

Balance between maternal antiviral response and placental transfer of protection in gestational SARS-CoV-2 infection

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INTRODUCTION

Maternal immune response protects the growing fetus by clearing the pathogen preventing its vertical transmission, and via transplacental transfer of protective cellular and humoral components to the fetus. The outcomes of SARS-CoV-2 infection in pregnancy vary from asymptomatic or mildly symptomatic to severe disease with increased levels of inflammatory cytokines and immune cells being detected in maternal and cord blood samples. How these cellular and humoral immune mediators balance maternal anti- SARS-CoV-2 response with the transplacental transfer of protection to the fetus remains to be addressed.

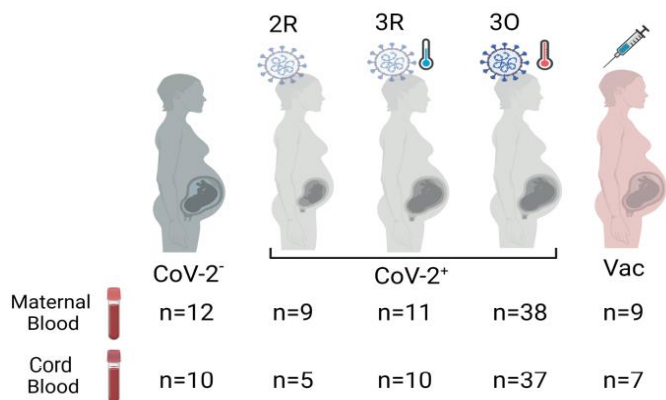
AIMS

- Evaluate the production of antibodies by the pregnant woman
- Access the quality of vertical transmission of antibodies to the neonate
- Determine if the transfer of antibodies is related to the gender of the neonate

HYPOTHESIS

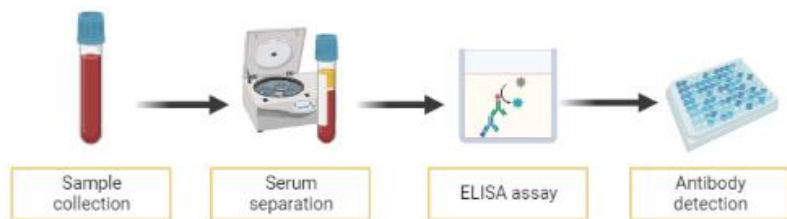
Do pregnant women COVID-19 infected or vaccinated equally transfer neutralizing antibodies to their fetus? How is protection against the disease conferred?

METHODS

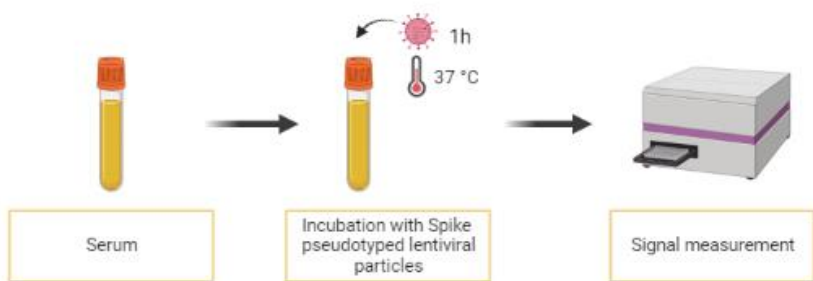


2R: Recovered second trimester group | 3R: Recovered third trimester group
3O: Ongoing third trimester infection group

ELISA

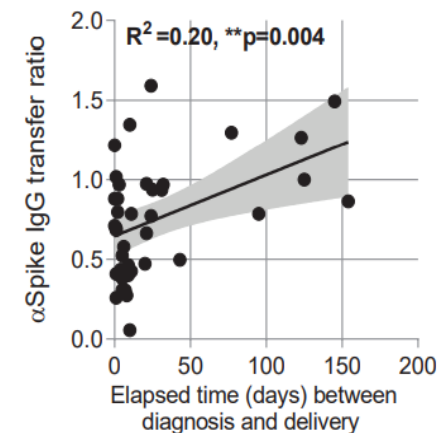
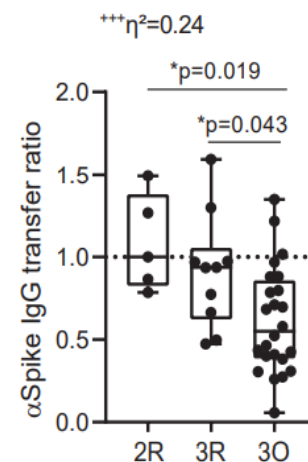
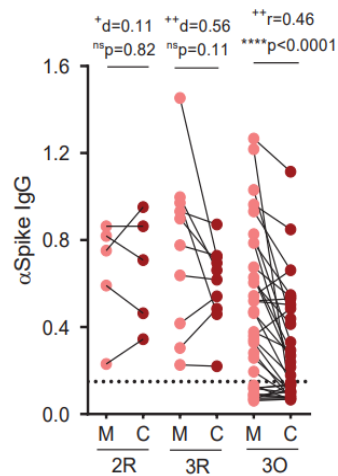


