

Prospects for Genetic Engineering in the Treatment of Cervical Cancer

Ziganshin Aydar Mindiyarovich*

Bashkir State Medical University, Ministry of Health of the Russian Federation, UFA, Russia.

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ABSTRACT

Viral infections pose a significant danger to humans. The most dangerous viruses are those that develop in a chronic form, when the infection is characterized by periodic periods of exacerbation and elimination, ensuring lifelong persistence of the virus in the human body. Despite antiviral therapy, many drugs do not have high specificity and effectiveness, which is associated with the high adaptive ability of viruses for treatment; all this requires the search for new effective methods of therapy.

The purpose of the abstract is to analyze modern methods of treating human papillomavirus.

Materials and Methods: A review of publications in international search engines was conducted using search keywords. An alternative to treatment could be the CRISPR-Cas9 “genetic scissors” technology for editing the human genome, which makes it possible to remove the structural elements of viruses after identifying a foreign agent. Human papillomaviruses, which are non-enveloped small dsDNA viruses, are of interest. Highly oncogenic strains of HPV are the cause of rectal cancer in 95% of cases, oropharyngeal cancer in 70%, vaginal cancer in 60% and the main cause of cervical cancer, which is associated with high mortality. Current vaccines prevent infection with the virus but do not protect those infected. All this significantly limits the use since the spectrum of HPV genotypes does not have a cross-effect. The use of CRISPR-Cas9 in combination with current anticancer drug may become an effective treatment in oncology, especially in cases associated with HR-HPV. Experiments with intratumoral administration of CRISPR-Cas9 mediated by HPV E6 and E7 led to the development of inactivating InDel mutations, which is associated with the induction of p53 or pRb proteins, and can lead to cell cycle arrest and cell death. Therefore, the use of CRISPR-Cas9 targeting HPV16 E6 and E7 oncogenes in combination with Cisplatin in vitro and in vivo may serve as an effective therapy for cervical cancer.

Conclusion: The introduction of modern genetic engineering technologies opens up new opportunities for the treatment of cervical cancer caused by the human papillomavirus.

Keywords: Genetic engineering, Genetic scissors, Human papillomavirus, Cervical cancer

Corresponding author: Ziganshin Aydar Mindiyarovich, Bashkir State Medical University, Ministry of Health of the Russian Federation, UFA, Russia, E-mail: Zigaidar@yandex.ru

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