

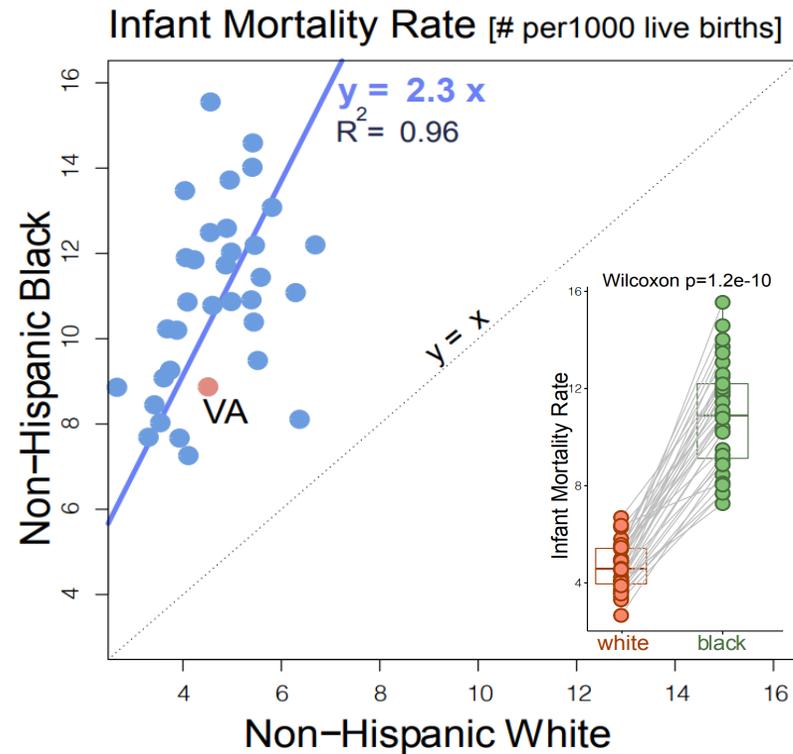
Systems Analysis of Maternal-fetal Omics Data Reveals Racial Differences in Pregnancy Immune Adaptation

Remziye Erdogan

Dolatshahi Lab

Department of Biomedical Engineering, UVA

There is a stark disparity in infant mortality between Non-Hispanic black (NHB) and non-Hispanic white (NHW) infants.

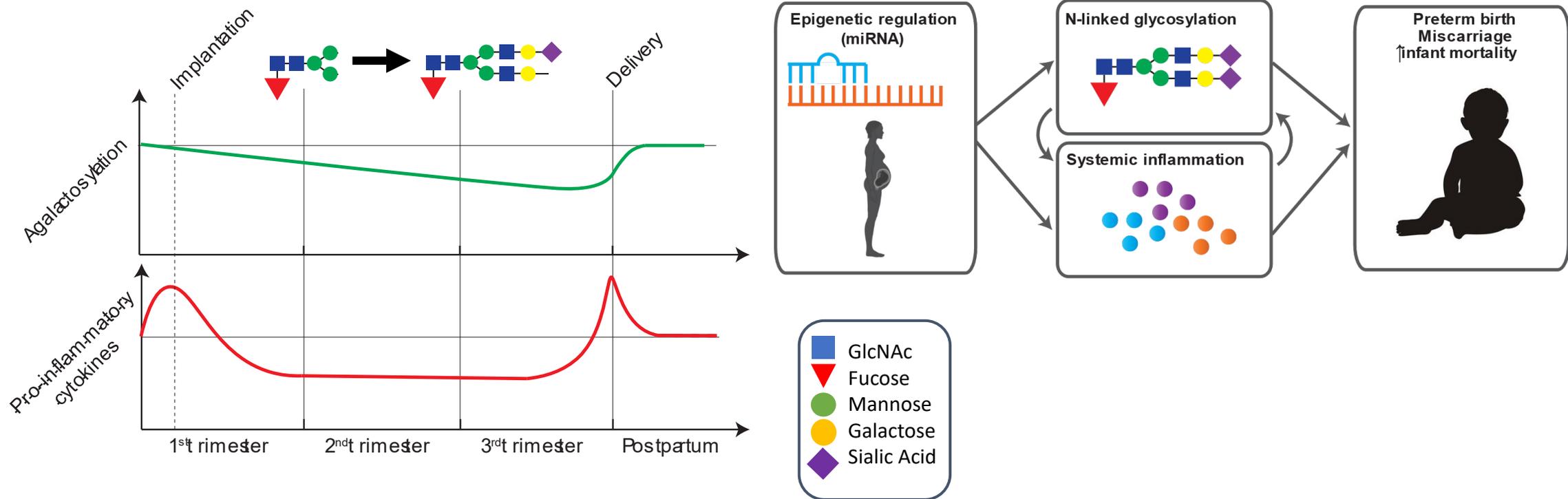


- Leading causes of infant mortality¹ :
 - Preterm birth
 - Maternal health complications
 - Early life infections

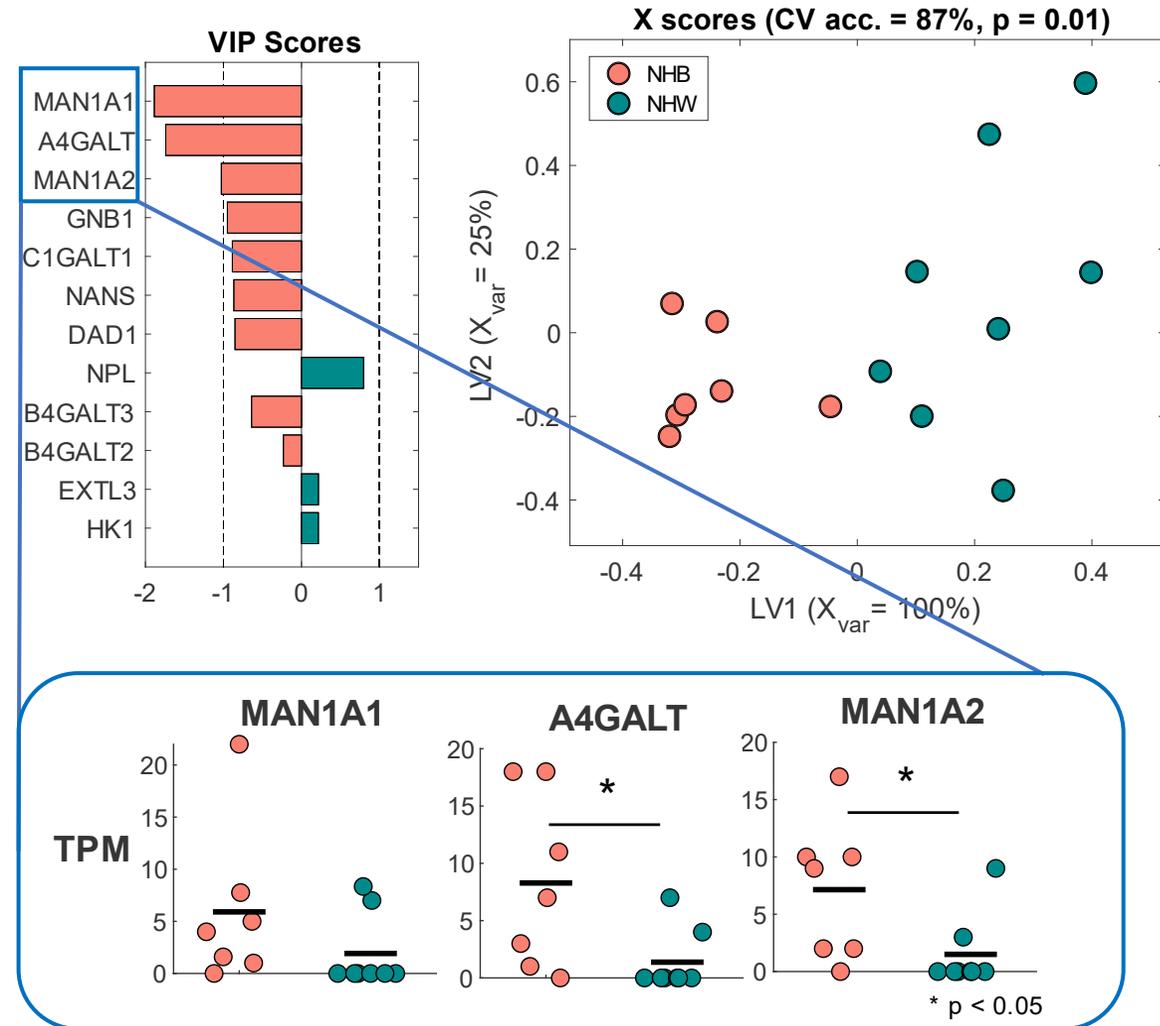
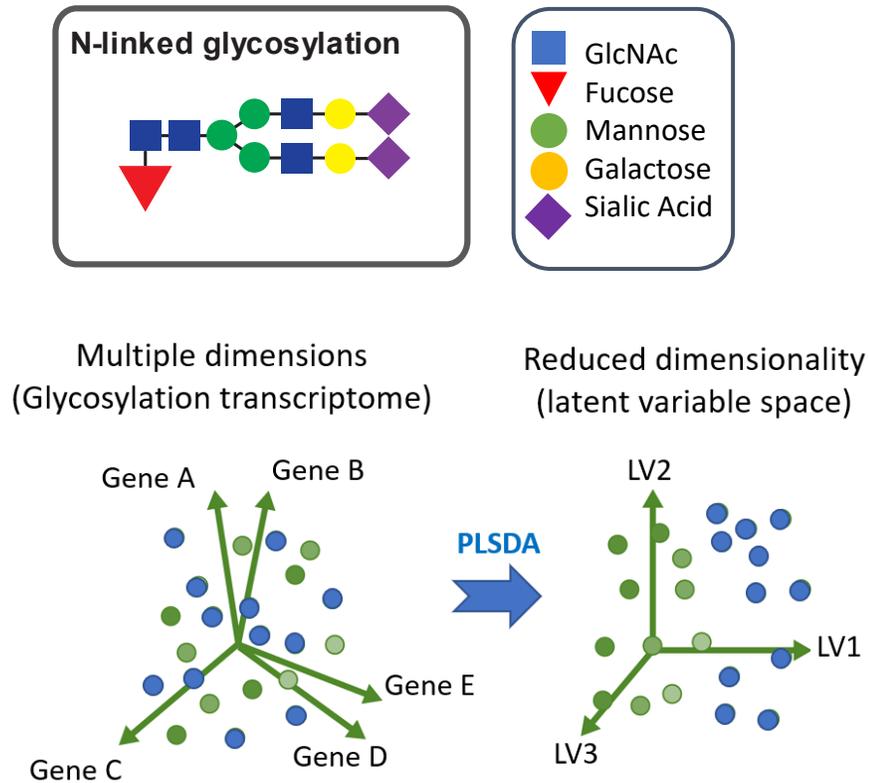
Pregnancy requires precise immune recalibration.

