

HIV-1 SUPERINFECTION OF AN HIV-1 ELITE CONTROLLER

Andrea Rachinger¹, Marjon Navis¹, Paul Groeneveld², Angelique van't Wout¹, Hanneke Schuitemaker¹
¹ Dep. Experimental Immunology, Lab Viral Immune Pathogenesis, AMC/Univ. of Amsterdam, NL; ² Dep.Int.Med, Isala Clinics,Zwolle, NL

BACKGROUND

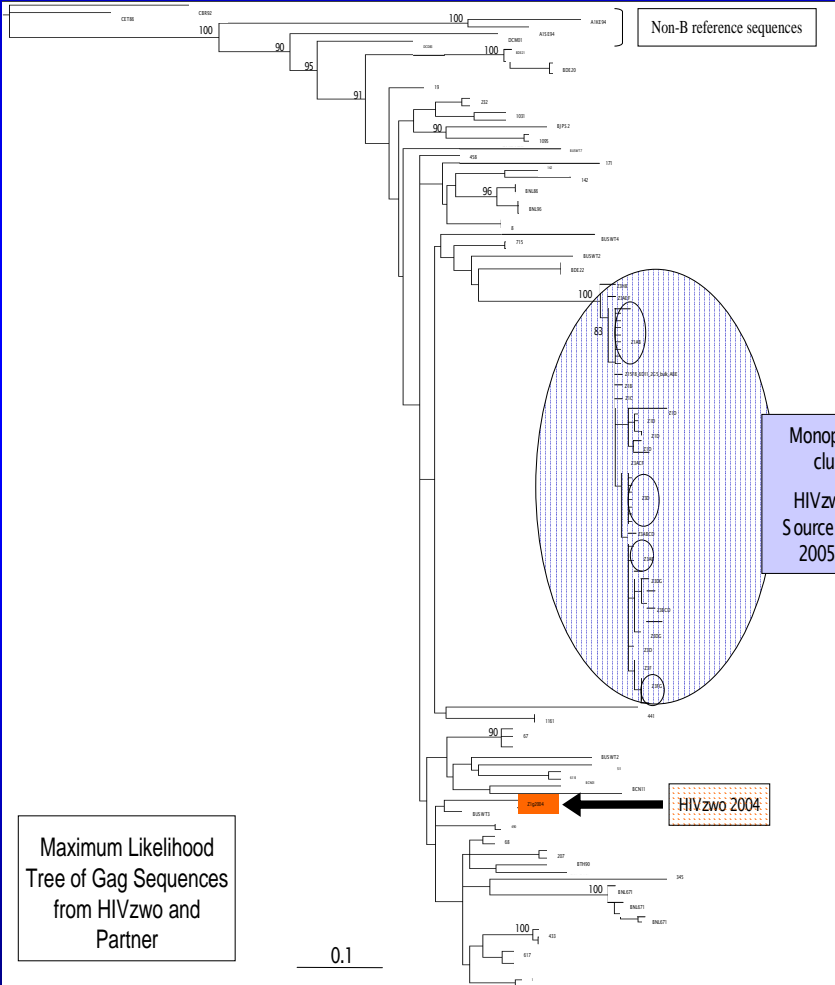
Spontaneous and sustained control of HIV infection to less than 50 copies of viral RNA/ml plasma in the absence of therapy is rare and represents a distinct phenotype among HIV-infected individuals ("elite" controllers). It is unknown how viremic control is established and whether it is determined by host or viral factors, or a combination of both.

METHODS

We performed a longitudinal immunological and viral analyses in an HIV-1 elite controller who experienced loss of viremic control after HIV-1 superinfection. We performed phylogenetic analyses on gag and env sequences from his HIV-1 variants and from variants from his HIV-1 infected partner.

RESULTS

This elite controller (HIVzwo) had undetectable viral load (VL<25-400 copies HIV-1 RNA/ml plasma) for at least 13 years and became viremic in December 2004 (95 copies). In May 2005, VL was again below detection limit (<25 copies) but had increased to 2300 copies in November 2005, reaching a maximum of 25000 copies in April 2006 before it declined again to 7500 copies in October 2007. Interestingly, a viral gag sequence obtained from the elite controller HIVzwo in December 2004 was phylogenetically distinct from sequences obtained later. Furthermore, viral gag and env sequences from the later time points clustered with sequences from his current HIV-1 infected partner with whom he engaged in unprotected sexual contact after February 2005. Detailed phylogenetic analyses was consistent with superinfection of this elite controller by his partner.



Maximum Likelihood Tree of Gag Sequences from HIVzwo and Partner

Monophyletic cluster HIVzwo and Source Partner 2005-2007

Maximum Likelihood Tree of Gag Sequences: Determination of HIV-1 Superinfection

The 'HIVzwo2004' sequence from the elite controller is not ancestral to sequences isolated between 2005-7 from the elite controller and his source partner, dating the superinfection event between December 2004 and May 2005.

CONCLUSION

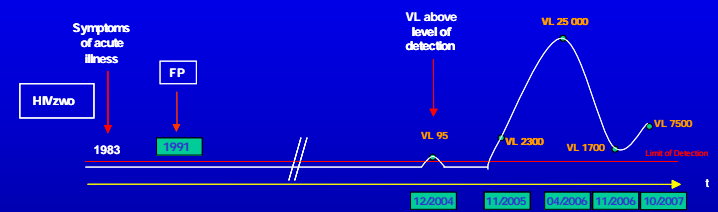
Here we report a case of HIV-1 superinfection of an HIV-1 elite controller by a known source partner. Loss of natural control after HIV-1 superinfection with a replication competent unrelated virus variant in this individual argues for a combination of viral and host factors as protective components against HIV-1 disease progression. A longer follow-up period is needed to assess whether re-establishment of elite control can be achieved.

Serology and Virology of Patient HIVzwo: an HLA*B57-positive long-term non-progressor

Test	Result
HIV specific antibodies	+
isolation of replication competent virus	-
Detection of proviral DNA in PBMC	-
HIV-1 RNA load (VL) in plasma	-
p24 antigen load in plasma	-
PBMC susceptibility to HIV-1	significantly lower than CD8 depleted PBMC of healthy blood donors

Kloosterboer et al. Virology, 2002

Viral Load in HIV-1 Elite Controller HIVzwo 1991-2007



Viral Load in Source Partner 2005-2007

