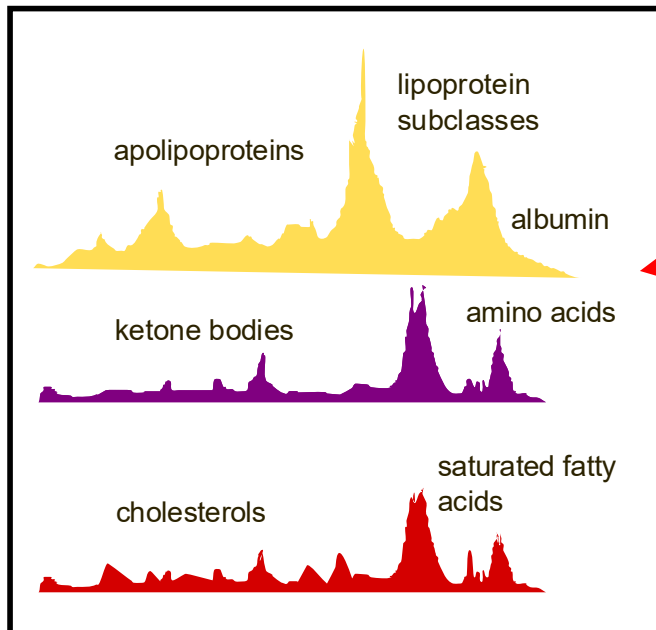


# Associations Between Maternal Prepregnancy Body Mass Index and Maternal and Cord Blood Metabolome



A COLLABORATION BETWEEN  
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## What is known:

- High maternal prepregnancy body mass index (**pBMI**) is associated with **congenital malformations and pregnancy complications**
- **High pBMI** is associated with **broad perturbations in the maternal metabolome** during pregnancy

## What we studied:

- is maternal pBMI associated with alterations in the **newborn cord blood metabolome**?
- does maternal pBMI modify **the associations between maternal and cord blood metabolomes**?

- Methods:**
- prepregnancy BMI (pBMI) measured or derived from patient records
  - blood samples collected three times in pregnancy (two cohorts, n=556)



Gestational Diabetes Prevention Study

**predo**

Prediction and Prevention of Preeclampsia  
and Intrauterine Growth Restriction Study



Intrauterine Sampling in  
Early Pregnancy Study

**GW (median) 12.6, 19.3 and 27.0**

**GW (median) 13.0, 23.1 and 35.1**

- cord blood samples collected in delivery (RADIEL, PREDO, ITU, n=1702)

**95 metabolic measures quantified with nuclear magnetic resonance (NMR)**

## Results:

### 1) high maternal pBMI → cord blood...

high-density lipoprotein (HDL) particle size ↓

linoleic acid to total fatty acids ↓

polyunsaturated to monounsaturated fatty acids ↓

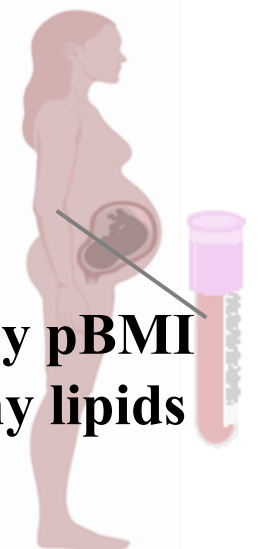
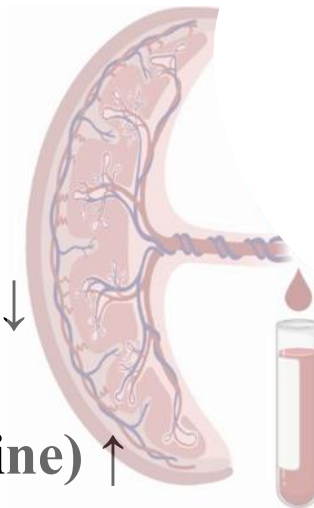
histidine ↓

branched-chain amino acids (leucine and isoleucine) ↑

phenylalanine and ketone bodies ↑

### 2) significant association between maternal and cord blood measures in 61/95 metabolic measures; spanning across all different classes

### 3) associations between maternal and cord blood measures were moderated by pBMI in 26/95; stronger association in mothers with obesity vs nonobesity in many lipids and lipoproteins



## Conclusions:

- 1) High maternal pBMI is associated with adversities in the cord blood metabolome**
- 2) Associations between maternal and cord blood metabolic measures are seen in numerous measures, even in the ones not crossing placenta**
- 3) In maternal obesity vs nonobesity, the association between maternal and cord blood measure is stronger in several metabolic measures**