Neutralization assay

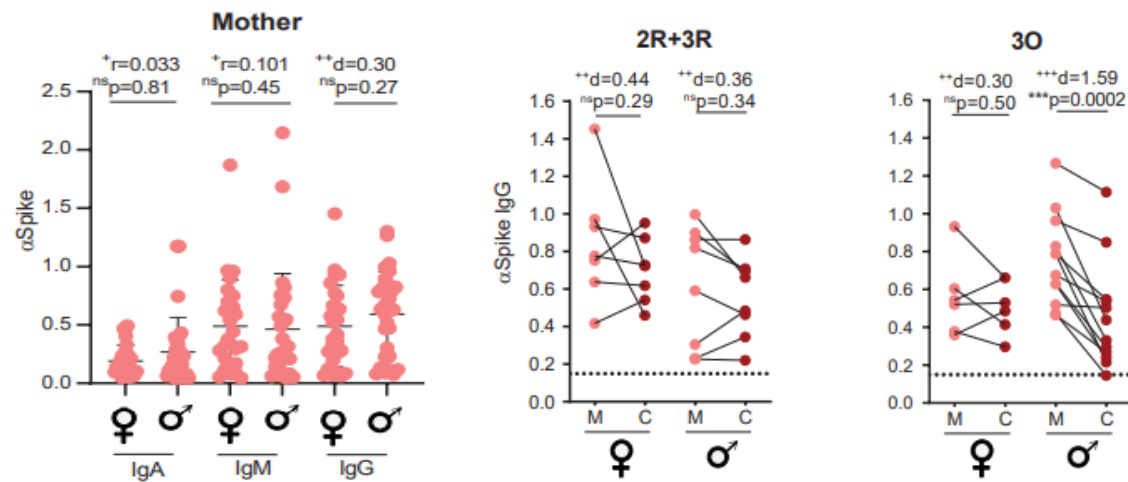


RESULTS

The longer the time between diagnosis and delivery, the greater the effectiveness of the transfer

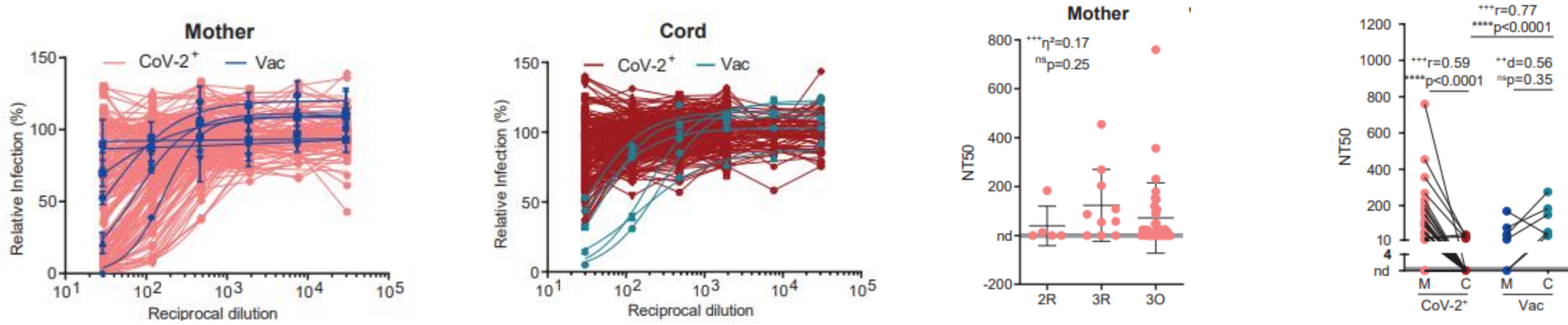


Male neonates, born to infected women, have less antibodies against spike at birth

