Perspective
Volume 6:6, 2022

Virology: Current Research

ISSN: 2736-657X

Open Access

Oncolytic Virus-mediated Anti-cancer Vaccination Strategies: Stabbing Cancer

Narayana Seth*

Department of Clinical Virology, University of Delhi, Delhi, India

Introduction

In recent years, significant progress has been made in the treatment of cancer, which has directly improved the outlook for cancer patients. Current treatments work well for many types of cancer, and some have a high rate of long-term remission. In spite of these advancements, the challenges of treating late-stage disseminated disease and the frequent occurrence of treatment resistance remain unmet by current care standards. Numerous novel strategies, including immunotherapy, have emerged as a result of the search for new options, particularly for cancers that resist treatment. The treatment of cancer has, without a doubt, been transformed by the concept of teaching the immune system to fight its own disease. The field of cancer immunotherapy is gaining popularity and is arguably one of the most promising therapeutic approaches to combating the disease. The recent successes and excitement that surround immune checkpoint blockade, chimeric-antigen receptor T cells, adoptive cell therapy and anti-cancer vaccines have led to the development of cancer immunotherapy. As a novel and adaptable treatment option that can induce anti-tumor immunity, oncolytic viruses (OV) are exciting immunotherapeutic possibilities.

Description

Although vaccinating against cancer on a preventative basis has the obvious benefit of preventing the onset of the disease, it can be challenging due to the need to identify a causal agent. Surprisingly, infection with oncogenic viruses accounts for more than 10% of all cancers. The L1 capsid proteins of the most prevalent HPV serotypes are the focus of the HPV vaccines. 95% protection against viral persistence, the development of external genital lesions, and cervical intraepithelial neoplasia was found in a clinical study involving cohorts of sero-negative women. Similar results have been achieved with HBV vaccines, which have been shown to reduce hepatocellular carcinoma incidence by up to 75% in vaccinated cohorts in a number of clinical trials conducted in high-prevalence areas. The promising clinical outcomes of the HPV and HBV vaccines emphasize the vaccine's potential; However, once the disease is well established, the majority of cancers are diagnosed. For patients who are unable to be treated with preventive vaccination, this provides additional support for the requirement of efficient therapeutic vaccines. Additionally, rather than focusing on self-antigens, the cancer vaccines discussed earlier target oncogenic pathogens. As a result, protective immunity is built up against viral epitopes, which are very specific for cancers caused by viruses and are therefore ideal targets for vaccination. On the other hand, the majority of cancers are not caused by infection, so these ideal foreign vaccination targets are not present. It is more difficult to identify and select effective vaccination targets for cancers that are not caused by oncogenic viruses. To prevent autoimmunity, auto reactive T cells are depleted during the negative selection step of thymic education, and only a small number can be found in the periphery. The majority of cancer antigens are aberrantly expressed or modified self-molecules, so this clearance step is necessary to prevent self-destruction but also hinders tumor recognition [1-5].

Anti-tumor immunity and immune memory can also be used to treat an existing disease in addition to the utilization of vaccination for the prevention of pathogen-induced carcinogenesis. Therapeutic vaccines target cancer cell-specific features and have the potential to directly control primary and metastatic lesions and reduce the likelihood of relapse. The majority of the current approaches target tumor antigens, whereas some immunization strategies target tumor-associated carbohydrates and vasculature. Tumour-associated antigens (TAA), which are used in vaccines against cancer, can either be common to all patients or unique to each one. The cancer testis antigens (CTA) are one of the common tumor antigens. Tumors frequently reactivate CTA expression, making them ideal vaccine targets. CTA expression is typically restricted to germinal cells in immune-privileged locations like the testis and the brain. After clinical validation of CTA expression, vaccines targeting these antigens have obvious therapeutic potential due to the large number of patients with CTA-positive tumors. The results of a recent review of the various anti-cancer vaccination trials emphasize this strategy's therapeutic potential. For instance, a phase III trial that looked at the use of interleukin (IL)-2 and gp100 peptide vaccination in patients with melanoma found that overall survival was improved to 17.8 months as opposed to 11.1 months. Another illustration is the autologous cell vaccine Sipuleucel-T, which was approved by the Food and Drug Administration (FDA) of the United States in 2010 for the treatment of patients with castration-resistant prostate cancer. The vaccine is made up of antigen-presenting cells taken from the patient's own blood that have been activated ex vivo with granulocyte macrophage colony-stimulating factor (GM-CSF) and a tumor antigen (prostatic acid phosphatase). The median overall survival of the Sipuleucel-T treatment group was found to be four months longer than that of the placebo group in a phase III trial. Patients in some studies, such as a trial comparing the use of an anti-melanoma vaccine with IL-2, developed autoimmune reactions like vitiligo (7 percent) and autoimmune thyroiditis. When developing an anti-cancer vaccine that targets cancer-associated antigens like CTA, these findings emphasize the significance of taking into account the potential emergence of autoimmunity.

Conclusion

The increasing drive for effective immunotherapies is certainly demonstrated through the many clinical trials initiated for virus-based mono therapies, as well as prime-boost regimens using viral vaccine platforms. Based on their success to-date, the development of effective cancer vaccines should continue to improve outcomes for cancer patients and become a popular treatment option for otherwise difficult-to-treat disease forms. OV vaccination strategies may be the final “stab” needed to take cancer down.

***Address for Correspondence:** Narayana Seth, Department of Clinical Virology, University of Delhi, Delhi, India, E-mail: sethnarayana@gmail.com*

Received: 03 November, 2022, Manuscript No. vcrh-23-86990; **Editor assigned:** 05 November, 2022, PreQC No. P-86990; **Reviewed:** 16 November, 2022, QC No. Q-86990; **Revised:** 22 November, 2022, Manuscript No. R-86990; **Published:** 30 November, 2022, DOI: 10.37421/2736-657X.2022.6.169

References

1. White, Martyn K., Joseph S. Pagano and Kamel Khalili. "Viruses and human cancers: a long road of discovery of molecular paradigms." *Clin Microbiol Rev* 27 (2014): 463-481.
2. Samoff, Erika, Emilia H. Koumans, Lauri E. Markowitz and Maya Sternberg et al. "Association of Chlamydia trachomatis with persistence of high-risk types of human papillomavirus in a cohort of female adolescents." *Am J Epidemiol* 162 (2005): 668-675.
3. Wang, Bin, Shanmugarajah Rajendra, Darren Pavey and Prateek Sharma et al. "Viral load and integration status of high-risk human papillomaviruses in the Barrett's metaplasia–dysplasia–adenocarcinoma sequence." *Am J Gastroenterol* 108 (2013): 1814-1816.
4. De Villiers, Ethel-Michele, Claude Fauquet and Thomas R. Broker. "Classification of papillomaviruses." *Virology* 324 (2004): 17-27.
5. Van Doorslaer, Koenraad, Qina Tan, Sandhya Xirasagar and Sandya Bandaru et al. "The Papillomavirus Episteme: a central resource for papillomavirus sequence data and analysis." *Nucleic acids research* 41 (2012): D571-D578.

How to cite this article: Seth, Narayana. "Oncolytic Virus-mediated Anti-cancer Vaccination Strategies: Stabbing Cancer." *Virol Curr Res* 6 (2022): 169.