Metabolomic barometer of gestational and postpartum weight in overweight pregnant women

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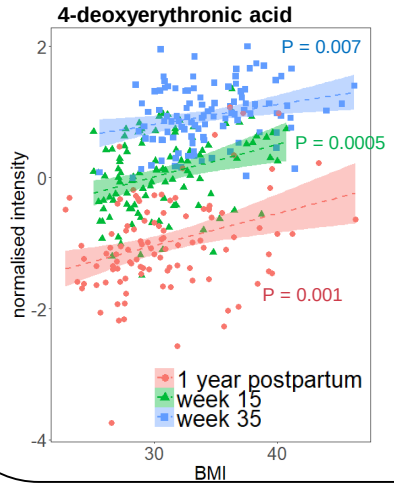
Aim

To establish a metabolic signature of gestational weight gain and weight loss postpartum in overweight/ obese pregnant women enrolled in lifestyle intervention studies.

Background

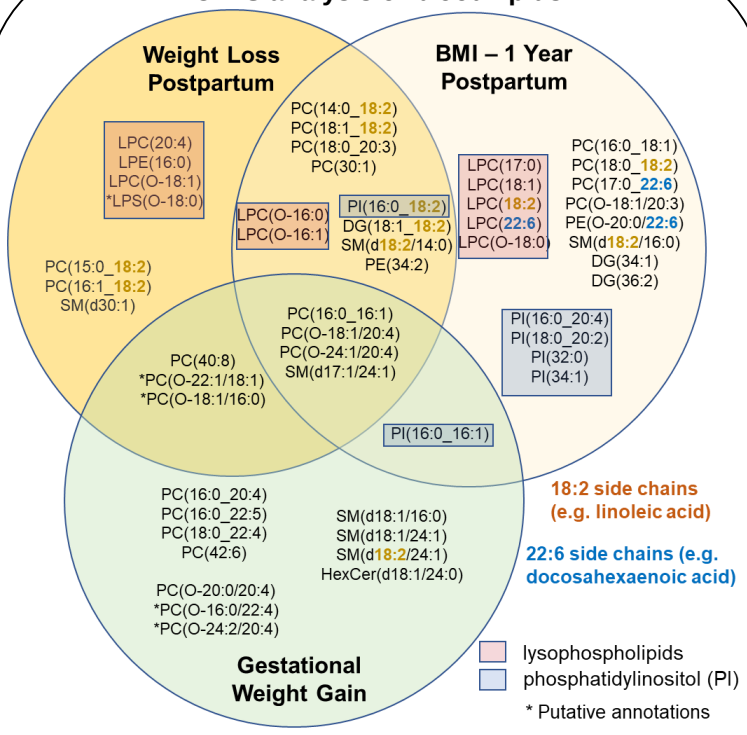
- Pregnancy can be a motivating factor for many women to adopt lifestyle changes, providing an excellent window for intervention.
- Metabolomics could help identify common/ distinct pathways for excessive gestational weight gain (GWG) and postpartum weight loss (WL) in pregnant women undergoing lifestyle intervention.

Analysis of NMR urine data



- Significant timepoint effects were observed between Week 15, Week 35, and 1 Year postpartum
- Correlations against outcome of interest were performed for each timepoint
- 4-dexoyerythronic acid was found positively correlated to BMI (P <0.05 after FDR correction)

LC-MS analysis of blood lipids



- Correlation analyses were performed on positive ion mode data (>1000 features) against GWG, WL and BMI at 1 year postpartum. Significantly correlated features (FDR < 0.05) are annotated

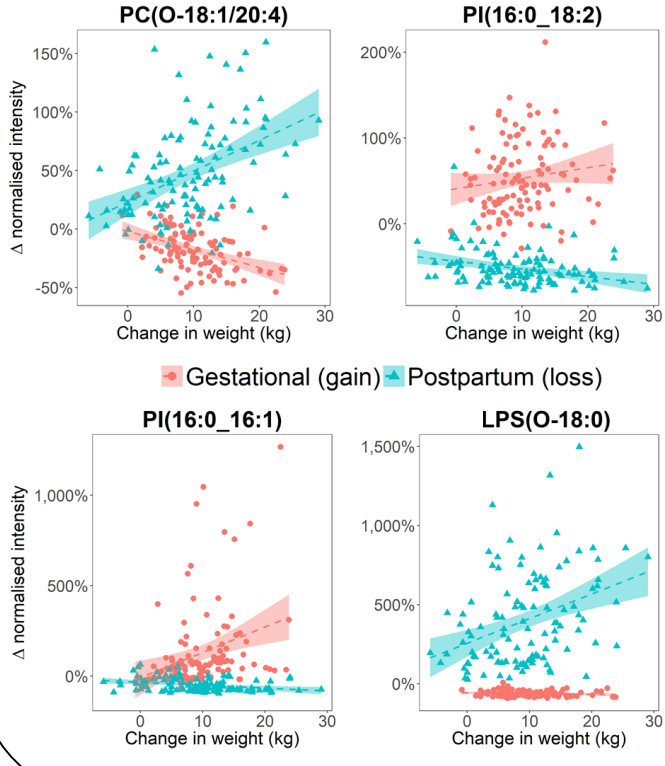
Study Design and Method

- Overweight or obese ethnically diverse pregnant women from Chicago (USA) were enrolled in a randomised diet and lifestyle intervention trial: Maternal Offspring Metabolics Family Intervention Trial (MOMFIT); NCT01631747.
- Urine and blood plasma samples at 15 weeks, 35 weeks of gestation, and at 1 year postpartum were analysed.
- Blood lipids were analysed by LC-MS and urine were analysed by NMR

	Control (N=50)	Intervention (N=64)	P value
Age (y, 15 weeks)	34 ± 4	34 ± 4	0.16
Weight (kg, 35 weeks)	95 ± 12	91 ± 13	0.07
BMI (kg /m2, 35 weeks)	35 ± 4	34 ± 4	0.06
Triglycerides (mg/dL, 35 weeks)	252 ± 80	231 ± 80	0.08
Gestational Weight Gain (kg)	10.6 ± 5.1	9.6 ± 4.6	0.14
Weight Loss postpartum (kg)	9.1 ± 7.2	9.4 ± 6.7	0.43

NB. Only a subsample were included for metabolomics study. Significant differences in GWG between the control and intervention groups were observed in the overall MOMFIT study. Means and standard errors are shown.

Lipid altered according to Weight Loss and GWG



Conclusions

Alterations in blood lipids are good indicators for GWG and WL and could potentially be exploited to evaluate and shed light on the beneficial effect of lifestyle interventions.

References

Van Horn L *et al*. Dietary Approaches to Stop Hypertension Diet and Activity to Limit Gestational Weight: Maternal Offspring Metabolics Family Intervention Trial, a Technology Enhanced Randomized Trial Am J Prev Med. 2018 Nov;55(5):603-614.

Acknowledgements

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