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Opposing abundance of pregnancy-specific glycoproteins in late-onset preeclampsia versus SGA/FGR: candidate biomarkers for early risk stratification
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Introduction

Preeclampsia (PE) and small-for-gestational-age/fetal growth restriction (SGA/FGR) are both placental dysfunction-related disorders that often co-occur. Current standard first-trimester combined screening detects fewer than half of these late onset cases, highlighting the need for novel early biomarkers to improve risk prediction. This study characterised the maternal plasma proteome before clinical onset of late-onset PE (LOPE) and SGA/FGR to identify differential proteins as candidate biomarkers for early risk stratification.

Methods

A nested case-control study was conducted within the Placental Health Study (PHS) cohort at Gold Coast University Hospital, Australia. This exploratory proteomics study profiled maternal plasma at 11–13 and 26–28 weeks gestation using liquid chromatography-quadrupole time-of-flight mass spectrometry (LC-QTOF-MS).

Study group:

11–13 weeks: LOPE (n=8) and SGA/FGR (n=8), each compared with matched controls (n=8). 26–28 weeks: LOPE (n=10) and SGA/FGR (n=14), compared with matched controls (n=10 and n=14, respectively).

Results

Pregnancy-specific glycoproteins (PSGs) are differentially expressed in LOPE and SGA/FGR groups compared to matched control group:

11–13 weeks

LOPE: PSG9 ↑ (FC=4.83, p<0.001); PSG1 trending ↑

SGA/FGR: PSG9 ↓ (FC=0.40, p=0.002)

26–28 weeks

LOPE: PSG9 remained modestly ↑ (FC=1.56); PSG1/4/5 trending ↑

SGA/FGR: PSG1/4/5/8/9/11 all trending ↓

PSG9 correlates independently with clinical parameters:

↓ with uterine artery PI (UtA-PI) at 11–13 weeks & 26–28 weeks

↑ with mean arterial pressure (MAP) at 26–28 weeks

Conclusion

PSG9 showed opposing abundance patterns from 11–13 weeks (elevated in LOPE and reduced in SGA/FGR) and was associated with UtA-PI and MAP. This protein candidate may help distinguish these conditions and refine first-trimester risk stratification, although validation in larger cohorts is required.

