

# Matrix Metalloproteinases (MMPs) are Potential Markers for Preterm Birth (PTB)

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Results

#### Background

- Recent literature demonstrated increased vaginal cytokine markers amongst high-risk women compared to a control group of low-risk women
- Matrix metalloproteinases (MMPs) are active in cellular processes including proliferation, pregnancy, and immune host defenses
- MMPs can serve as potential markers for labor onset
- MMPs have shown to be increased in cases of preterm labor
- Currently, no predictive markers for PTL have been identified in the cervico-vaginal fluid in the 1st trimester

#### Objectives

To compare the vaginal inflammatory markers MMPs and TIMPs in women who are high-risk for PTB compared to healthy, uncomplicated pregnancies

### Study Design

- Prospective cohort study
- Time period: June 2016 through August 2017
- Inclusion criteria: Pregnant women with a history of preterm birth that were eligible for IM 170H-P and healthy pregnant women without a previous history of PTB as controls
- Exclusion criteria: Patients with vaginitis, pre-existing diabetes mellitus, pre-existing hypertension, or other immune altering conditions
- Vaginal rinse samples were collected at the initial visit between 11-16 WGA
- Samples were spun at 3000rpm x 10min, aliquoted, and stored at -80oC
- Aliquots were analyzed using semi-quantitative membrane assays for MMPs and TIMPs
- Post-hoc power analysis was performed
- Chi square and Fisher's exact test for categorical variables; two independent samples t-test for continuous variables

Demographics	High Risk (N=16)	Control (N=32)	P value	
Matemal Age (y)	31.9±4,3	29.8±5,3	0.08	M
Age > 35 years old	5 (31,3)	8 (25,0)	0.74	-
Race/ethnicity				MN
Caucasian	8 (50.0)	20 (62.5)	0.54	
African American	3 (18.8)	4 (12,5)	0.57	мм
Asian	0 (0.0)	3 (9.4)	0.54	MM
Hispanic	5 (32,3)	5 (15,6)	0.27	
BMI (Pre-pregnancy BMI, kg/m <sup>2</sup> )	33,1±8,3	27,6±8,2	0.16	AIT
Obesity (BMI ≥ 30)	9 (56,3)	12 (37.5)	0.24	
Multiparity	18 (100,0)	22 (68.8)	0.02	- Dite
Smoker	1 (6.3)	4 (12.5)	0.65	TIM
Pregnancy outcomes				MIN
GA at delivery (w))	36.5±4.7	39.4 ± 1,4	0.01	TIN
Cesarean delivery	5 (37.5)	12 (37,5)	1.00	1 martin
Delivery < 37 weeks	\$ (31.3)	2 (6.3)	0.03	MM
Delivery < 34 weeks	3 (18.8)	0 (0.0)	0.03	
Birth weight (g)	2885,3±898.5	3480,7±473,3	0.02	MN
Apgar score at 5 minutes < 7	0 (0.0)	1 (3.1)	1.00	MMP
NICU admission	6 (37.5)	5 (25,6)	0.24	Data pres

• There were 48 women included: 16 with a prior spontaneous preterm birth and 32 healthy controls

- The baseline demographics for both groups were similar in age, race, and BMI (Table 1)
- Patients in the high-risk group were significantly more likely to deliver preterm at less than <37 weeks (5/16 [31.3%] high-risk vs 2/32 [6.3%] controls; p=0.03) and <34 weeks (3/16[18.8%] high-risk vs 0/32 [0%] controls; p=0.03)
- The metalloproteinase comparison results can be seen in Figure 1:
  - The vaginal MMP-9 value was significantly greater in the high-risk group than in the control group (integrative density 74.94  $\pm$  27.04% vs 49.38  $\pm$  31.08%; p=0.009)
  - The ratio of MMP-9:TIMP-1 was also 1.8 times higher in the high-risk group than in the control group (integrated density 2.17  $\pm$  2.78% vs 1.21  $\pm$  1.09%; p=0.099)

1. Initial visit MMP comparison between women that are isk and healthy control subjects.

	Control High Risk							
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#### Conclusion

- There is an increased MMP presence in vaginal washings of women at high-risk for preterm birth compared to healthy controls
- Vaginal MMP-9 may have potential as a marker for predicting preterm birth
- We believe our results, although on a limited group of patients, warrant further research on the role of MMPs in pregnancy and PTL

#### References

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