

Original Paper

Development of a single cycle replicable HIV-1 system: potential implications for vaccine and experimental researches investigations

Sadat SM (MSc)¹, Zabihollahi R (MD)², Vahabpour R (MSc)³, Siadat SD (PhD)⁴
Javadi F (MSc)³, Rezaei A (MD)⁵, Parivar K (PhD)⁶, Aghasadeghi MR (PhD)*⁴

¹PhD Student, Science and Research Branch of Islamic Azad University, Tehran, Iran. ²General Physician, Department of Hepatitis and AIDS, Pasteur Institute of Iran, Tehran, Iran. ³Department of Hepatitis and AIDS, Pasteur Institute of Iran, Tehran, Iran. ⁴Assistant Professor, Department of Hepatitis and AIDS, Pasteur Institute of Iran, Tehran, Iran. ⁵Professor, Department of Immunology, Esfahan University of Medical Sciences, Esfahan, Iran. ⁶Professor, Department of Biology, Science and Research Branch of Islamic Azad University, Tehran, Iran.

Abstract

Background and Objective: Human immunodeficiency virus (HIV) belongs to the retroviridae family and is the agent of acquired immunodeficiency syndrome (AIDS). Treatment of HIV for the global health has made a special importance for the new antiviral drug discoveries in addition to HIV vaccine developments.

Materials and Methods: In this experimental study single cycle replicable (SCR) HIV-1 virions with the capability of one cycle of replication were produced by the co-transfection of three plasmids of pmzNL4-3, psPAX2 and pMD2.G to the HEK cells and their replication capacity of the first generation SCR virions in HEK 293T, MT-2, and mouse spleen cells was examined by p24-capture ELISA, syncytium formation assay. The infectivity of the SCR-produced virions was also analysed on MT-2 cells.

Results: Experiments showed the efficient production of SCR virions. Moreover, results indicated the replication potency of SCR virions on the investigated cells and the inactivity of the produced SCR HIV virions. Complete HIV antigens are expressed in their native forms by SCR virions, but this second viral particles lack the replication capacity.

Conclusion: SCR HIV virions produced in this study are capable of one cycle of replication and will be inactivated thereafter. These features make SCR virions as a good candidate for HIV vaccine studies. Moreover, considering the one cycle replication, SCR virions do not need the severe biosafety concerns involved in retrovirus studies.

Keywords: HIV-1, Single cycle replicable (SCR) virions, Vaccine investigation

* **Corresponding Author:** Aghasadeghi MR (PhD), E-mail: mrasadeghi@pasteur.ac.ir

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