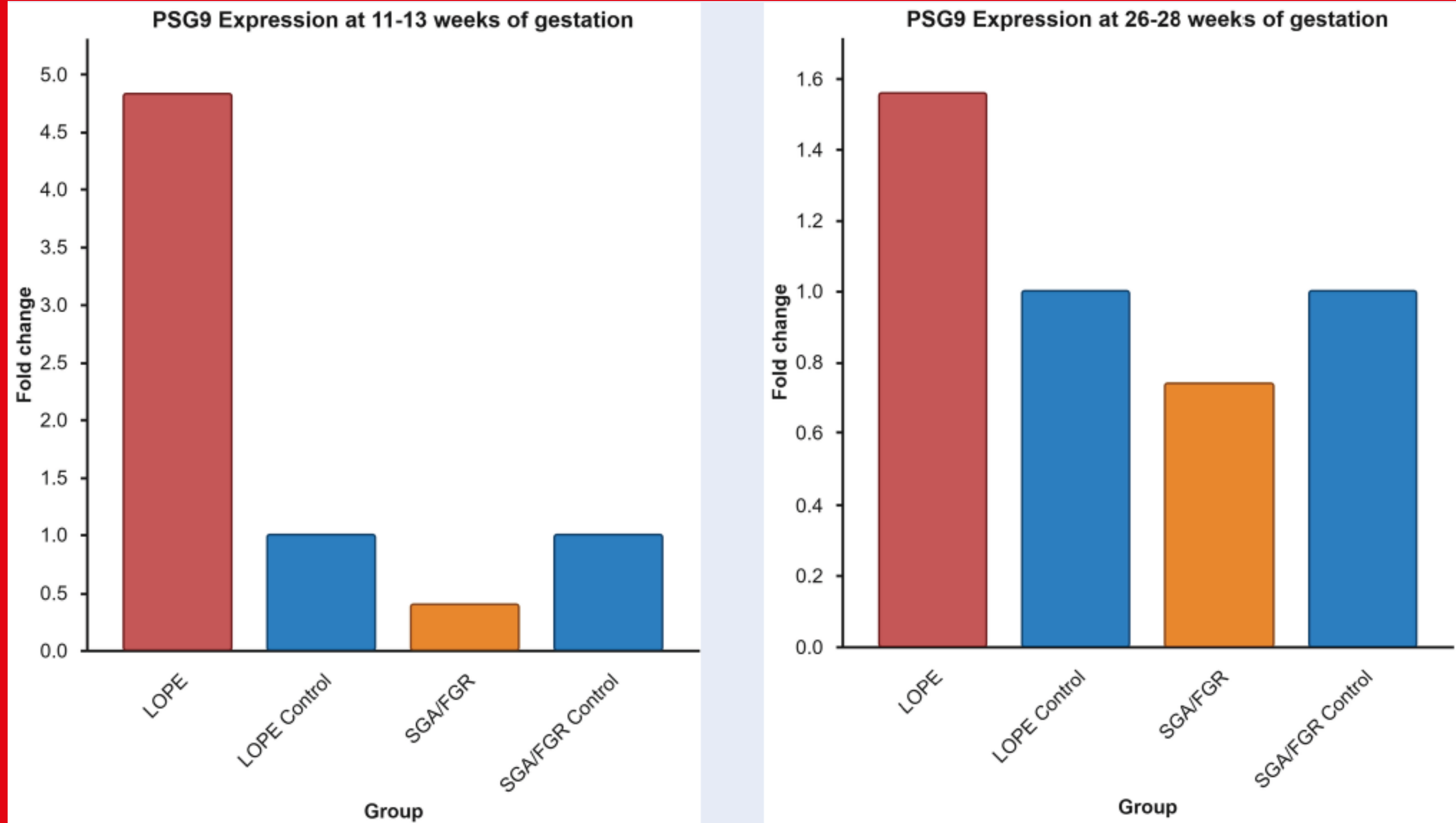


Figure 1. Relative PSG9 abundance in LOPE and SGA/FGR at 11–13 and 26–28 weeks of gestation. Fold changes are relative to the matched control group (FC = 1.0).

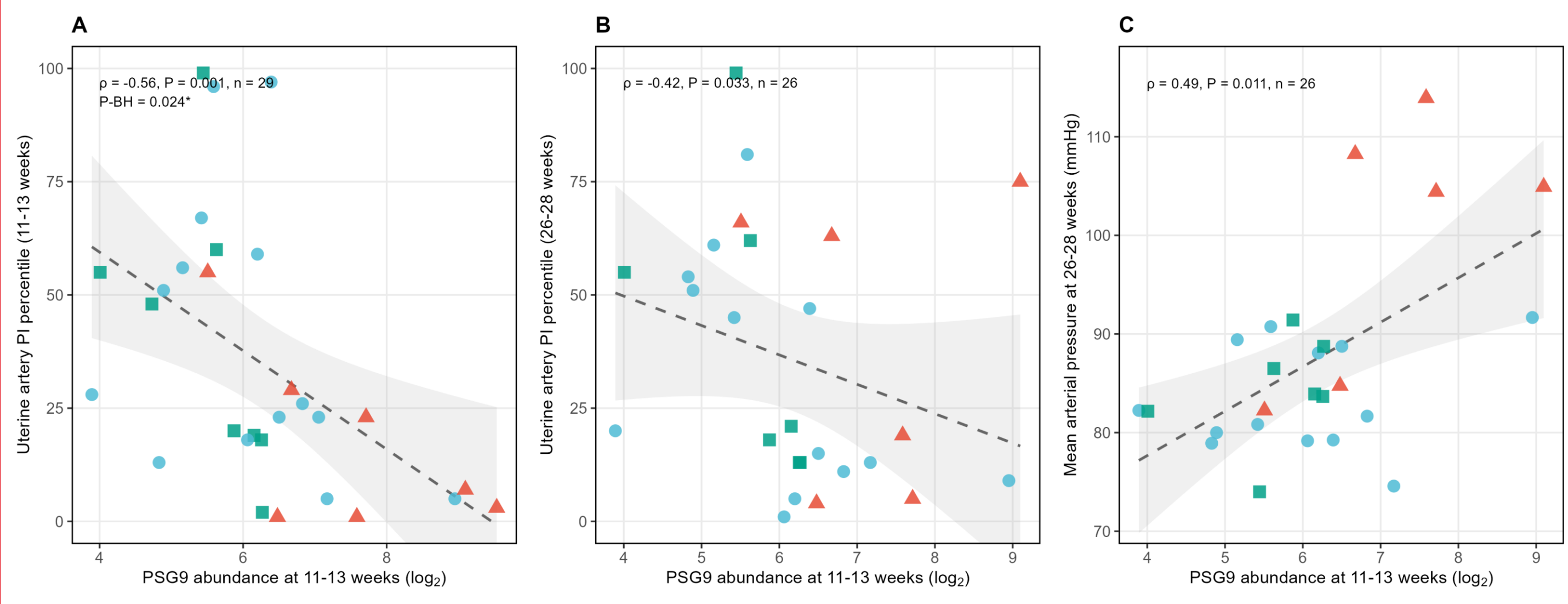


Figure 2. First-trimester PSG9 abundance correlated negatively with UtA-PI and positively with later MAP. Spearman's ρ and p-values are shown; shading indicates 95% CIs. Circles: controls; squares: SGA/FGR; triangles: LOPE.

