Pre-eclampsia is a disorder of pregnancy that affects approximately 5% of pregnancies in the United States and is a major contributor to maternal mortality, worldwide. While the underlying cause of pre-eclampsia is unknown, the origins of the disease are believed to lie within the placenta. The placenta is a temporary organ that makes up the maternal-fetal interface and serves as an important target organ during pregnancy. Exposures to toxic metals and deficiencies in essential metals are known to disrupt placentation and may contribute to pre-eclampsia. Previous research has linked toxic metals, such as arsenic (As), chromium (Cr), cadmium (Cd), mercury (Hg), and lead (Pb) to increased risk of pre-eclampsia and essential metals, such as selenium (Se) and zinc (Zn) to reduced risk of pre-eclampsia.

The placental epigenome may serve as an important link between prenatal metals exposure and pre-eclampsia. We investigated this question using a case-control cohort of women participating in the Maternal Oral Therapy to Reduce Obstetric Risk (MOTOR) cohort. We measured (1) placental levels of toxic and essential metals and (2) the expression of 4 microRNAs (miRNAs) known to control placentation. First, we examined the relationship between placental metals exposure and the expression of these miRNAs. Second, we examined the relationship between miRNA expression and the odds of pre-eclampsia. Although we did not observe associations between miRNA expression and pre-eclampsia, we did observe an association between several toxic metals and placental miRNA expression.