

Transplacental Antibody Transfer in Placental Insufficiency: *From Basic Biology to Clinical Implications*

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INTRODUCTION

- Transplacental IgG transfer is critical for neonatal immunity.
- Understanding these mechanisms may guide maternal vaccination strategies in high-risk pregnancies.

Key question

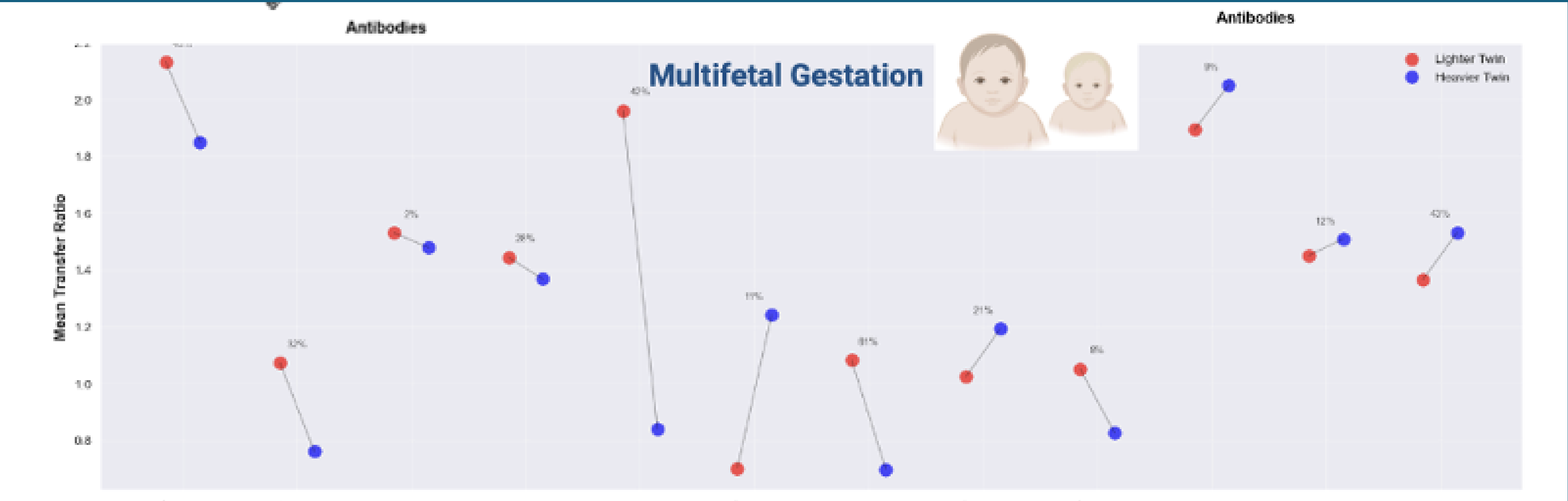
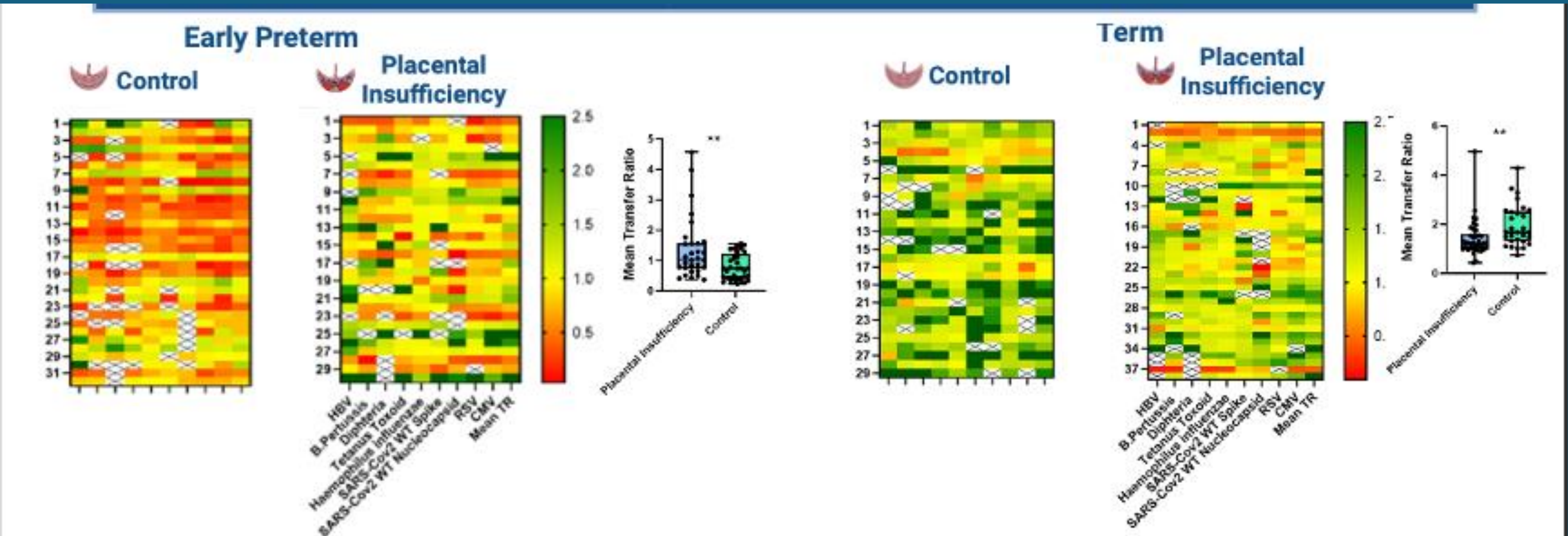
How does placental dysfunction affect antibody transfer across different gestational ages?

METHODS

- Multicenter study examining placental insufficiency cases vs. controls
- Multifetal pregnancies used as validation
- 9 pathogen-specific antibodies measured

Further analysis

- Immunohistochemistry to evaluate IgG receptor distribution (FcRn, FcγR2, FcγR3)
- Neutralization assay
- Functional capacity of transferred antibodies through NK cell-mediated responses in dysfunctional placentas compared to controls
- Single-cell mRNA sequencing to identify transcriptional differences



RESULTS

Type 1 preeclampsia (placenta-driven, <34 weeks)

Severe placental dysfunction showed enhanced antibody transfer in insufficiency cases.

Type 2 preeclampsia (maternal cardiovascular, >37 weeks)

Revealed different transfer patterns compared to early preterm cases.

Multifetal validation

Twin analysis confirmed gestational age-dependent transfer patterns.

CONCLUSIONS

Enhanced antibody transfer in early preterm placental insufficiency suggests compensatory mechanisms may be active. These findings may inform maternal vaccination timing and personalized approaches based on placental function. Ongoing analyses aim to identify molecular drivers of this enhanced transfer phenomenon.