Question 1: Does altered immune calibration contribute to the racial disparity in infant mortality?

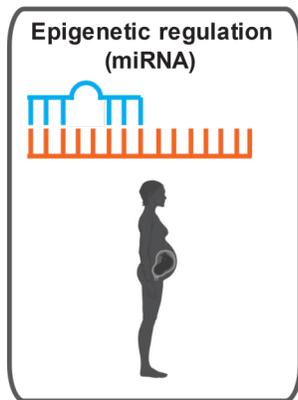
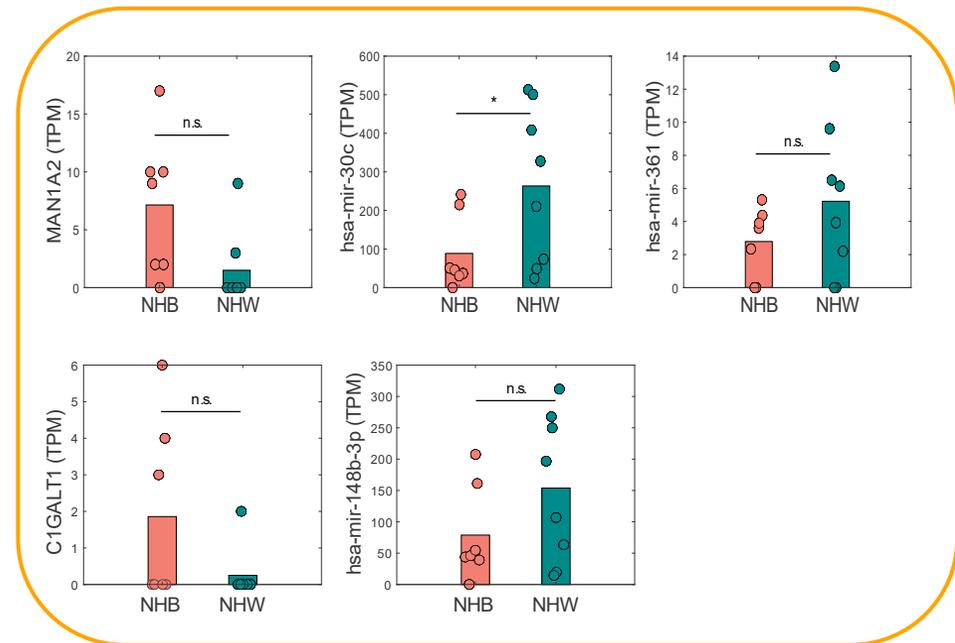
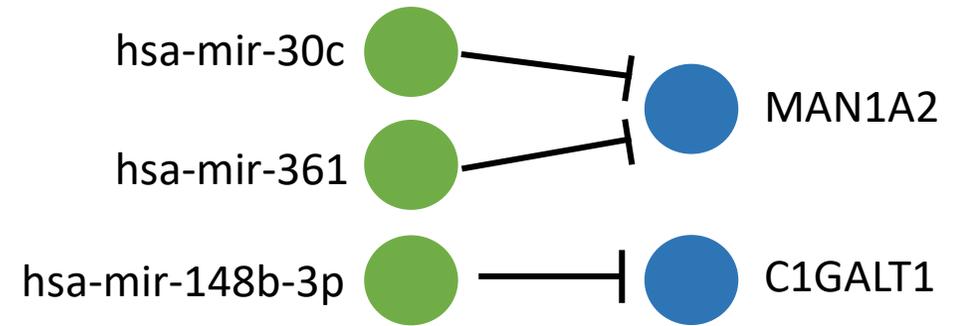
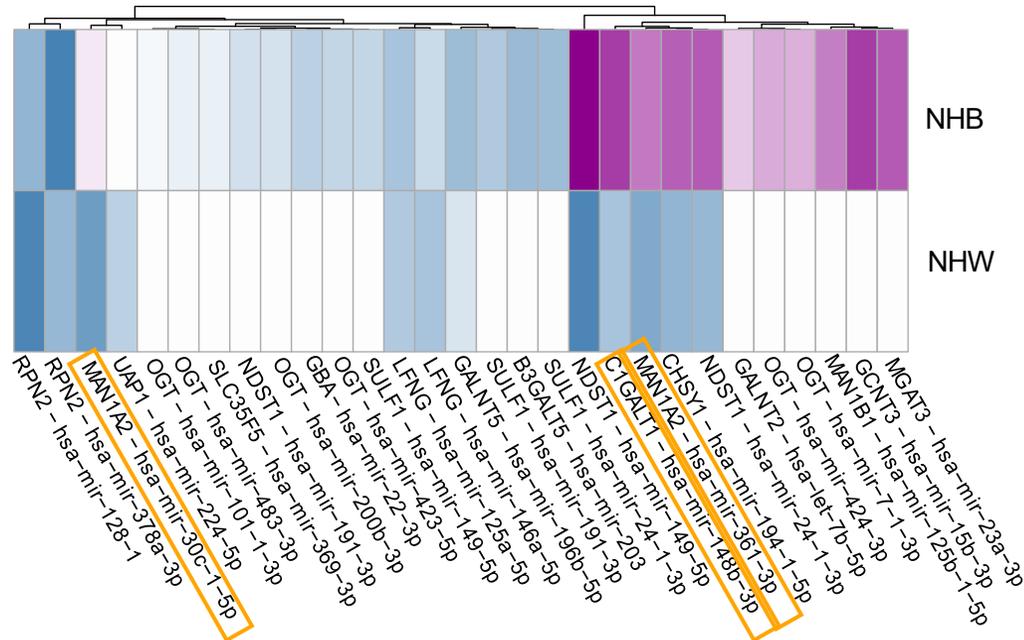
Question 2: Do epigenetic mechanisms (e.g., microRNA) influence disparate immune adaptation?



