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Investigating Pro-inflammatory Cytokines in Opioid-exposed Pregnancies

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Opioid use disorder during pregnancy has surged, leading to approximately 300,000 opioid-exposed pregnancies annually. These neonates are at heightened risk for Neonatal Opioid Withdrawal Syndrome (NOWS), which presents symptoms like poor feeding, poor weight gain, and respiratory complications. While medications such as buprenorphine and methadone improve maternal outcomes and reduce mortality, individual responses can vary, making NOWS unpredictable. The placenta, crucial for nutrient transfer and fetal development, may provide insights into NOWS through its role in inflammation. Given that opioids are pro-inflammatory, we sought to investigate whether pro-inflammatory cytokines are increased in opioid-exposed pregnancies and in cases of NOWS. This was a secondary analysis of a prospective multi-site case-control study conducted between 2021-2024 of pregnant people with and without opioid use disorder (OUD). We analyzed data from 12 participants, including 8 individuals receiving treatment (4 on methadone and 4 on buprenorphine) and 4 control subjects with no opioid exposure. Villous fragments from the placentas were collected within one hour of delivery and analyzed for cytokines IL-1 β , IL-6, IL-8, and IL-18 using ELISA. Between-group comparisons were performed using Fisher's exact tests for categorical variables and t-tests for continuous variables, with a significance threshold set at $p < 0.05$. The average gestational age at delivery was 38 ± 2 weeks for both groups. No significant differences in cytokine levels were found between the OUD patients and the controls. Future studies will analyze a broader panel of cytokines including assessing whether anti-inflammatory cytokines might be downregulated.