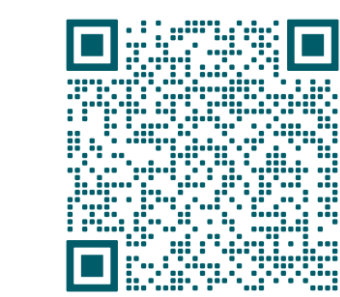


The impact of chronic schistosomiasis on co-infections with dengue virus in Madagascar



Background and Setting

- Chronic schistosomiasis is highly prevalent in Madagascar and causes high morbidity.
- Interestingly, only sporadic outbreaks of dengue virus (DENV) are described in the country, although the suitable vectors are present.



Figure 2: Impressions from Madagascar.

We hypothesise that the immune response, elicited by chronic schistosomiasis, might confer protection against DENV infections or dengue fever progression.

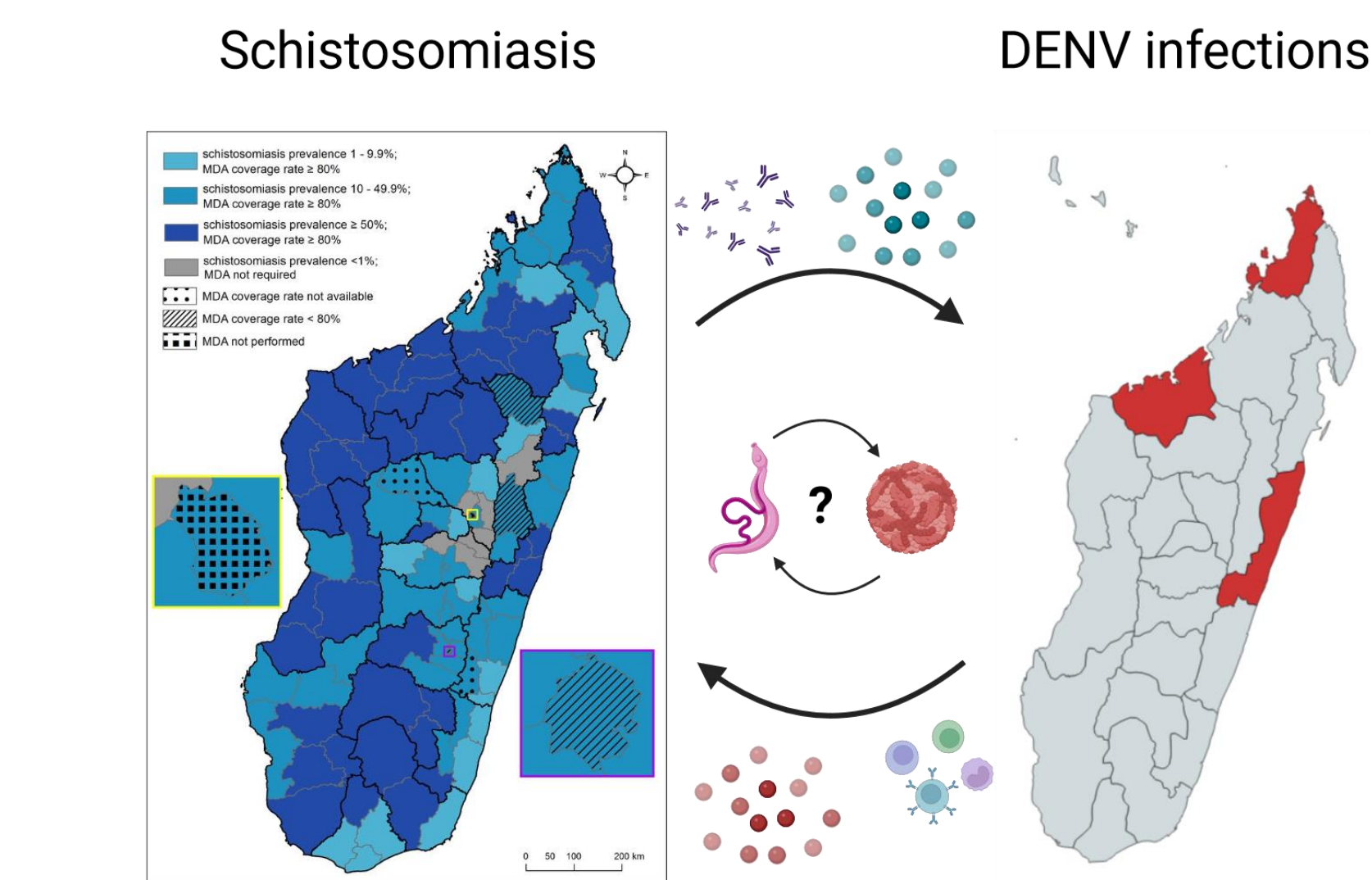
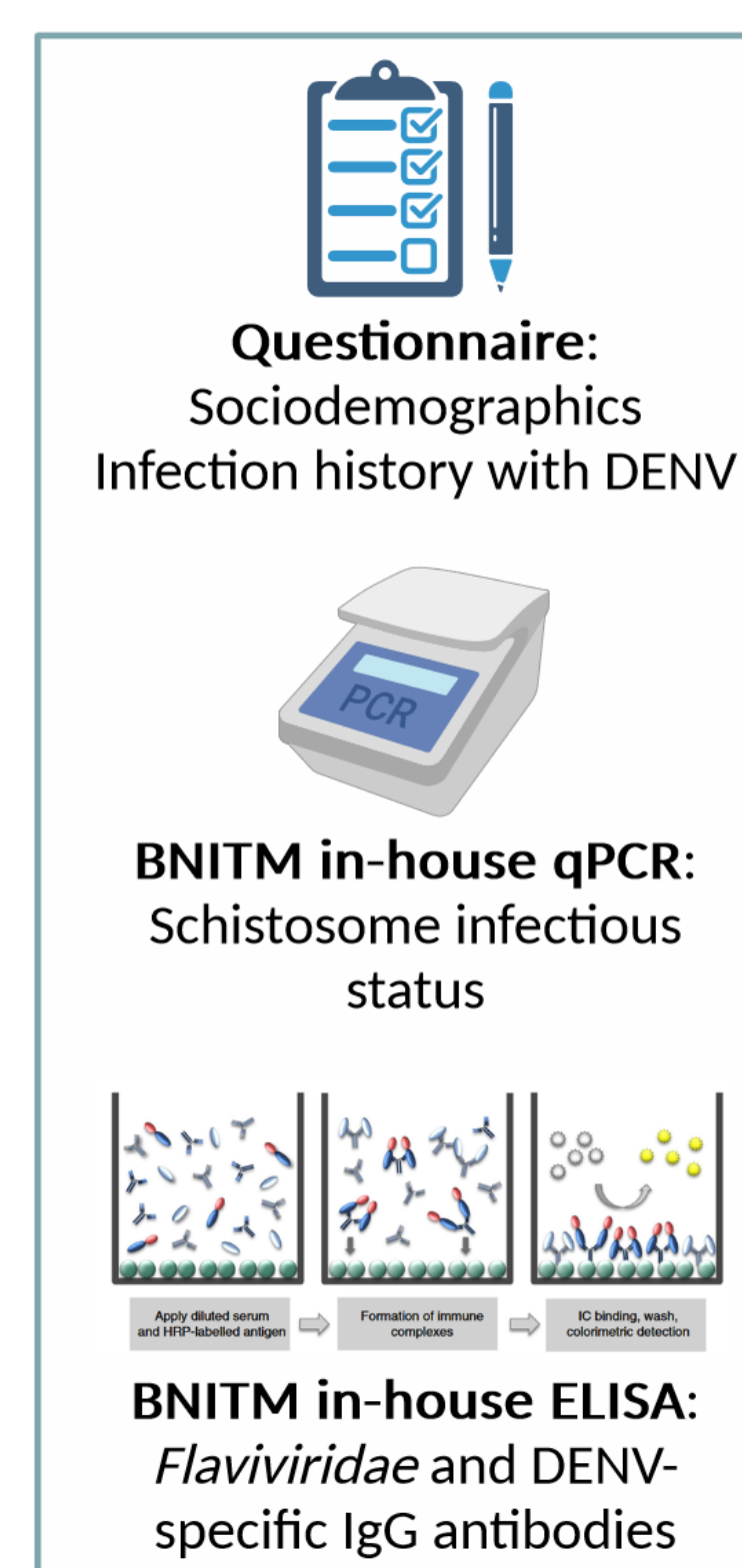


Figure 1: Background of the research question. Adapted from Rasoamananjah et al., 2023.