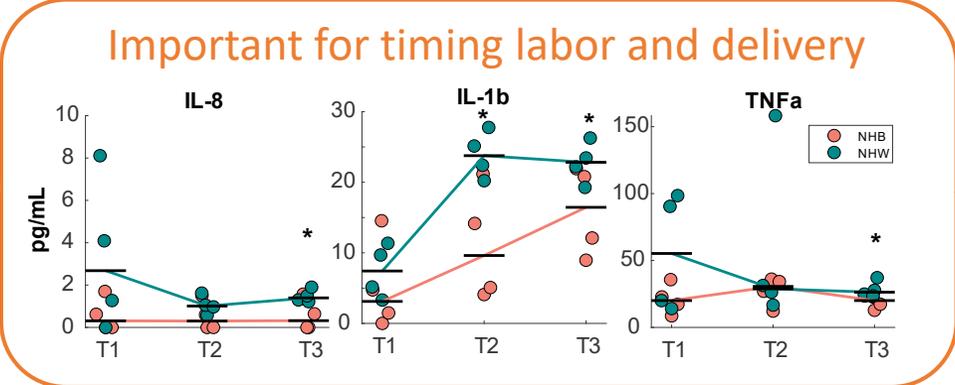
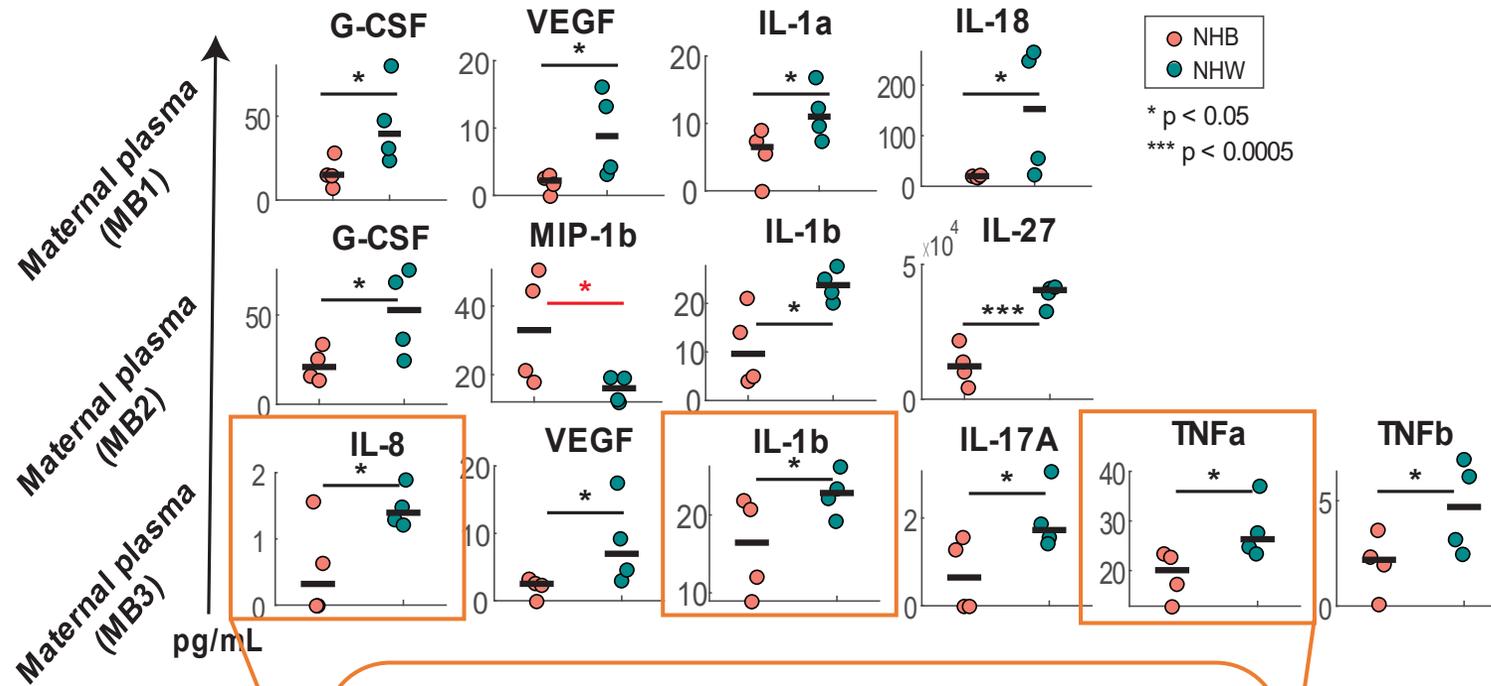
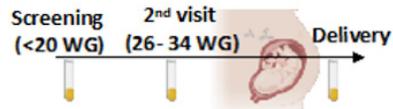
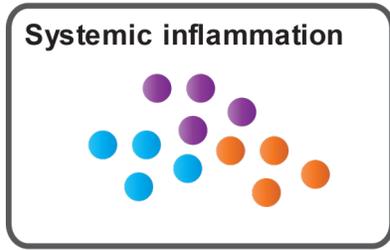
Glycosylation perturbations in NHB cord blood suggest a shift towards galactosylation.



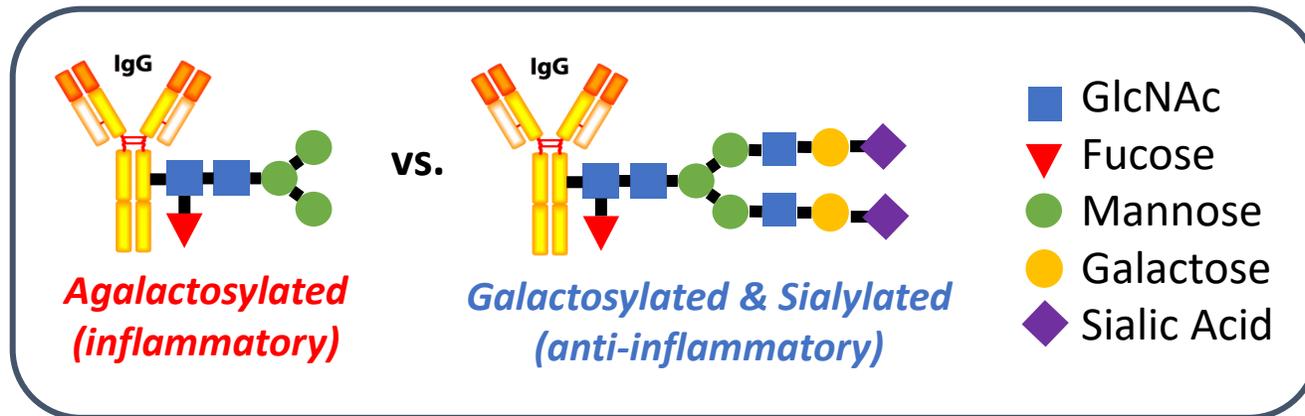
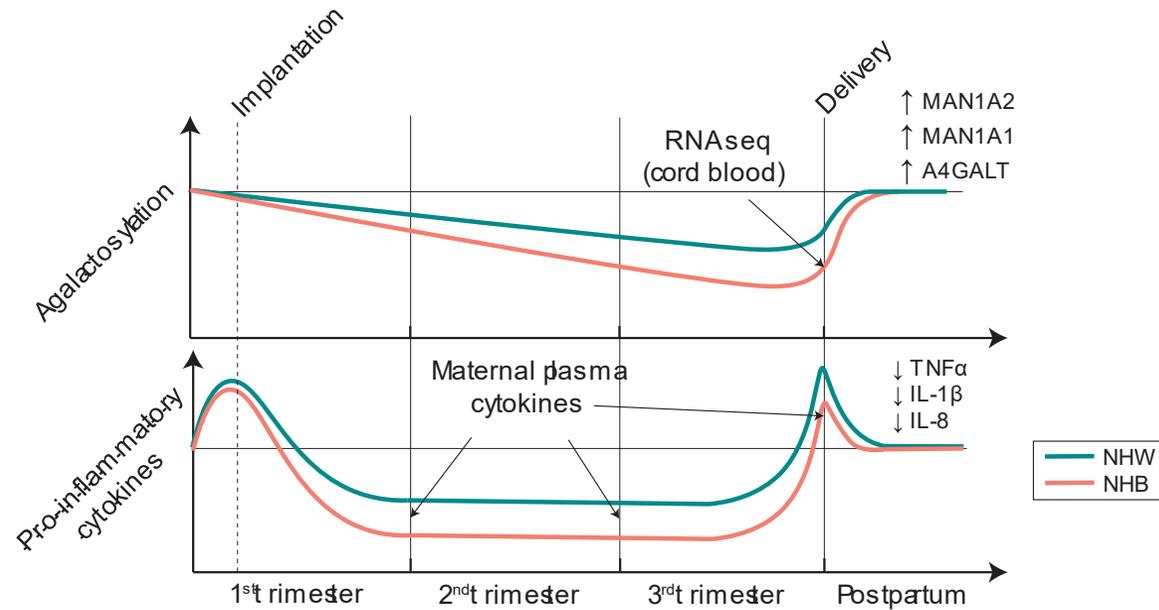
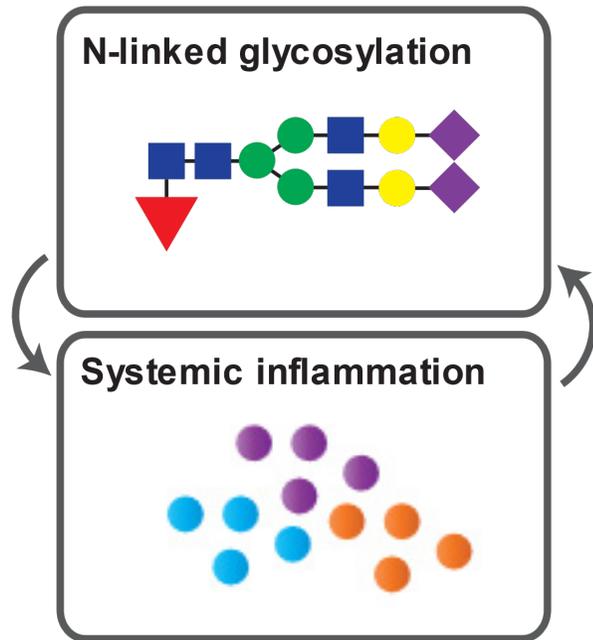
miRNA differentially regulates glycosylation in NHB and NHW cord blood.



