Method to improve efficiency and specificity of human tumor targeting and elimination by using a combination of split & splice protein toxins and oncolytic viruses

Published date: Feb. 13, 2019

Technology description

The Need

In combating malignancies as complex as cancer, researchers and clinicians have created a diverse set of strategies to reduce tumor burden. Oncolytic viruses (OVs) have emerged as a promising means of treating this disease due to their potential to selectively target and effectively kill cancer cells. Numerous ongoing OV clinical trials have demonstrated efficacy and the first ever viral cancer treatment received FDA approval in 2015. The goals of oncolytic virus therapy include both tumor cell death and immune system engagement. The latter of these goals has only recently become a priority as tumor evasion of the immune system is a limiting factor in treatment. Oncolytic viruses serve as cancer immunotherapy agents that can interrupt this dangerous circumventing of normal immune response, but there are existing challenges with this approach. Expansion of OV therapy to more cancer subtypes would drastically increase the servable patient population and requires a framework of tailorable oncolytic virus approaches. To avoid immune system resistance to viral therapies themselves, the strategies should be suitable to multiple mechanisms of action and entry points to tumor cells. Bacterial toxins are also being developed for specific targeting of cancer cells to inhibit the immune system of the infected organism. Frequently, they catalyze a covalent modification of specific proteins or nucleic acids and thereby compromise cell homeostasis. Toxins have the capacity to enter cells and to modify their substrates in the cytosol and change the cellular morphology and function of a cell to kill the cell. Moving forward, the field must refine strategies utilizing the specificity and customizability of viruses and bacterial toxins. In conjunction with targeted diagnostics and other therapeutic options, this area of study holds the power to transform cancer care.

The Technology

Researchers at The Ohio State University have created a novel means of employing oncolytic viruses in conjunction with bacterial toxins to create a widely-applicable strategy for cancer cell targeting. The scientists have demonstratedin vitroa strategy for reversible inactivation of bacterial toxins with their

subsequent reactivation with the help of oncolytic viruses, and regain activity upon controlled reconstitution within a cancer cell. Presently, the team is further validating the approach through conductingin vivoexperiments in human xenograft mouse models.
This technology expands the range of human cancers susceptible to oncolytic virus therapy while improving upon the specificity of existing approaches and reducing off-target toxicity. Additionally, this proposed strategy will also improve the efficacy of the therapy by combining the oncolytic power of viruses with killing power of bacterial toxins.
Novel strategy to improve efficiency and specificity of tumor treatment via combinative use of a split & splice protein toxin and oncolytic virus.

Application area

Cancer immunotherapy
Biomedicalin vivoresearch assays

Advantages

Expanded application of oncolytic virus therapy to more cancer subtypes
Increased specificity of cancer cell targeting
Reduced risk of toxic side effects

Institution

Ventech Solutions

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