

Double-stranded RNA adenosine deaminase ADAR1 enhances both T cell susceptibility to human T-cell leukemia virus type 1 and 2 and viral replication

Anne Cachat, Sébastien Chevalier, Sandrine Alais, Adrien Boniface, Nga Ling Ko, Antoine Gessain, Hélène Dutartre, Renaud Mahieux

► **To cite this version:**

Anne Cachat, Sébastien Chevalier, Sandrine Alais, Adrien Boniface, Nga Ling Ko, et al.. Double-stranded RNA adenosine deaminase ADAR1 enhances both T cell susceptibility to human T-cell leukemia virus type 1 and 2 and viral replication. *Retrovirology*, BioMed Central, 2014, 11 (Suppl 1), pp.O49. <inserm-00924967>

HAL Id: inserm-00924967

<http://www.hal.inserm.fr/inserm-00924967>

Submitted on 7 Jan 2014

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.



ORAL PRESENTATION

Open Access

Double-stranded RNA adenosine deaminase ADAR1 enhances both T cell susceptibility to human T-cell leukemia virus type 1 and 2 and viral replication

Anne Cachat¹, Sébastien A Chevalier¹, Sandrine Alais¹, Adrien Boniface¹, Nga Ling Ko², Antoine Gessain², Hélène Dutartre¹, Renaud Mahieux^{1*}

From 16th International Conference on Human Retroviruses: HTLV and Related Viruses
Montreal, Canada. 26-30 June 2013

Type I interferons represent the first line of defense against pathogens. This family of cytokines activates the expression of antiviral proteins, such as the protein kinase R (PKR), an inhibitor of viral mRNA translation, and the double-stranded RNA adenosine deaminase ADAR1. ADAR1 has the ability to convert adenosine (A) into guanosine (G), thereby introducing mutations in the viral genome during its replication. A to G editing was previously reported in cells expressing HTLV-2 or STLTV-3 viruses but not investigating in HTLV-1 expressing cells (Ko et al. *J. Gen Virol.* 2013). Consequently we investigated whether ADAR1 expression was associated or not with an antiviral effect in the course of HTLV-1 and HTLV-2 infections. We first show that ADAR1 expression is increased in ATL patient peripheral blood mononuclear cells, in HTLV-1 and HTLV-2 transformed cell lines as well as in activated primary peripheral blood lymphocytes. Strikingly, in cells transfected with HTLV-1 and HTLV-2 molecular clones, ADAR1 over-expression enhances viral replication and viral egress through PKR functional inhibition, as demonstrated by western-blot analyses, luciferase assays, ELISA and infection experiments. We also demonstrate that this effect is independent of ADAR catalytic activity. In addition, ADAR1 expression enhances the susceptibility of a non-infected T cell line to HTLV-1 and HTLV-2

infection. Altogether, our results demonstrate that an interferon-induced protein exerts a proviral role in the context of HTLV infection by enhancing cells susceptibility to infection and increasing viral replication.

Authors' details

¹Oncogenèse Rétrovirale, Equipe labellisée Ligue nationale contre le cancer, CIRI, INSERM U1111-CNRS UMR5308, Université Lyon 1, Ecole Normale Supérieure, LabEx ECOFECT - Eco-evolutionary dynamics of infectious diseases, Lyon, Cedex 07, France. ²Unité d'Epidémiologie et Physiopathologie des Virus Oncogènes, CNRS URA 3015, Institut Pasteur, Paris, Cedex 15, France.

Published: 7 January 2014

doi:10.1186/1742-4690-11-S1-O49

Cite this article as: Cachat et al.: Double-stranded RNA adenosine deaminase ADAR1 enhances both T cell susceptibility to human T-cell leukemia virus type 1 and 2 and viral replication. *Retrovirology* 2014 **11** (Suppl 1):O49.

**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



* Correspondence: renaud.mahieux@ens-lyon.fr

¹Oncogenèse Rétrovirale, Equipe labellisée Ligue nationale contre le cancer, CIRI, INSERM U1111-CNRS UMR5308, Université Lyon 1, Ecole Normale Supérieure, LabEx ECOFECT - Eco-evolutionary dynamics of infectious diseases, Lyon, Cedex 07, France

Full list of author information is available at the end of the article