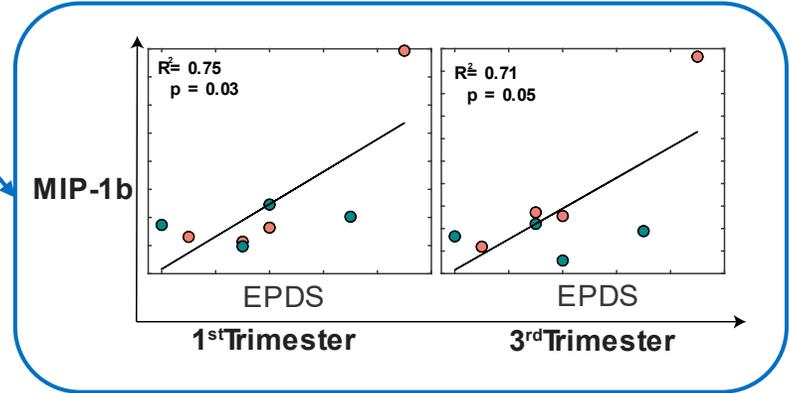
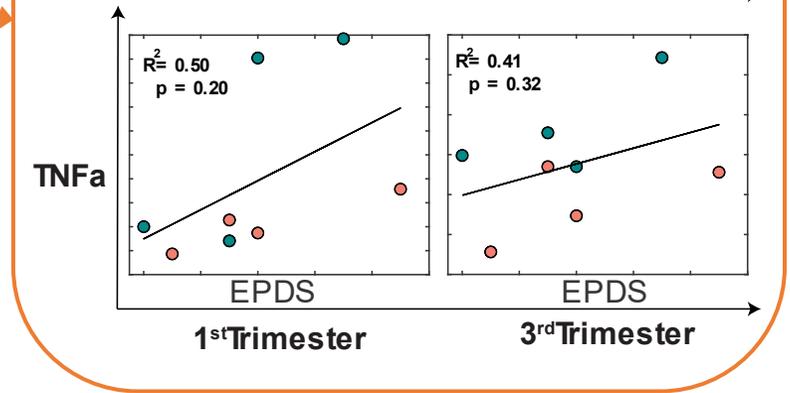
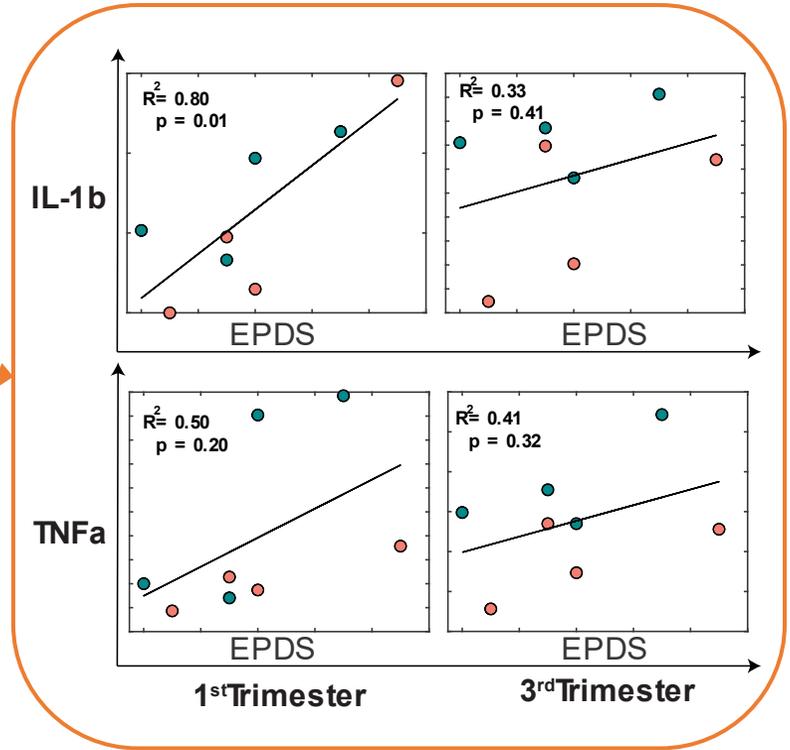
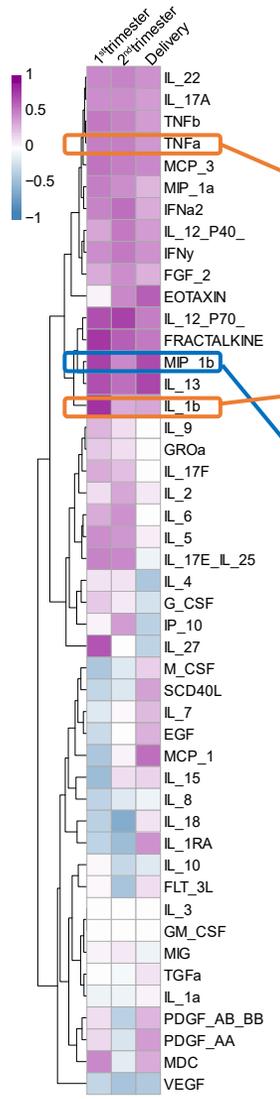
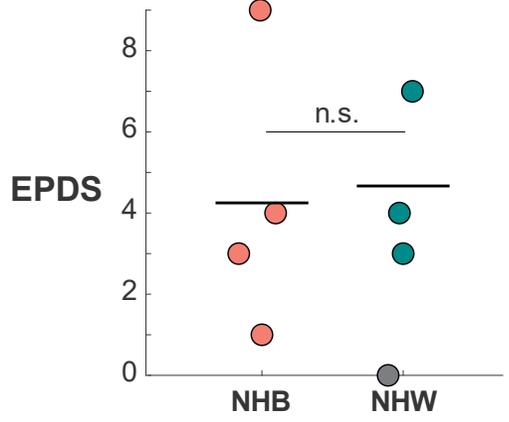
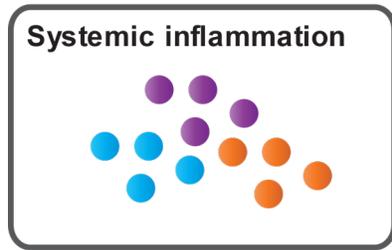
NHW women have longitudinal enrichment of pro-inflammatory cytokines.