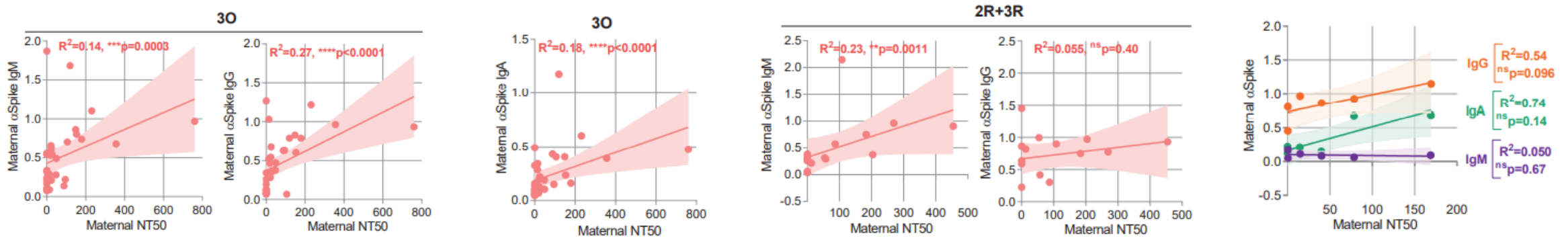


RESULTS

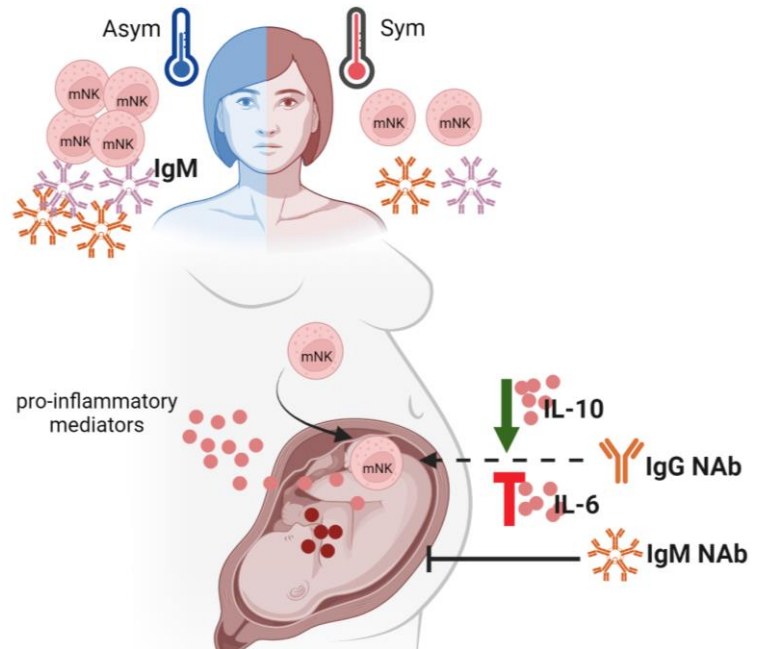
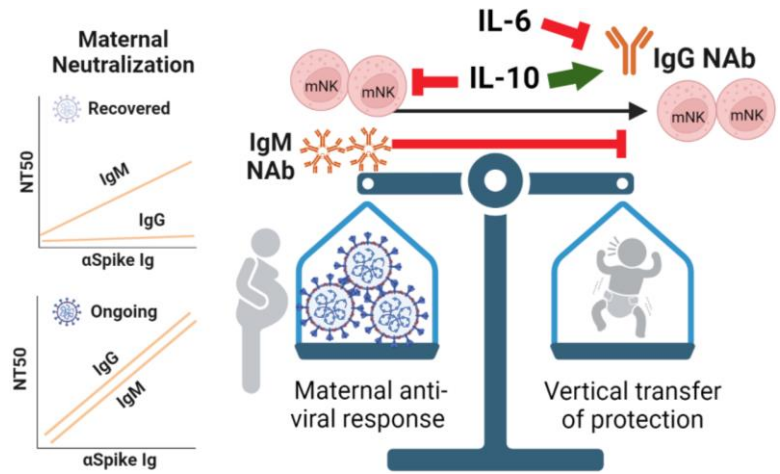
Infected pregnant women produce equivalent amount of NABs than vaccinated women but much less capable to transfer them to the neonate



Impaired NABs vertical transfer is partly due to infected mother producing NABs of the IgA and IgM isotypes which are not transported across the placenta



CONCLUSIONS



- The time between diagnosis and delivery is relevant to the efficacy of vertical transfer of anti-spike antibodies, and the greater the time gap, the greater the efficacy.
- We show that the time window of decreased anti-spike IgG transfer is relatively short (~11 days prior to delivery) and affected more pronouncedly IgG transfer to male fetus.
- Whether the pregnant woman was infected or vaccinated is also a relevant variable regarding the impact on the transfer of NAbs
- Since IgA and IgM do not pass through the placenta, this may explain the low efficacy of vertical transfer of NAbs

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ACKNOWLEDGEMENTS

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