**Maternal obesity and serum proteins, identified through mass spectrometry, are potential biomarkers of large for gestational age neonates**

**Background**: Neonates born large for gestational age (LGA) have higher incidence of childhood obesity and diabetes. Therefore, timely identification of women most at risk of having LGA neonates could have value in addressing rising rates of diabetes.

**Aims**: To identify anthropometric and serum protein differences in women who deliver LGA neonates.

**Methods**: Pregnant women from Royal North Shore Hospital were screened for known risk-factors of gestational diabetes (GDM). Anthropometric measures and serum samples were collected in trimester 1 and perinatal outcomes were recorded. Proteomic analysis was done using data-dependant acquisition, liquid chromatography mass spectrometry. Mothers were grouped based on occurrence of LGA with statistical analysis completed in R.

**Results**: This study included 102 women with an LGA incidence of 20(19.6%). There was no significant difference in GDM rates between groups (6(30%) vs 23(28%), p=1.00). BMI (26.0±6.32kg/m2 vs 32.2±7.45kg/m2, p=0.002), abdominal circumference (93.6±12.1cm vs 99.7±9.18cm, p=0.038) and neck circumference (33.6±3.03cm vs 35.1±2.27cm, p=0.042) were significantly higher in mothers with LGA neonates. Mass spectrometry identified 2 significantly upregulated proteins and 4 significantly downregulated proteins in mothers with LGA neonates based on a fold change (FC) threshold of 1.5 (table 1).

**Table 1:** Significantly dysregulated trimester 1 serum proteins in mothers that delivered LGA neonates identified by mass spectrometry.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Upregulated** | | | **Downregulated** | | |
| **Protein ID** | **Log2(FC)** | **P-Value** | **Protein ID** | **Log2(FC)** | **P-Value** |
| IGKV1.17 | 0.592 | 0.0184 | PROC | -0.802 | 0.000388 |
| IGHV4.4 | 0.776 | 0.0264 | PAPPA | -0.925 | 0.00289 |
|  |  |  | HBD | -0.645 | 0.0228 |
|  |  |  | IGKV2.28 | -0.993 | 0.0370 |

**Conclusion**: A combination of anthropometric measures of obesity and protein biomarkers may help to identify women at risk of delivering LGA neonates. Future work should aim to confirm these findings using established laboratory-based measures to identify predictive thresholds, thus allowing for more timely and targeted interventions.