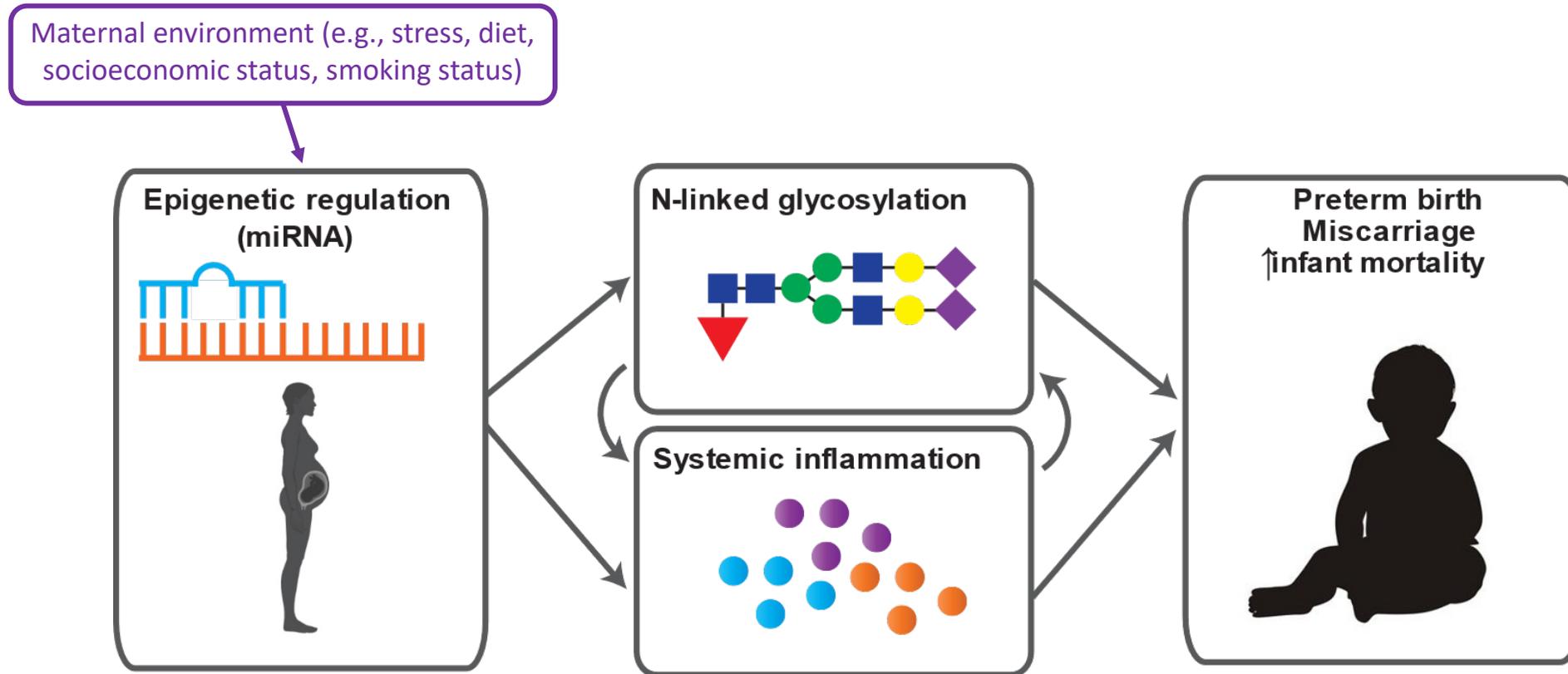
Antibody glycosylation could mediate the anti-inflammatory profile of NHB mothers.



Longitudinal cytokines correlate with Edinburgh Postnatal Depression Score (EPDS).



Summary



Acknowledgements



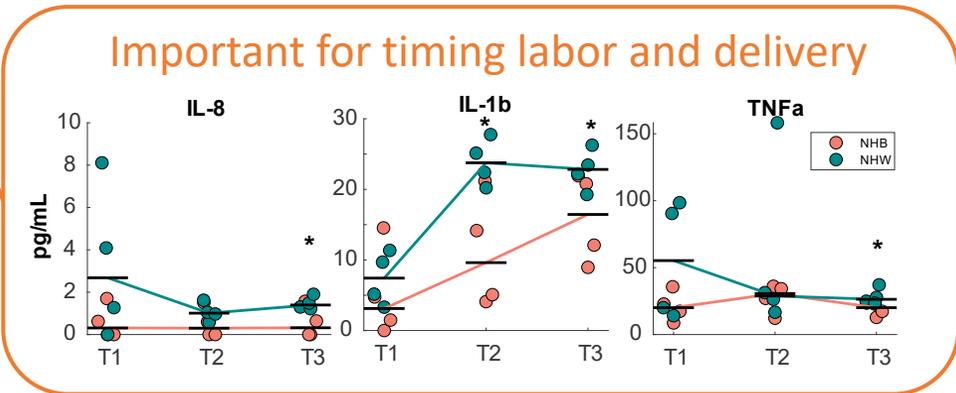
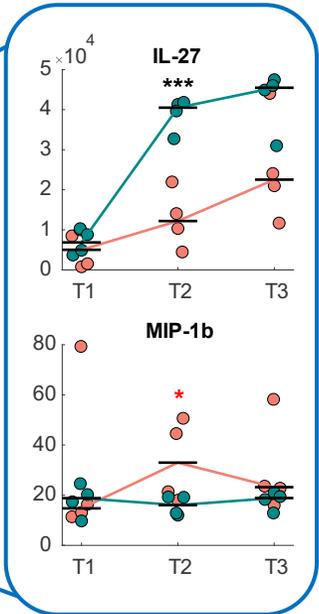
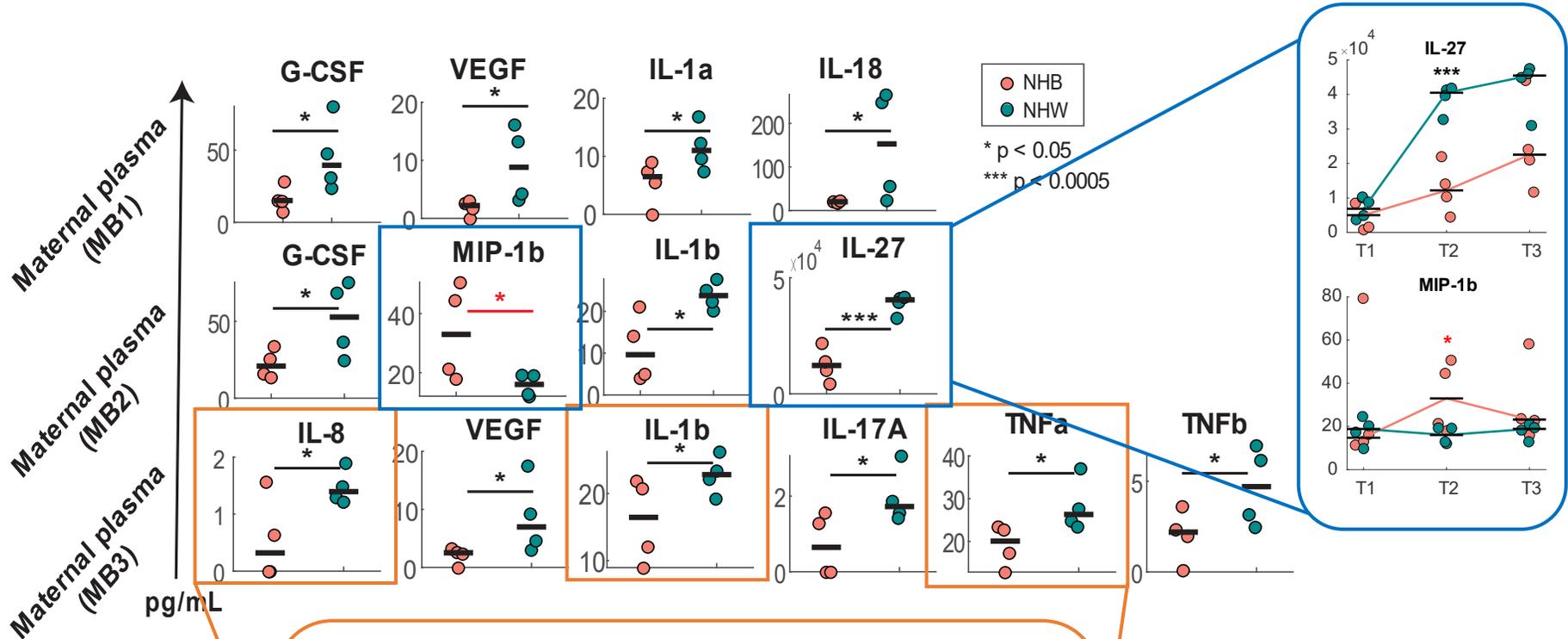
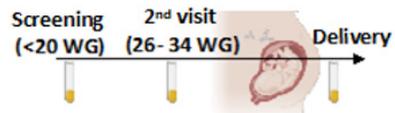
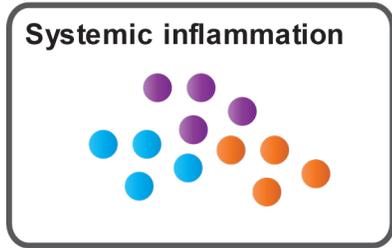
- Systems Immunology Lab
 - PI: Sepideh Dolatshahi
 - Lab members
 - Rob Barnes
 - Amanda Briegel
 - Anne Talkington
- UVA Maternal-Fetal Medicine
 - Dr. Don Dudley
 - Amanda Urban
- Funding sources
 - Jeffress Trust Award