Methods

Data collection



Lab flow

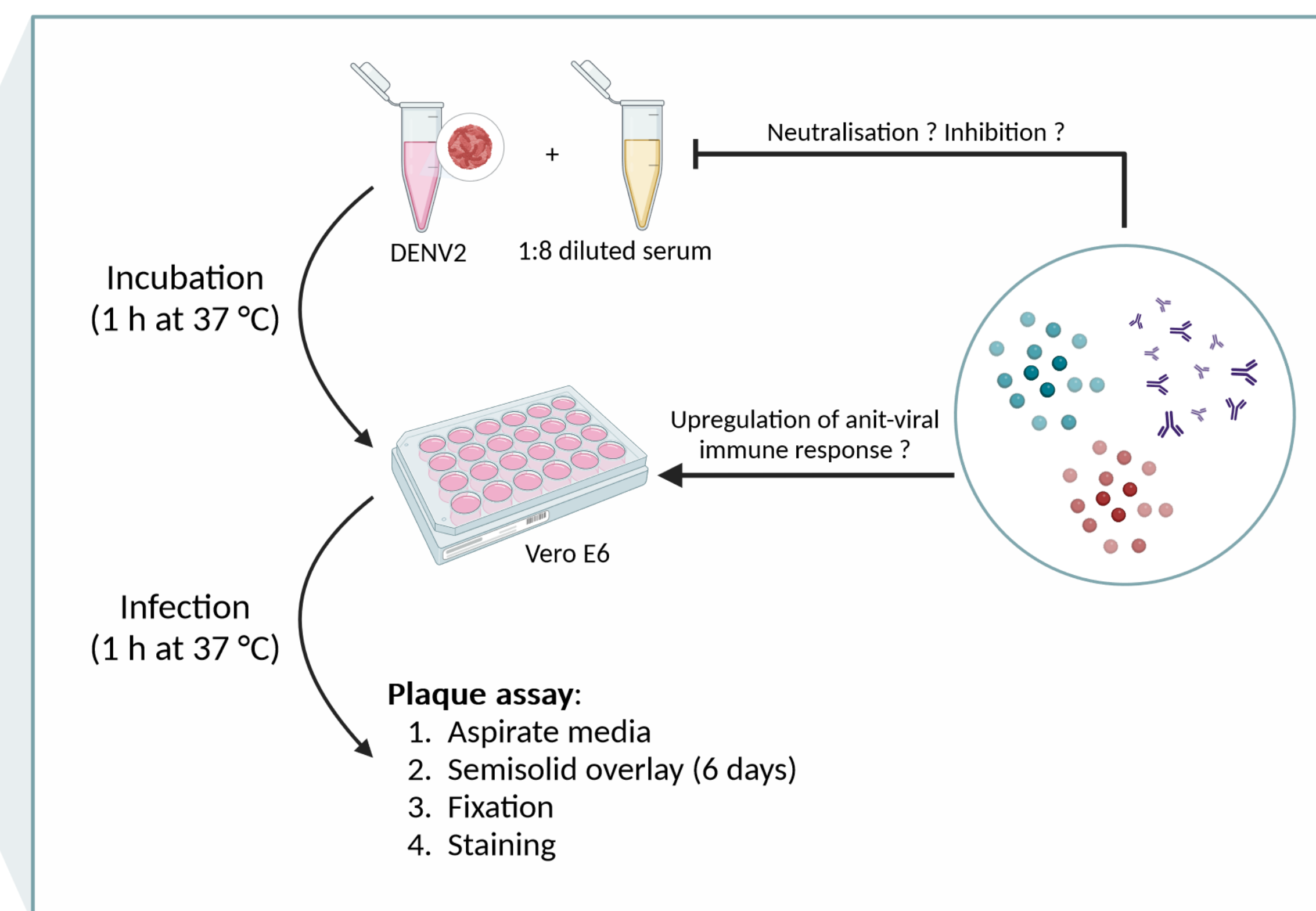


Figure 3: Schematic overview of sample collection and lab flow of the established PRNT.

Results

Overall observations:

- From 990 samples 548 (55,4 %) tested positive for Schistosome infection.
- The in-house ELISA determined IgG antibodies against *Flaviviridae* in 167 (16,9 %) samples and DENV-specific IgG antibodies in 32 (3,2 %) samples.
- So far, 378 samples have been subjected to PRNT.

