

# HIV antibodies and reservoir size characterization of perinatally infected children



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## Background

Absence of detectable viremia after treatment cessation in few perinatally HIV-infected (PHIV) children suggests the possibility of early initiation of highly active combination of antiretroviral therapy (HAART) leading to functional cure<sup>1,2</sup>.

## Objective

To describe the factors associated with HIV antibodies and the viral reservoir size in PHIV HAART-treated children.  
To identify global HIV seroreversions and describe the factors associated.

## Methods

Transversal prospective study of 97 PHIV HAART-treated children with virological suppression (HIV-1 RNA plasma  $\leq$  50 copies/mL), in CHU Gabriel Touré, in Bamako, Mali, between August 2013 and April 2014.

HIV antibodies:

Anti-gp41 antibodies activity, by an enzyme-immunoassay evaluating the binding of antibodies to the immunodominant epitope of gp41<sup>3</sup>.

Quantification of antibodies against HIV, by enzyme-linked immunosorbent assay (ELISA) from Architect (Abbott).

Size of viral reservoir, by the measure of HIV blood cell associated total DNA<sup>4</sup>.

## Results

The characteristics of PHIV children are summarize in table 1.

**A low activity of anti-gp41 antibodies was associated with a younger age at treatment initiation** (Figure 1,  $p = 0.01$ ).

**A low level of antibodies against HIV was associated with a low activity of anti-gp41 antibodies** (Figure 2,  $p = 0.0015$ ).

A low level of antibodies against HIV tended to be associated with a younger age of treatment instauration ( $p = 0.06$ ).

No correlation was found between anti-gp41 antibodies activity or level of antibodies against HIV and HIV DNA level ( $p = 0.17$  or  $p = 0.4$ ).

The 9 children having an HIV DNA under the threshold ( $< 66$  copies/ $10^6$  cells) tended to have a lower anti-gp41 antibodies activity versus children with an HIV DNA  $> 66$  copies/ $10^6$  cells ( $p = 0.11$ ).

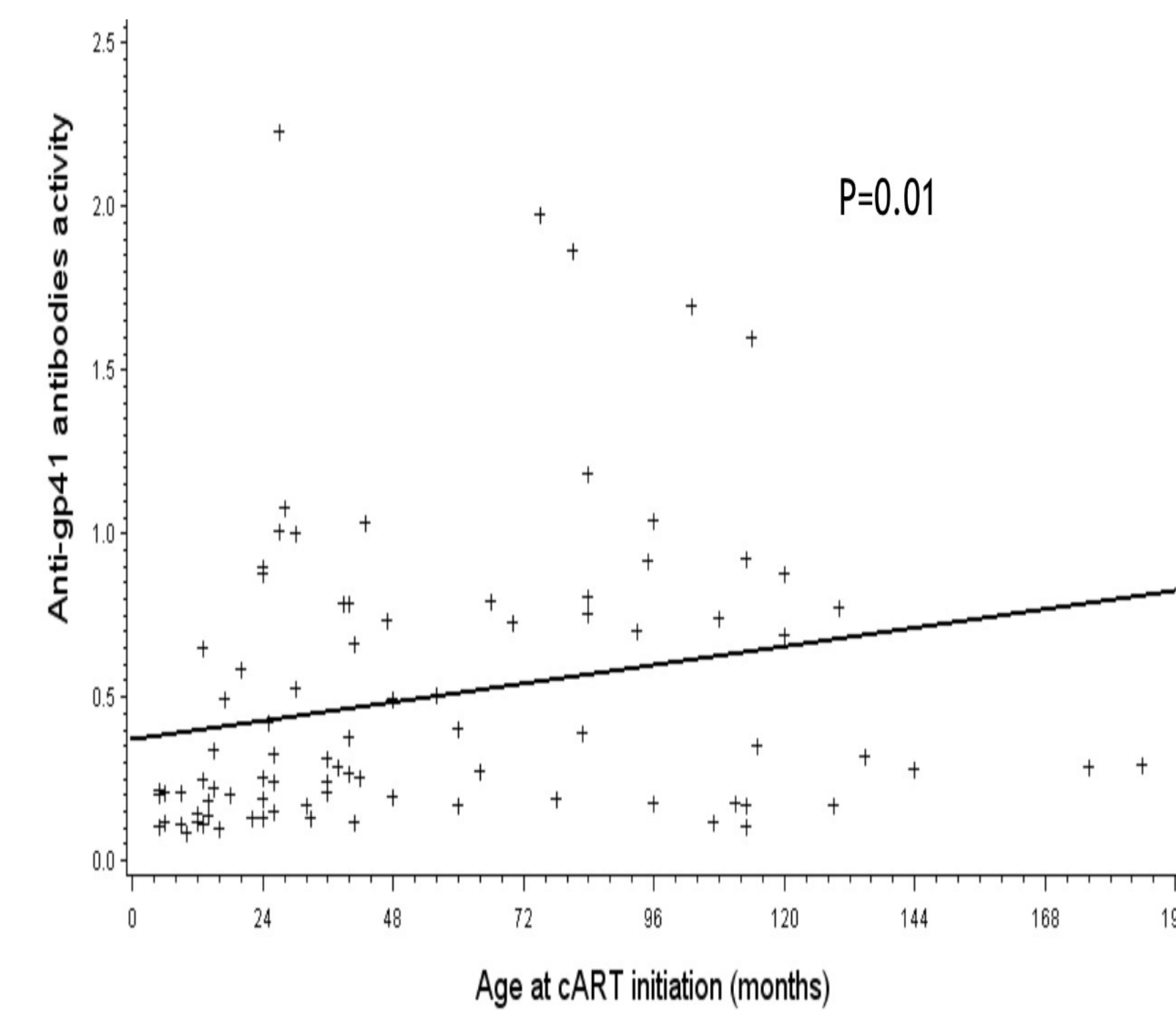
**Table 1** : Descriptive characteristics of PHIV HAART-treated children

