INTRODUCTION

- Chronic stress is a risk factor for preterm birth
- There is a pressing need to predict preterm birth risk and identify potential treatments
- Stress-responsive neurosteroids play a critical role in pregnancy and stress pathophysiology
- Low allopregnanolone is associated with perinatal depression and poor birth outcomes in animal models

We hypothesized allopregnanolone is lower in women who deliver preterm

METHODS

- Nested case-control study using fasting biobank serum samples from The Healthy Start Study Pre-Birth Cohort
- Healthy, singleton pregnancy, 18-34 yo
- Preterm cases matched (1:1) with term controls (N=27 per group)
- Developed and validated a new HPLC-MS/MS assay for quantification

RESULTS

- Allopregnanolone:
  - Higher levels in late pregnancy are associated with decreased odds of preterm birth
  - No significant difference in group comparisons

- Other Steroid Hormones:
  - Higher cortisol, cortisone and pregnanolone levels, early in pregnancy, associate with increased odds of preterm birth. Progesterone is the inverse.
  - Cortisol significantly different between preterm and term groups

Gestational Age at Blood Sample 1  Gestational Age at Blood Sample 2
Mean (Range)  16.8 weeks (12.4 – 25)  26.5 weeks (22.3 – 32)

Fig. 1 Odds ratios for preterm birth by serum concentration at a given gestational age. Odds ratios at 13 – 32 weeks’ gestation with 95% confidence intervals. Horizontal black bar is odds ratio of 1 indicating no association. Values above 1 indicate increased association with odds of preterm birth and values below 1 indicate reduced association with odds of preterm birth.

Fig. 2 Estimated mean serum concentration for a given gestational age with confidence intervals by pre- and full-term delivery.*We observed significant differences in the estimated mean cortisol levels between the cohorts at gestational ages 13+0 – 18+0.

Maternal serum steroids in early pregnancy associate with preterm birth.