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Journal of Human Virology & Retrovirology

Viruses: Promising Anti-Oncogenic Virotherapy

Abstract

While many medical regimes are used to treat oncogenic infections, the emergence of virotherapy has drawn much interest among researchers nowadays. However, many hindrances are facing the use of them, the eminent of which is the development of tumor-resistant viral mutants. A long side with this, much knowledge on the tactics of cancerous infections coupled with better understanding of the biological properties of the viruses and viral genetics have enabled overcoming these difficulties leading to recognition of a panel of new virotherapeutic organisms. This editorial is trying to enumerate some of the oncolytic viral agents that are used in this field.

Keywords: Viruses; RNA viruses; DNA viruses; Viral mutants

Editorial

Volume 2 Issue 7 - 2015

Haroun M*

[1]*Department of Animal Resources, Virology Unit, Veterinary Laboratory, Qatar*

***Corresponding author:** Haroun M, Department of Animal Resources, Virology Unit, Veterinary Laboratory, PO Box 23211, Doha, Qatar, Tel: +97444560545; F: +97444653086; Email: mismail_99@yahoo.com; mohamedharounismail@gmail.com

Received: December 20, 2015 | **Published:** December 22, 2015

Introduction

In the long hunt for combating oncogenic diseases, the understanding, treating and controlling processes has reached significant levels. With the emergence of many therapies to treat oncongenesis, virotherapy was described. Since the first break through of 1960s, many human and animal viruses were proved experimentally to suppress in vitro and in vivo infectious and non-infectious tumor growths. Based on the replication potentiality of a given virus in cancerous cultures and its oncolytic capacity, a virus could be identified anti-cancerous. Both DNA and RNA viruses of human and animal origin are claimed to be oncolytic agents against many cancer types. DNA viruses; namely avian adenovirus [1-3] and herpes viruses [1,4] are proved to be effective virotherapeutic microbes. Interesting enough, a panel of RNA viruses including orthomyxoviruses, paramyxoviruses, rhabdoviruses, picornaviruses, non-human coronaviruses, reoviruses, retroviruses and many, are defined to be oncolytic agents. Newcastle disease virus [5-7], bovine herpesvirus-1 [8-9], bovine herpesvirus-4 [9], feline leukemia virus [10], non-human coronaviruses [11] are animal origin viruses described to combat tumorigenic cultures. Human viruses, namely measles virus [12-13] and herpes simplex virus [14] are well-known oncolytic agents used experimentally to treat tumor cases. Beside, many other viruses including Yaba-like disease virus, sendbis virus, foamy virus, and echovirus-type 1, saimiri virus are also known to be oncolytic [15].

With the fact that most of the available chemotherapeutic preparations are of deleterious side effects, the vector oncolytic viruses are either used alone or synergistically with other chemotherapeutic preparations and radiating regimes. Many efforts are applied to reconstruct their biochemical composition to retain maximum therapeutic yield. The core of these modifications is directed towards combination of three traits; namely targeting, arming and shielding of the vector virus. Efficient targeting of the cancerous element usually happens via introduction of multiple layers of cancer specific elements that would further improve safety and efficiency. While arming is attainable by provision of pro-drug convertases and cytokines expression, shielding of the vector virus for protection from the host immune system is carried through coating with polymers and sequential usage of envelopes and capsids [16].

Many hindrances are facing virothrapies as therapeutics for cancer, the eminent of which is the development of tumor-resistant viral mutants. However, the much knowledge on the tactics of cancerous infections coupled with better understanding of the biological properties of the viruses and viral genetics have enabled overcoming these difficulties. Despite the fine technology needed to attain this, many indicators of a promising future are on the horizon signaling the use of virotherapy in the field of controlling oncology.

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Citation: Haroun M (2015) Viruses: Promising Anti-Oncogenic Virotherapy. J Hum Virol Retrovirol 2(7): 00074. DOI: 10.15406/jhvrv.2015.02.00074