	All participants (n=97)
Median age (IQR), y	9.8 [7;13.1]
Sex, No. (%): Female Male	38 (39) 59 (61)
cART prophylaxis type, No. (%): 2 NRTI + 1 NNRTI 2 NRTI + 1 PI	60 (62) 37 (38)
Median age at cART initiation (IQR), y	3.3 [1.9;7]
Median duration of cART treatment (IQR), y	5.4 [3.5;7]
WHO stage at study, No. (%): 1 or 2 3 or 4	36 (39) 52 (61)
cART type at study, No. (%): 2 NRTI + 1 NNRTI 2 NRTI + 1 PI	61 (63) 36 (37)
CD4 level at study: Median (IQR), /mm <sup>3</sup> No. with missing data	820 [605;1120] 1
HIV DNA level at study: Median (IQR), copy/ $10^6$ cells No. with missing data	445 [87;902] 2
Anti-gp41 antibodies activity: Median (IQR), OD No. with missing data	0.29 [0.18;0.75] 9
Anti-HIV antibodies level: Median (IQR), S/CO No. with missing data	14.1 [4.1;39.3] 10

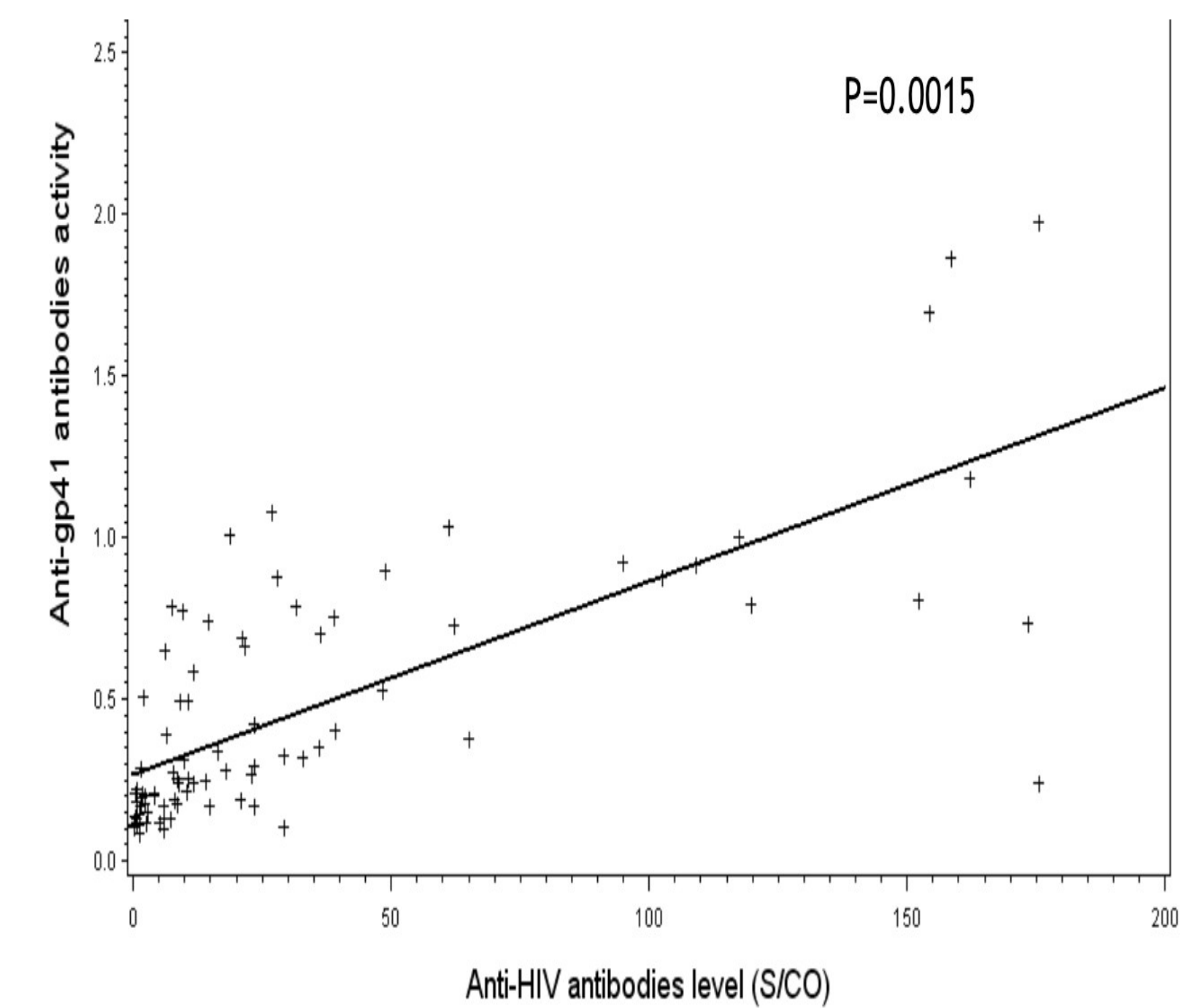
Abbreviations: cART, combination of antiretroviral therapy; IQR, interquartile range ; NNRTI, nonnucleoside reverse transcriptase inhibitor ; NRTI, nucleoside reverse transcriptase inhibitor ; OD, optical density ; PI, protease inhibitor ; S/CO, signal-to-cutoff ; WHO, World Health Organization ; y, years

<sup>a</sup> calculated by Spearman correlation and Fischer test

**Figure 1**: Distribution of anti-gp41 antibodies activity by age at cART initiation (optical density by months),  $p = 0,01$  calculated by Spearman correlation



**Figure 2**: Relationship between anti-gp41 antibodies activity and