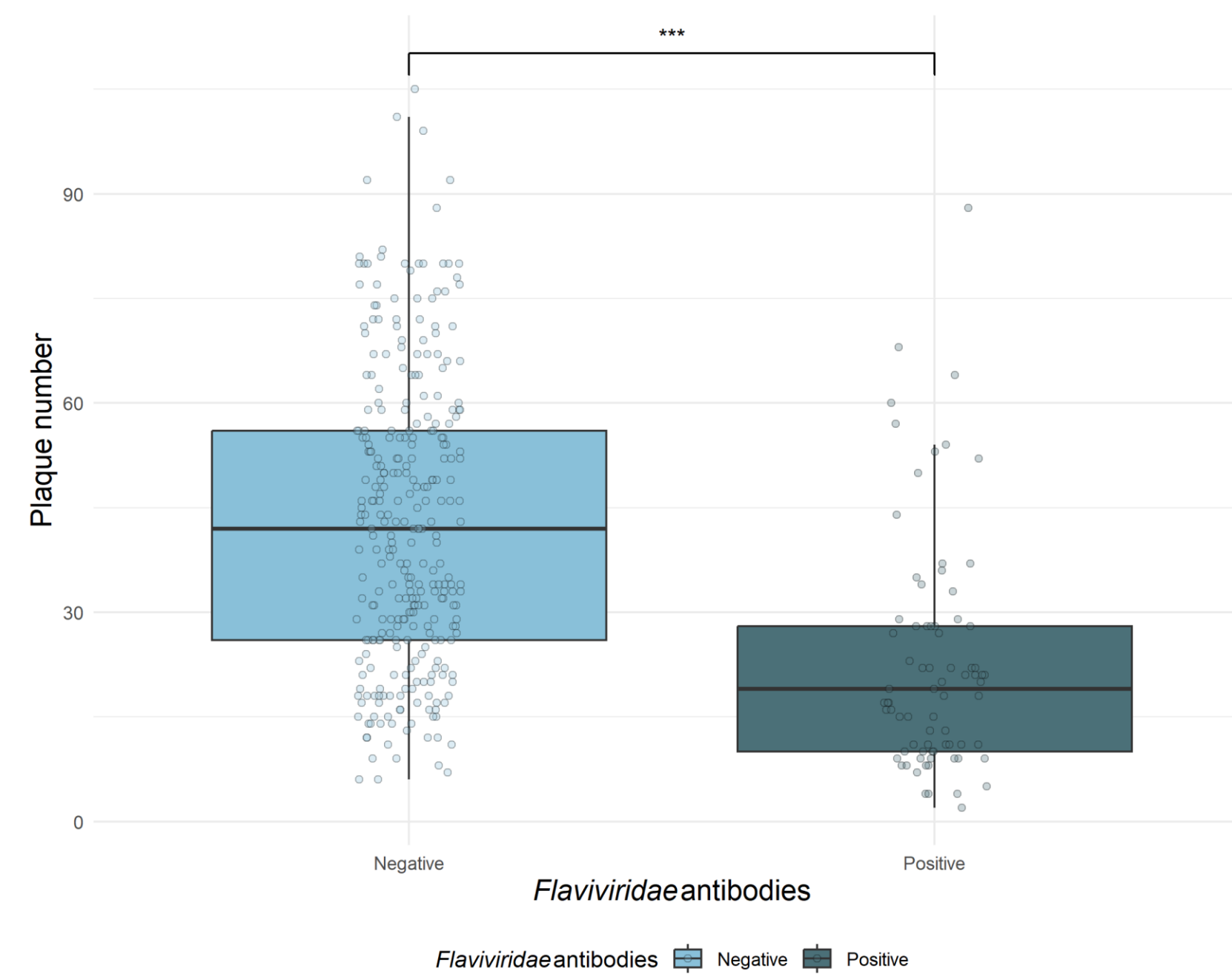


Figure 4: PRNT results for 378 samples, stratified by presence of any *Flaviviridae* antibodies (n positive = 77, n negative = 301). P-value < 0,001 determined by Wilcoxon rank sum test.

