

Interferon- α blocks HIV-1 infection in non-dividing myeloid cells despite SAMHD1 degradation and high deoxynucleoside triphosphates supply

Loic Dragin, Laura Nguyen, Hichem Lahouassa, Adèle Sourisce, Baek Kim, Cecilia Ramirez, Florence Margottin-Goguet

► To cite this version:

Loic Dragin, Laura Nguyen, Hichem Lahouassa, Adèle Sourisce, Baek Kim, et al.. Interferon- α blocks HIV-1 infection in non-dividing myeloid cells despite SAMHD1 degradation and high deoxynucleoside triphosphates supply. *Retrovirology*, BioMed Central, 2013, 10 (Suppl 1), pp.P69. <inserm-00868817>

HAL Id: inserm-00868817

<http://www.hal.inserm.fr/inserm-00868817>

Submitted on 2 Oct 2013

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



POSTER PRESENTATION

Open Access

Interferon- α blocks HIV-1 infection in non-dividing myeloid cells despite SAMHD1 degradation and high deoxynucleoside triphosphates supply

Loic Dragin^{1,2}, Laura Nguyen³, Hichem Lahouassa^{1,2}, Adèle Sourisce^{1,2}, Baek Kim³, Cecilia Ramirez^{1,2*}, Florence Margottin-Goguet^{1,2}

From *Frontiers of Retrovirology: Complex retroviruses, retroelements and their hosts*
Cambridge, UK. 16-18 September 2013

Background

Interferon- α (IFN- α) potently inhibits both the early and late phases of HIV replication by inducing diverse unknown antiviral host factors. The dGTP-regulated deoxynucleoside triphosphate (dNTP) hydrolase SAMHD1 is a restriction factor that inhibits the reverse transcription (RT) of HIV. SAMHD1 depletes dNTP levels in quiescent cells such as myeloid cells or resting CD4⁺ T lymphocytes. HIV-2 and its SIVsm and SIVmac close relatives encode a protein termed Vpx that counteracts this antiviral mechanism of “nucleotide depletion” by promoting SAMHD1 degradation, thus allowing the RT of retroviruses to proceed. It is also proposed that Vpx targets the IFN- α -induced APOBEC3A (A3A) antiviral protein for degradation. Here, we investigated whether IFN- α cooperates with nucleotide depletion to counteract HIV.

Materials and methods

Peripheral blood mononuclear cells from the blood of different anonymous donors were obtained and monocytes as well as CD4⁺ T cells were isolated by positive selection on magnetic microbeads (Milteny Biotec). Monocyte-derived macrophages (MDMs) and CD4⁺ T cells were used to study IFN- α effects on SAMHD1 expression, Vpx-induced SAMHD1 degradation, Vpx-mediated rescue of HIV-1 transduction and on the dNTP supply.

Results

IFN- α inhibited HIV-1 transduction in monocytes and in MDMs while SAMHD1 expression was not up-regulated. Vpx triggered SAMHD1 degradation in IFN- α treated cells, and weakly restored HIV-1 transduction from the IFN- α block. Vpx helper effect towards HIV-1 transduction was gradually inhibited with increasing doses of IFN- α . dNTP levels were not significantly affected in MDMs and CD4⁺ primary activated T lymphocytes by IFN- α and, in correlation with SAMHD1 degradation, restoration of dNTP levels by Vpx was efficient in MDMs treated with the cytokine. In contrast, IFN- α inhibited Vpx-mediated SAMHD1 degradation in THP-1 cells, where, accordingly, Vpx could not rescue HIV-1 transduction.

Conclusion

Our results suggest that the early antiviral effect of IFN- α results from a mechanism independent of nucleotide depletion in MDMs. In addition, they indicate that the macrophage-like THP-1 cell line may provide a system to characterize an IFN- α -induced cell response that inhibits Vpx mediated SAMHD1 degradation.

Acknowledgements

This work was supported by grants from the “Agence Nationale de la Recherche sur le SIDA et les hépatites virales” (ANRS), SIDACTION, Fondation de France and US National Institutes of Health (GM1041981 and AI049781 to B.K).

¹Institut Cochin, CNRS UMR81, Inserm U101604, Paris, France
Full list of author information is available at the end of the article

Authors' details

¹Institut Cochin, CNRS UMR81, Inserm U101604, Paris, France. ²Université Paris Descartes, Paris, France. ³University of Rochester Medical Center, Rochester, NY, USA.

Published: 19 September 2013

doi:10.1186/1742-4690-10-S1-P69

Cite this article as: Dragin *et al.*: Interferon- α blocks HIV-1 infection in non-dividing myeloid cells despite SAMHD1 degradation and high deoxynucleoside triphosphates supply. *Retrovirology* 2013 10(Suppl 1):P69.

**Submit your next manuscript to BioMed Central
and take full advantage of:**

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

