Simultaneous profiling of oral and placenta microbiome in pregnant women with Preeclampsia: a cross-sectional study

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Abstract

Objective: Preeclampsia (PE) is a leading cause of morbidity and mortality in pregnancy. This observational study aims to determine associations between oral and placental microbiome in women with and without preeclampsia and periodontal disease (PD) and evaluate systemic immune responses in patients with and without PE and PD. Population: Fifty-four pregnant patients with and without PE and PD were recruited. The microbiome profiles of both oral subgingival region and placenta were characterized by V4 region of 16S rRNA gene sequencing. Systemic inflammation markers tumor necrosis factor-alpha (TNF-α), C-reactive protein (CRP), lipopolysaccharide binding protein (LBP), interleukins 6 & 8 (IL-6, IL-8) in blood were measured by ELISA. Results: PD significantly increased the risk of PE after adjustments for age, preterm delivery and smoking status (OR=2.26, 95% CI=1.14-4.48, p=0.024). A group of oral associated bacteria Veilonella, Fusobacterium, Haemophilus, Granulicatella, Streptococcus, Gemella and Neisseria in placenta had significantly higher prevalence in women with PE compared to women without PE (53.8% vs 19.0%, p=0.018), the highest prevalence in patients with both PE and PD (58.8%). Relative abundances of Haemophilus, Veillonella and Fusobacterium in oral samples were significantly higher in patient with PE than those without PE. Proinflammation cytokine analysis showed that PE patients with PD had higher blood IL-8 levels than PE patients without PD (p=0.028). Conclusion: Oral-like microbiome was identified in placenta more frequently in patients with PE than those without PE. Placental microbiome is associated with systemic inflammation. High abundances of Haemophilus in oral cavity is associated with increased risk of PE.