Effect of *Flaviviridae* antibodies:

- Samples with cross-reactive *Flaviviridae* antibodies significantly decreased plaque numbers (median plaque number 19 vs. 42, Figure 4).
- Samples with DENV-specific antibodies tend to reduce plaque numbers (median plaque number 27 vs. 42, Figure 5), but this trend is so far not statistically significant.

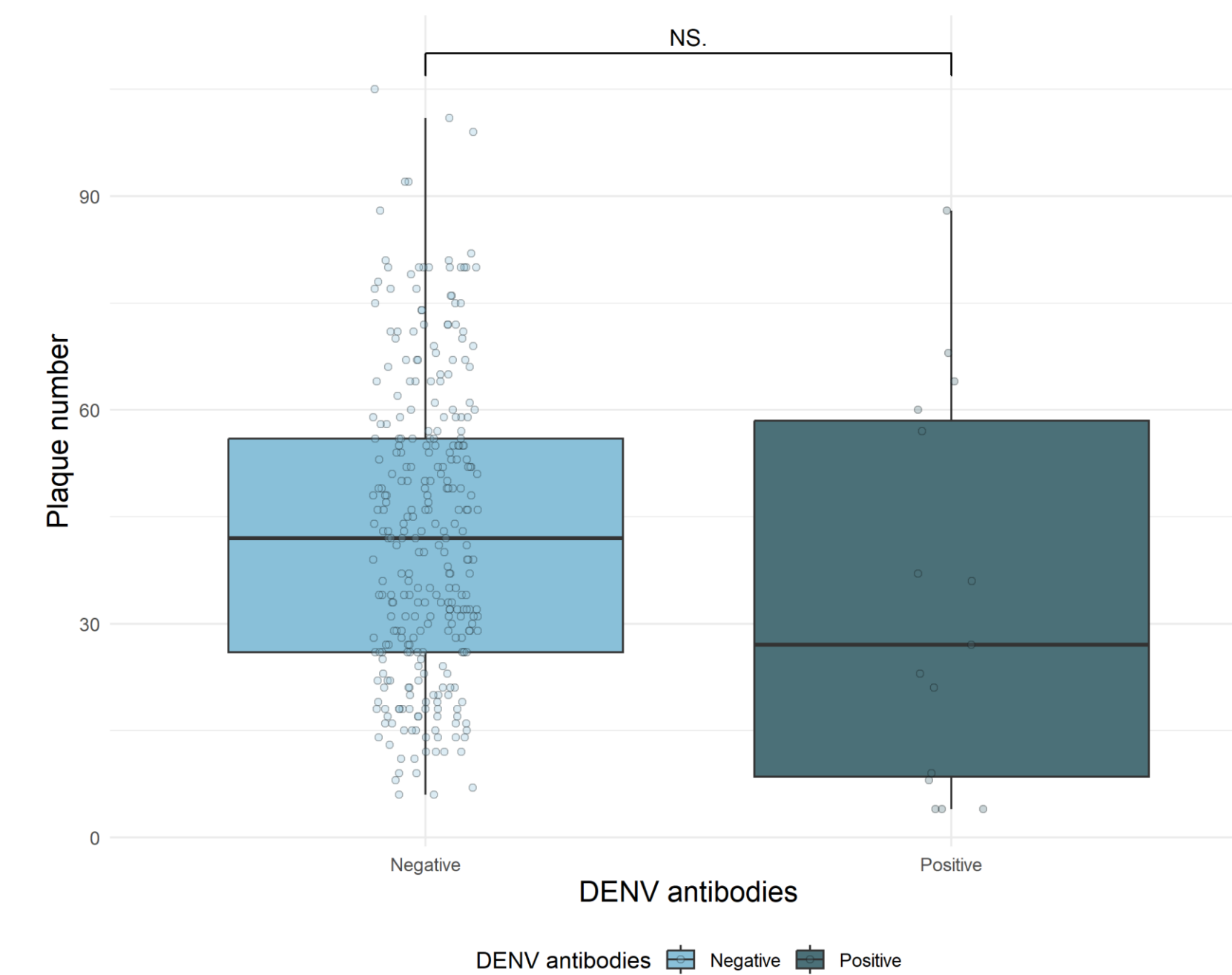


Figure 5: PRNT results for 316 samples (exclusion of n = 62 with other *Flaviviridae* antibodies), stratified by plaque number and stratified by presence of DENV antibodies (n positive = 15, n negative = 301). P-value = 0,13 determined by Wilcoxon rank sum test. NS = non-significant.