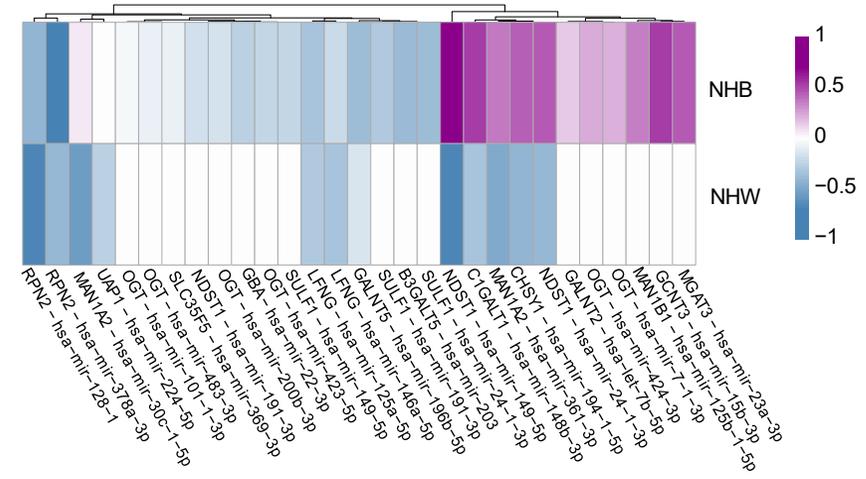
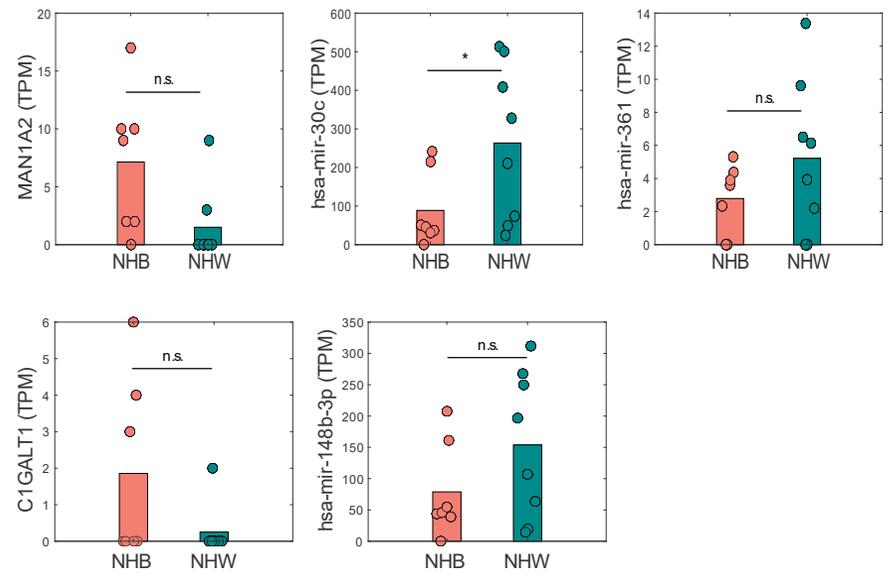
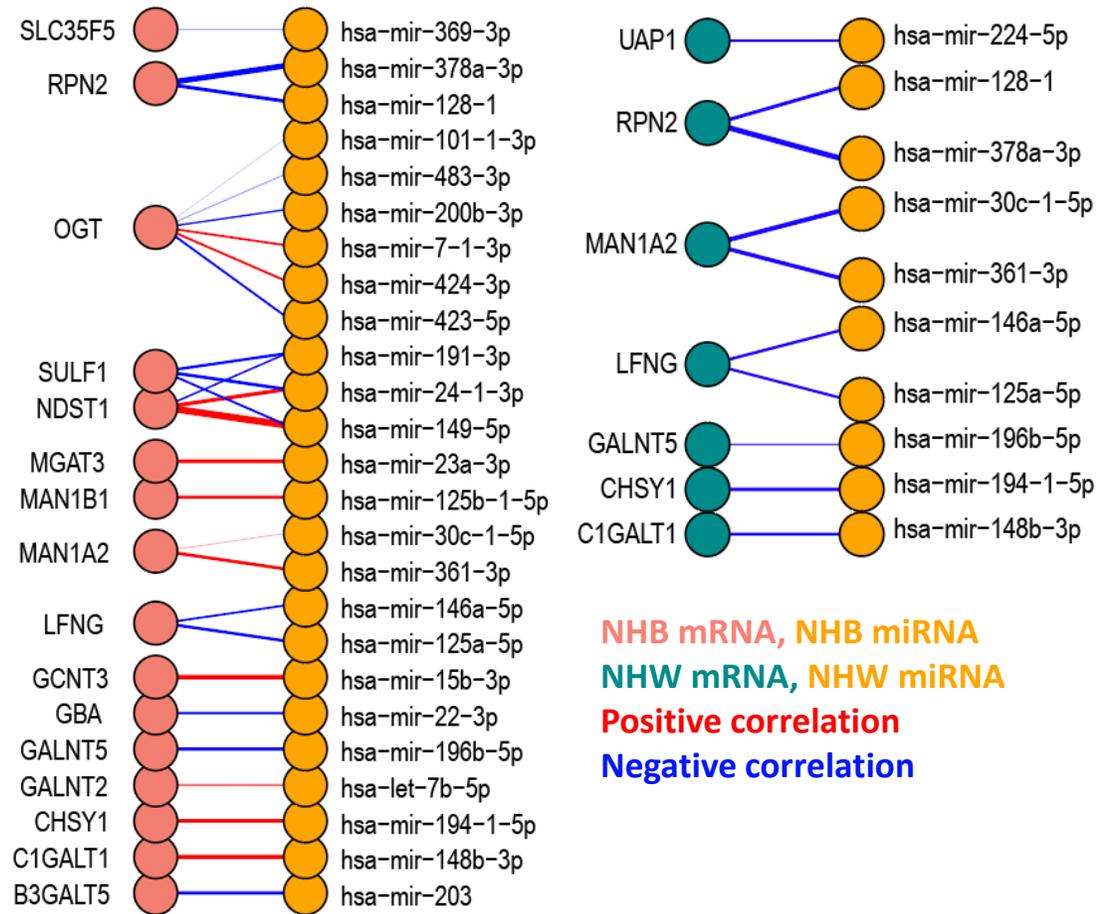
References

- [1] WHO. *World Health Statistics, Monitoring health for the Sustainable Development Goals*. (2018).
- [2] Vora, N., Parker, J., Mieczkowski, P. et al. RNA-Sequencing of Umbilical Cord Blood to Investigate Spontaneous Preterm Birth: A Pilot Study. *Am J Perinatol. Rep.* 9:1, 60-66 (2019).
- [3] Apps, R. et al. Multimodal immune phenotyping of maternal peripheral blood in normal human pregnancy. *JCI Insight.* 5:7, (2020).
- [4] Shade, K.C. and Anthony, R.M. Antibody Glycosylation and Inflammation. *Antibodies.* 2(3), 392-414 (2013).
- [5] Thu, C. and Mahal, L. Sweet Control: MicroRNA Regulation of the Glycome. *Biochemistry.* 59, 3098-3110 (2020).

