miR-100, miR-1285, miR-296 and miR-487 associated with maternal metabolic parameters (all p<0.05) and were predictors of lower birth weight (all p<0.05 and R²>30%) and increased postnatal weight gain (all p<0.05 and R²>15%) (Table 1). In silico analysis showed that these miRNAs were related with cell proliferation and insulin signalling pathway.

Conclusion:
We identified a specific placental miRNA profile in several pregnancy disorders including maternal obesity, GDM and SGA. The dysregulation of placental miRNAs may mediate the growth promoting effects of maternal obesity on the offspring.