Effect of Schistosome infections:

- N = 77 (all DENV- and *Flaviviridae*-positive samples) were excluded from further analysis.
- Sera from participants infected with Schistosomes significantly decreased plaque numbers (median plaque number 35 vs. 46, Figure 6).
- The effect of age, sex and other factors possibly affecting the immune response towards DENV infections is being investigated.

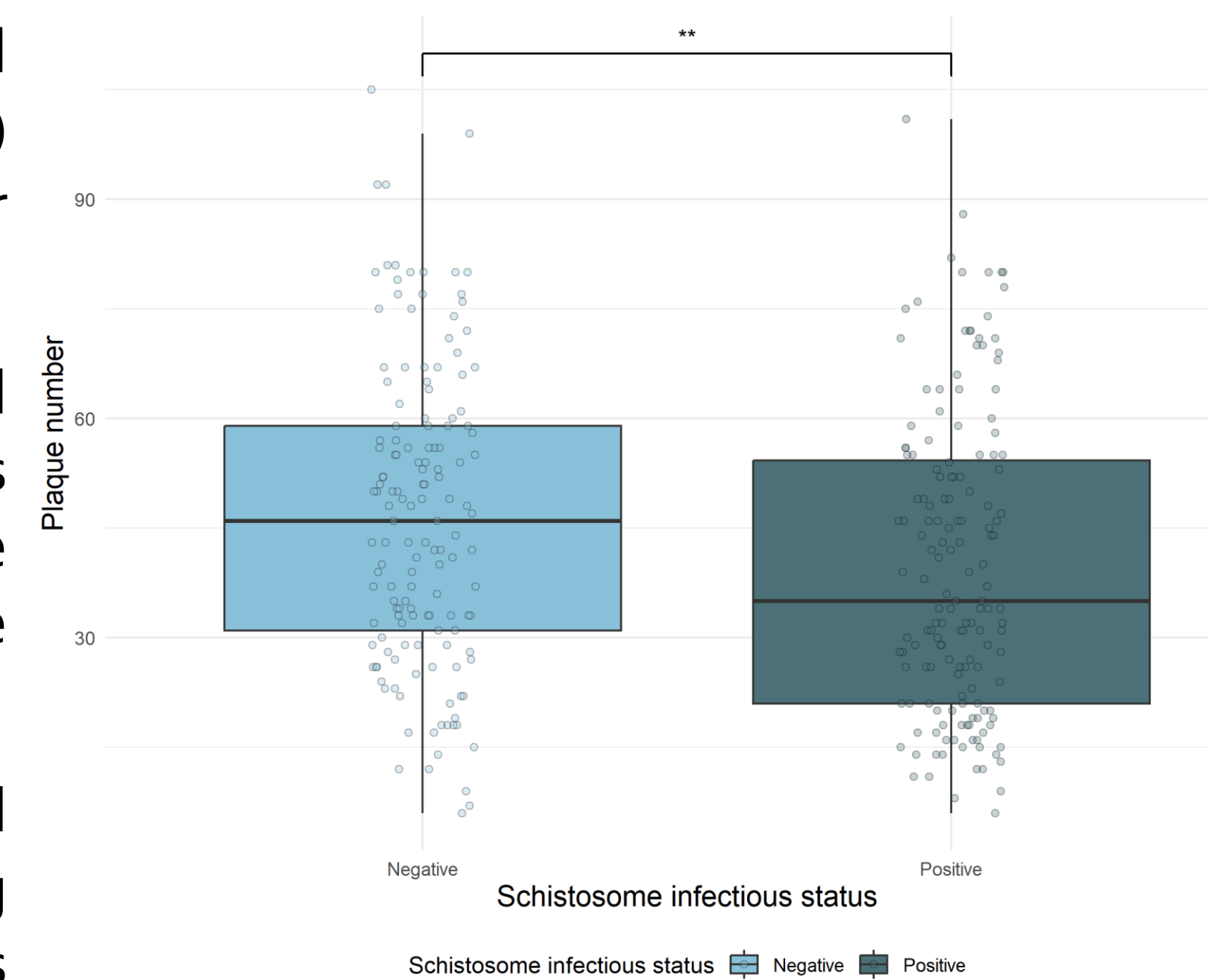


Figure 6: PRNT results for 301 samples, stratified by presence of Schistosome infection (n positive = 156, n negative = 145). P-value = 0,003 determined by Wilcoxon rank sum test.