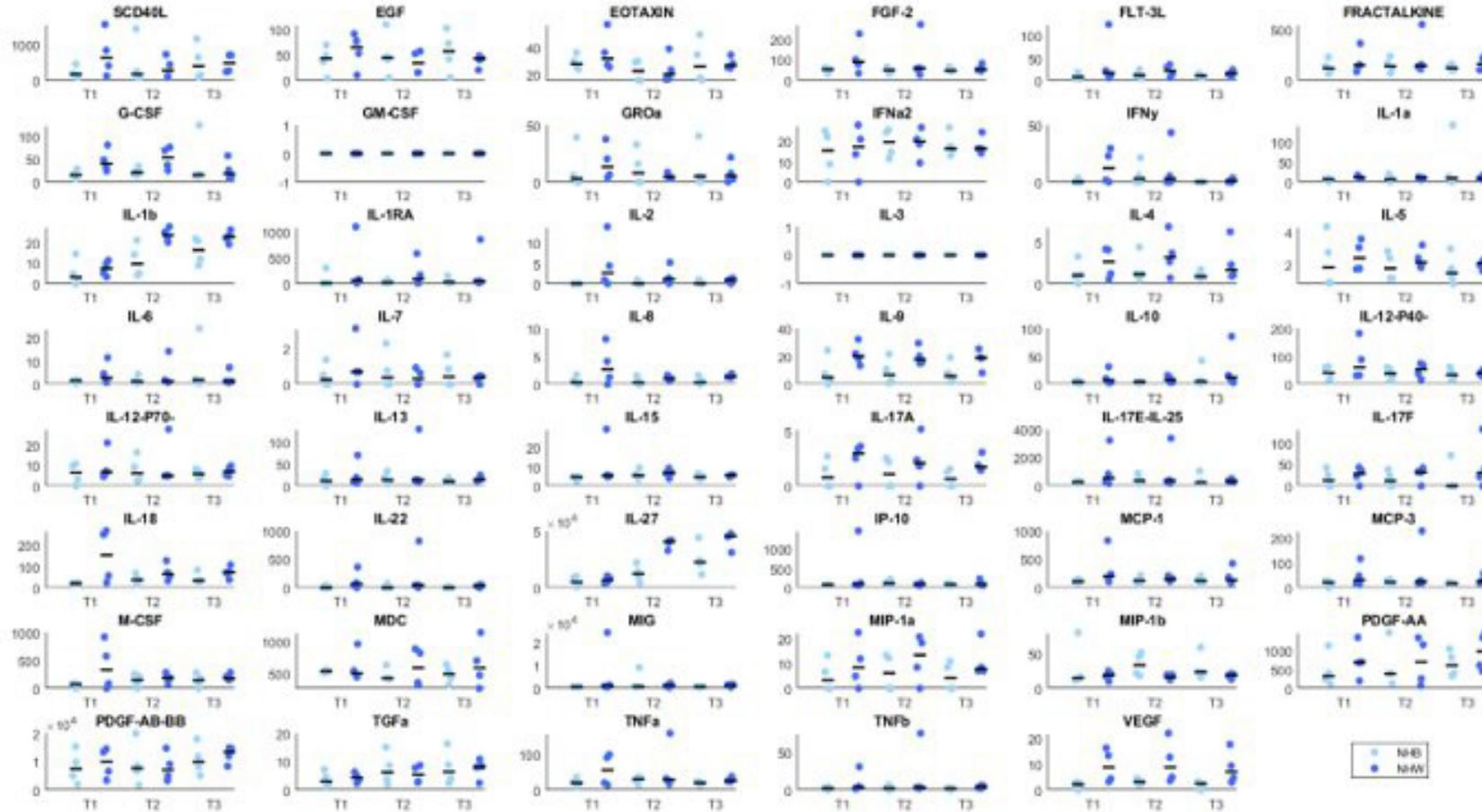
NHW women have longitudinal enrichment of pro-inflammatory cytokines.



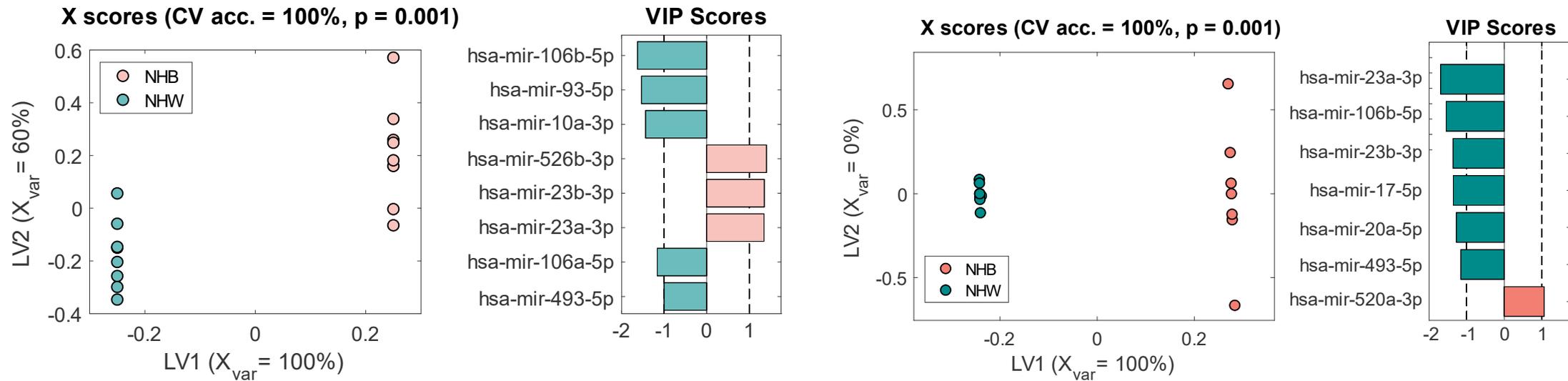
miRNA differentially regulates glycosylation in NHB and NHW cord blood.