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Figure 1

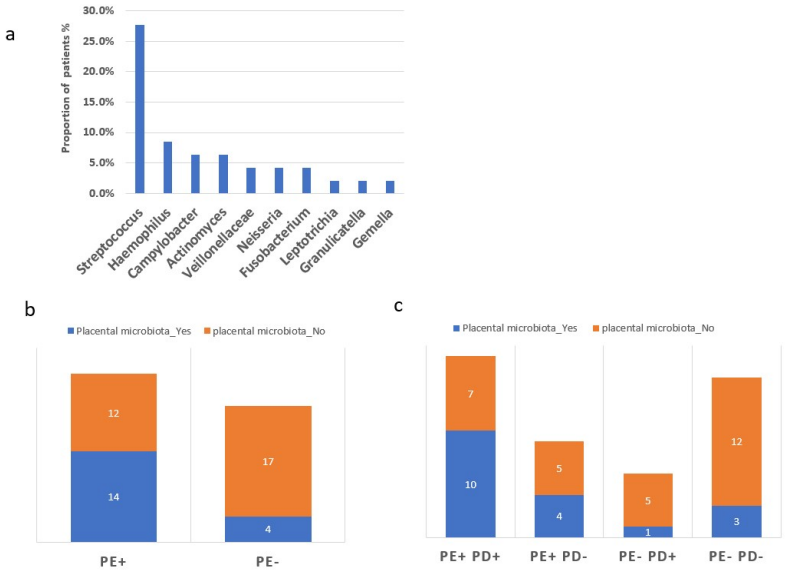

Figure 2

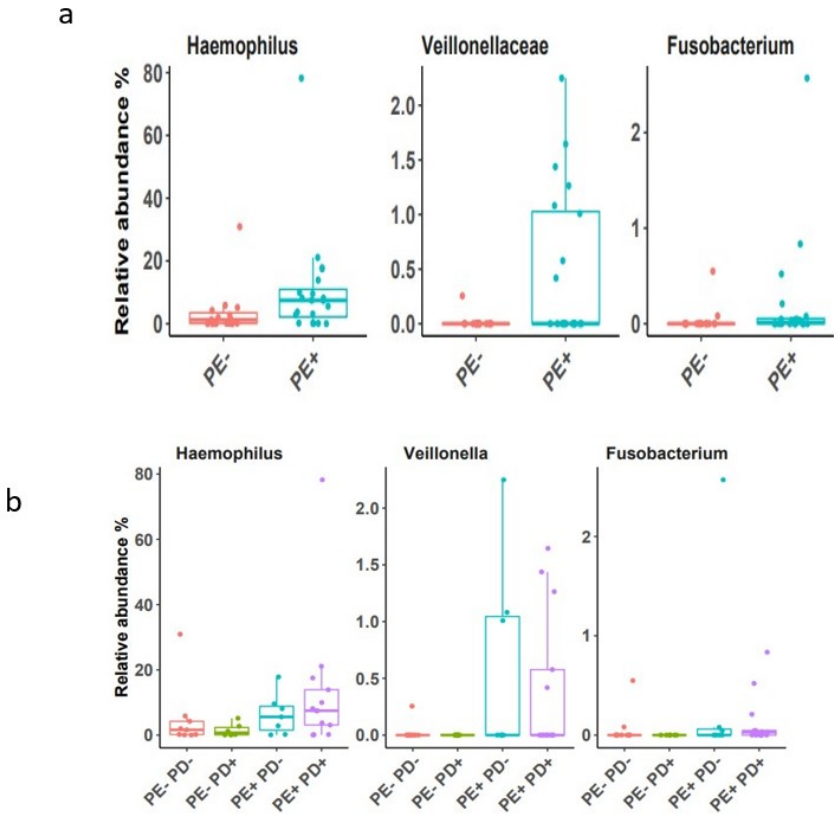

Figure 3

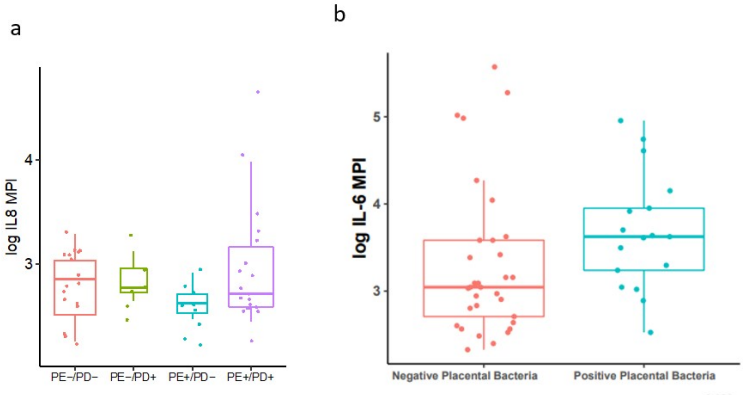

Figure S1

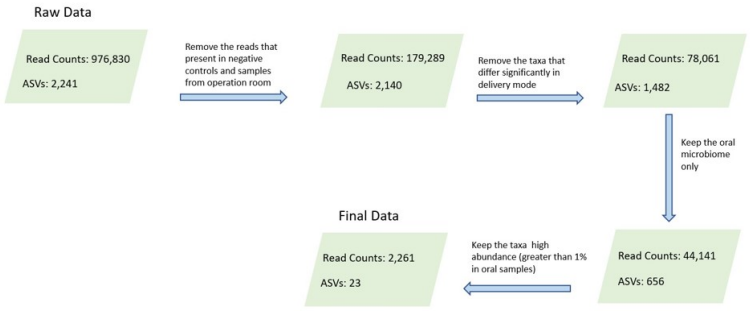

Figure S2

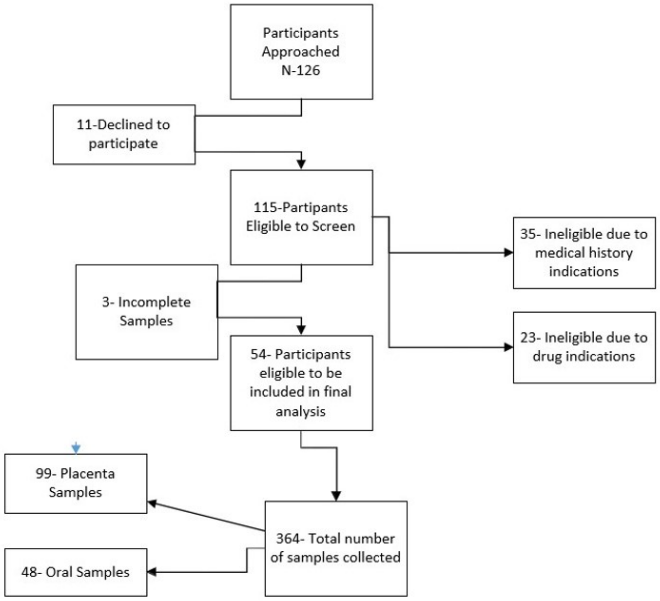

Figure S3

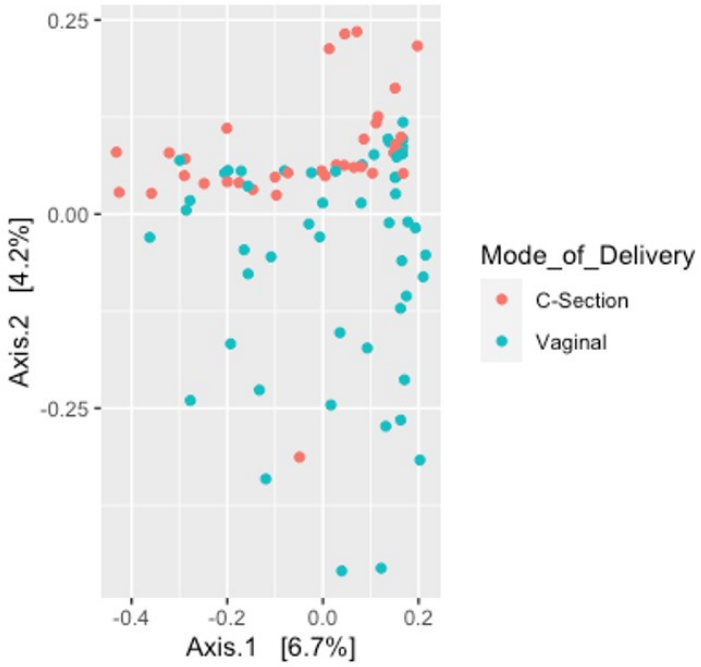

Figure S4