Conclusion

- We investigate, to our best knowledge, for the first time the impact of anti-schistosome immune responses on DENV infections.
- The preliminary assessment of our data suggests a protective anti-DENV effect, resulting from sera from Schistosome infected individuals.



Figure 7: Impressions from sample collection and lab work.

Outlook

Future analysis will include testing the whole study sample, exploring the impact of age, sex and other factors and further investigating the observed effect and the possible mechanisms behind it.

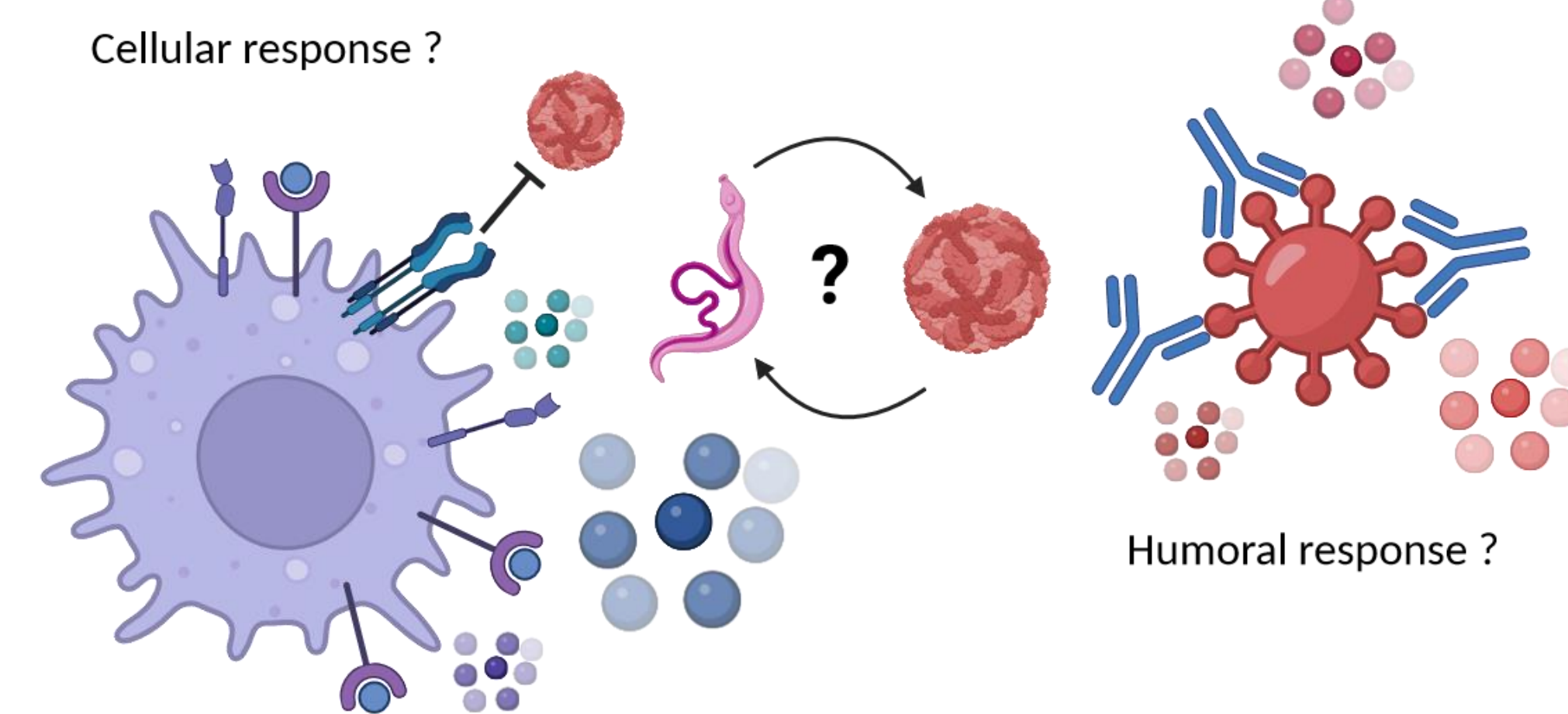


Figure 8: Schematic hypothesis of possible mechanisms behind our results.