anti-VIH antibodies level (optical density by the signal-to-cutoff),  $p = 0,0015$  calculated by Spearman correlation



Overall, **eight global HIV seroreversions** were identified (negative ELISA Architect ie signal-to-cutoff (S/CO) values  $< 1.00$  ) with a median of anti-HIV antibodies level at 0.6 S/CO (IQR = 0.4 - 0.7). These 8 children started HAART at a median of 1.1 years of age. At inclusion in the study, they had in median 7.9 years of age, 820 cells/ $mm^3$  LT CD4 (IQR = 643 - 941) and were under HAART for 7.3 years.

Their median level of total HIV DNA was 315 copies/ $10^6$  cells (IQR = 132 - 526) and the median anti-gp41 antibodies activity was 0.13 OD (IQR = 0.12 - 0.19).

Two children had an HIV DNA under the threshold (1 detectable and 1 undetectable) with a low anti-gp41 antibodies activity.

The profile of cART was similar among the cohort (63 % of children had 2 NRTI and 1 NNRTI for treatment or prophylaxis).

## Conclusion

The decrease of antibodies production and/or their activity against some epitopes might reflect the absence of antigenic stimulation, reflecting the absence of residual viral replication. This study may be helpful to identify candidates with low viral reservoir through low antibodies level for future trials aiming at reducing or controlling HIV reservoir in order to limit children HAART duration.

## References

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