Expression of Unique and Diverse HIV Variants in Cerebrospinal Fluid during ART

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Background: The central nervous system (CNS) may become a sanctuary site for HIV during stable antiretroviral therapy (ART). The determinants and functional roles of CNS HIV remain poorly understood, and further studies are needed to understand the profile and dynamics of viruses in the central nervous system. Viral load suppression in plasma and virus detection in the CNS also provide the possibility of detecting HIV and quantifying its CNS load. Here, we report the analysis of HIV variants in cerebrospinal fluid (CSF) under chronic ART, with emphasis on the expression of viral RNA in the CSF of persons with persistent CNS viremia under HAART, and examined the phylogenetic relatedness of plasma and CSF viruses.

Methods: From the PARTNERS Study, 44 persons were included. Viral RNA was extracted from plasma and CSF samples, and HIV-1 RNA levels were determined. In 19 persons out of 44, HIV samples were captured based on specific virion antigen targeting. The CSF and plasma samples were analyzed using a particle immunocapture algorithm targeting host proteins embedded in the virion envelopes and examined the phylogenetic relatedness of plasma and CSF viruses.

Results: Among 44 persons on stable ART who underwent lumbar puncture for neurological disease (n=4) or a history of intermittent plasma viremia (n=2). Virions expressed in CSF were examined 6 HIV envelopes and ART using TDF FTC (99/99), RAL (99/99), DRV (79/79), EFV (86/86), ABC (60/60). Only 1 person had plasma viremia of 10 copies/mL and 5/6 samples from the other 5 persons were negative for HIV RNA in plasma, and CSF samples were captured by HIV-1 RT drug resistance mutations.

Aims: To identify the possible cellular sources of variant populations in the CSF by targeting host proteins embedded in the virion envelopes. To examine the phylogenetic relatedness of plasma and CSF viruses.

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Phylogenetic tree of HIV sequences obtained from the CSF and plasma of participants. Bulk and capture analyses were performed on each participant. The organism was identified from the CSF and plasma. The virus was wildtype or resistant to first-line ART drugs. The virus was wildtype or resistant to first-line ART drugs. The virus was wildtype or resistant to first-line ART drugs.

Conclusions: The virus was wildtype or resistant to first-line ART drugs. The virus was wildtype or resistant to first-line ART drugs. The virus was wildtype or resistant to first-line ART drugs.

Summary: Our findings contribute to understanding of cellular source of HIV variants in the CNS and ART drug resistance.

Acknowledgments: This work was supported by the National Institute of Allergy and Infectious Diseases of the National Institutes of Health under Award Number AI141862 (to A.J.); the NIHR London Biomedical Research Centre; the NIHR Health Protection Research Unit in HIV and HCV at Imperial College in partnership with Public Health England, funded by the Department of Health (to A.J.); and the Wellcome Trust (to A.J.).

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