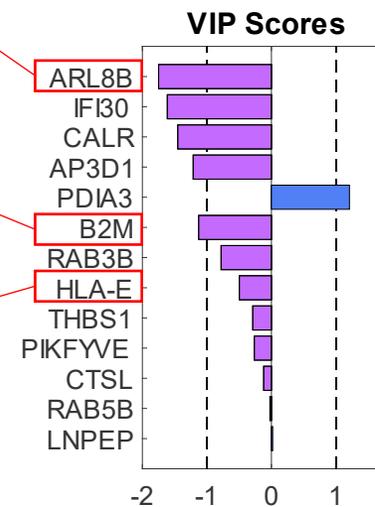
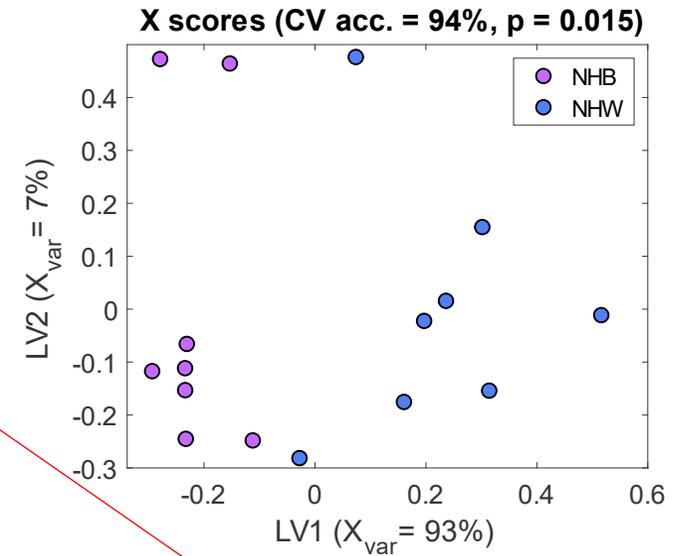
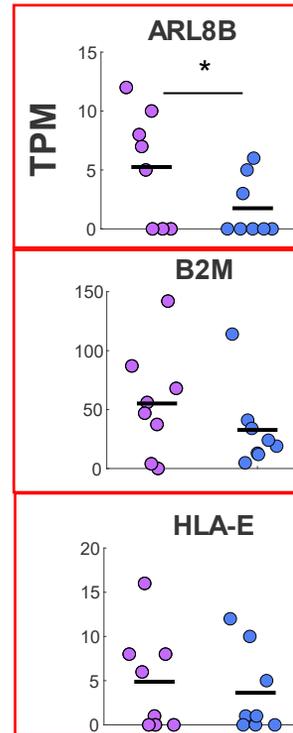
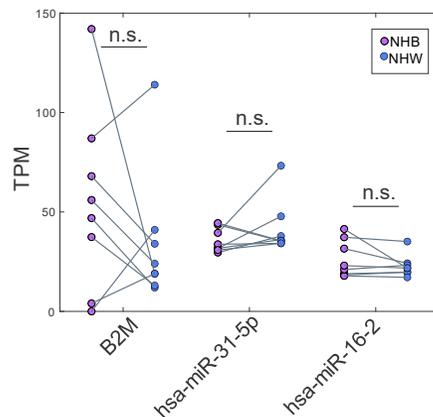
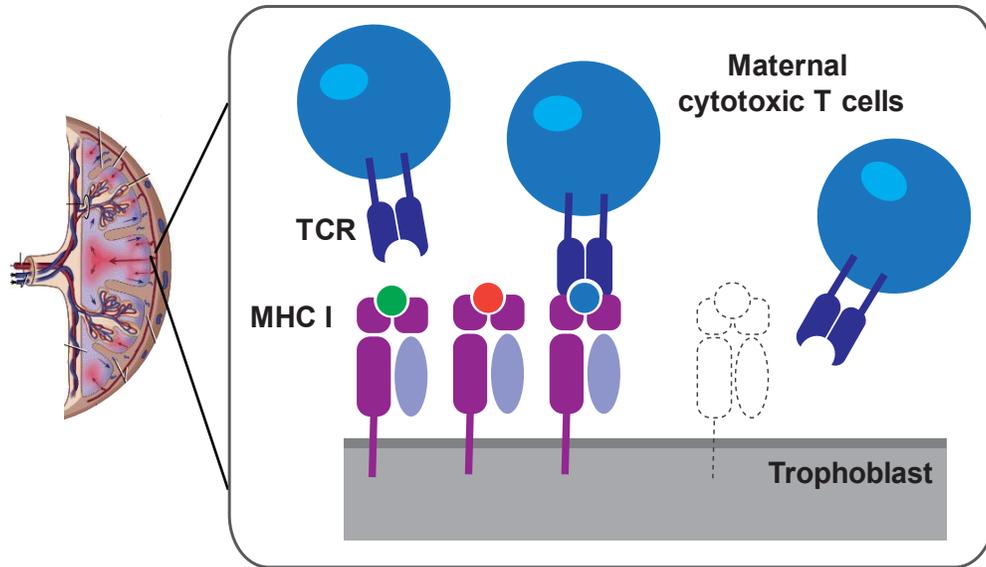
Dynamics of longitudinal maternal cytokines differ between racial groups.



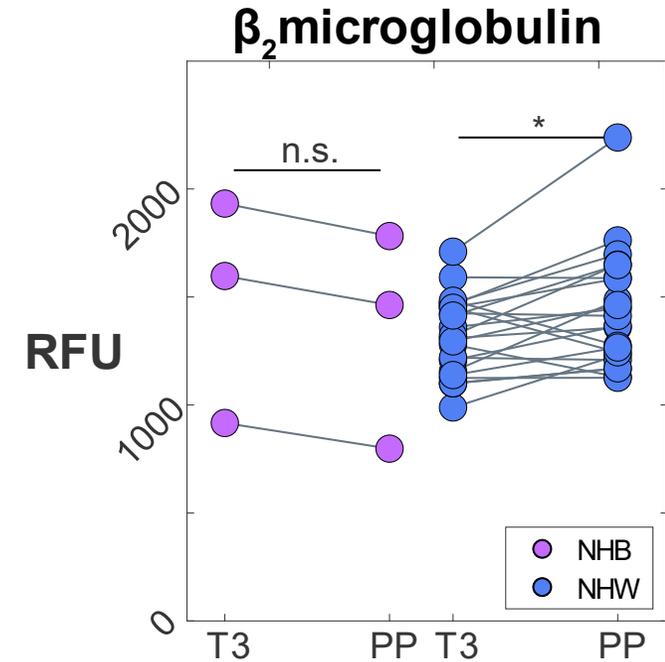
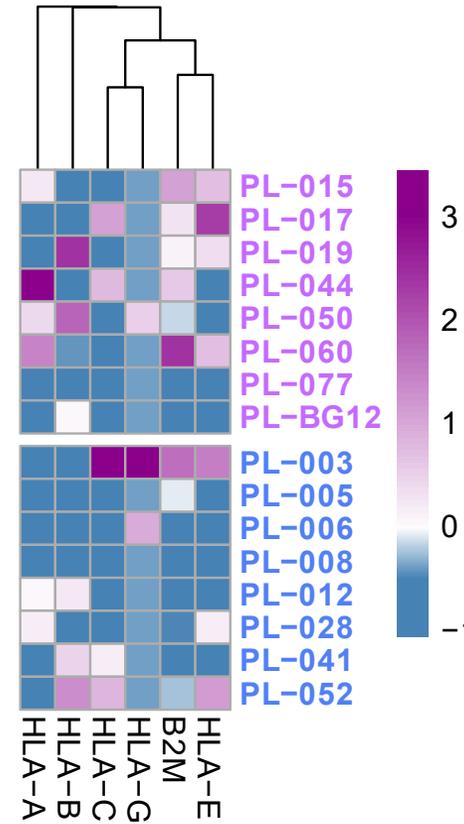
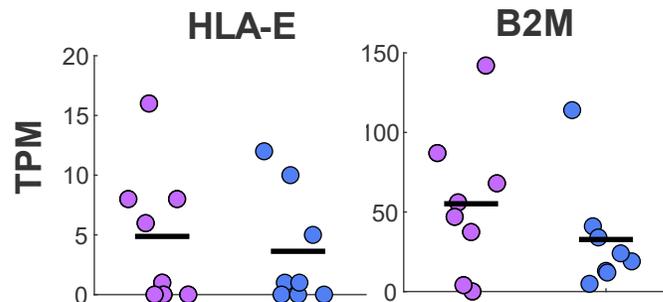
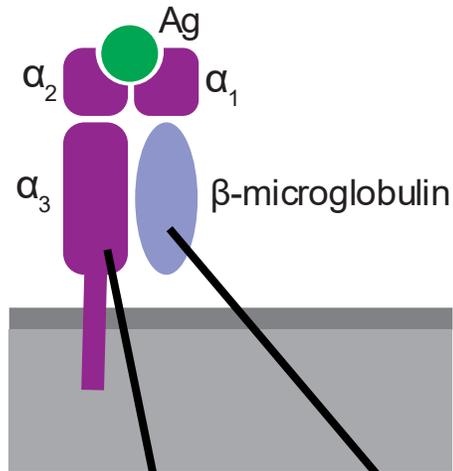
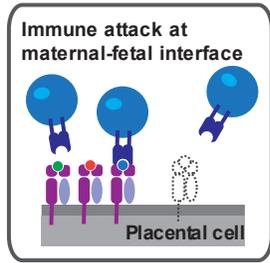
Active miRNA regulators of inflammation differ between cord blood and placenta.



Placental antigen presentation by MHC I could contribute to loss of tolerance in NHB pregnancies.



Alpha and beta components of MHC I are upregulated in NHB placenta.



HLA-E is immunosuppressive??