Infected and HIV-exposed uninfected (HEU) infants have similar neutralization response against a heterologous envelope panel.

Heat map analysis showed that AI and HEU infants did not have unique neutralization fingerprints because the two infant clusters that separated with 100% bootstrap support contained relatively equivalent proportions of infected and uninfected infants (Fig 2A).

AI had a higher BP (median 0.79, range 0.20-0.96) compared to HEU infants (median 0.63, range 0.42-0.77), although this difference was not statistically significant (p = 0.46) (Fig 2B).

AI (median 0.82, range 0-100%) neutralized a higher percentage of the Env's in the heterologous panel compared to the HEU infants (median 0.64, range 22.71-100%), but this difference was not statistically significant (p = 0.30) (Fig 2C).

Infant BP scores showed an inverse correlation with the number of days between sample collection and birth (p = 0.001; Spearman’s r -0.50) (Fig 2D).

The breadth and potency of maternal plasma antibodies significantly associates with vertical transmission and pre-determined infant clinical outcomes.

Heat map analysis showed that maternal samples clustered into two separate groups with 100% bootstrap support (Fig 3A). These two clusters contained a significantly different proportion of transmitting mothers (TM) versus non-transmitting mothers (NTM) (p = 0.03) suggesting that transmitting as compared to non-transmitting mothers contained a unique neutralization fingerprint.

TM (median 0.77, range 0.19-0.90) also had a significantly higher BP score compared to NTMs (0.64, range 0.40-0.83) (p = 0.03) (Fig 3B).

TM maternal Env neutralized 89% (95% CI: 86% - 92%) compared to NTMs (median 0% ± 0% range 0%-100%) also had significantly higher breadth compared to NTMs (median % Env neutralized 0% ± 0% range 0%-100%) (Fig 3C).

There was a significant 3-4 fold increase in the likelihood of having a life-threatening illness or death in infants born to mothers with high BP as compared to low BP (hazard ratio (HR): 3.30, 95% CI: 1.26-9.80, p = 0.03) (Fig 3D).

REFERENCES


Maternal breast milk antibodies correlate with both infant and maternal antibodies despite a lower overall breadth and potency.

Breast milk Env neutralization was significantly correlated with infant plasma Env neutralization (r = 0.39) (Fig 4A) and maternal plasma Env neutralization (r = 0.40) (Fig 4B).

Maternal breast milk samples demonstrated lower Env neutralization than maternal plasma (Fig 4C).

CONCLUSIONS

These results imply that pre-existing Env antibody activity present in exposure infant does not prevent breast milk HIV transmission. However, pre-existing high maternal neutralizing breadth and potency associated with both a higher frequency of breast milk transmission and subsequent infant morbidity. These results have important implications for vaccine and passive immunization strategies intended for HIV-1 infected mothers and their exposed infants. Further exploration of the effect of the maternal AID response on infant outcomes is warranted using different cohorts and subtypes of HIV.