Advances in Medical Research

Short Article

World Medicine 2018 New generation of therapeutic cancer vaccines affordable to the masses, Michael Har-Noy, Immunovative Therapies Ltd., Israel

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Abstract

Immunotherapy is now accepted as a new treatment modality for cancer. US FDA approved checkpoint blockage, anti-CTLA4 and anti-PD1/L1, monoclonal antibody drugs and autologous CAR-T cells are the first generation of drugs with an immunemediated anti-tumor mechanism. These immunotherapy drugs have demonstrated ability to control metastatic disease and hematological malignancies. However, these first generation immunotherapy drugs work in only a limited number of indications and in only a minority subset of patients within these limited indications, particularly the small subset with tumors that express high mutational load status. In addition, these first generation drugs have unique and often serious immune-related sideeffects that require intensive expert supportive care. While many patients can achieve long-term disease control with current immunotherapy drugs, the majority of patients experience only the side-effects without clinical benefit. The limited applicability
and efficacy of checkpoint blockade drugs is due to the requirement for a pre-existing, effective immune response to be resident within the tumor lesions ("hot" tumors) in order for the mechanism of checkpoint blockade to be effective. The majority of human tumors lack an effective immune cell infiltrate ("cold" tumors). CAR-T cells are directed against surface antigens on tumor cells. This limits the use of this technology to hematological malignancies, as solid tumors lack unique surface antigen targets which are not expressed on normal tissues. Additionally, due to the cost of current immunotherapy drugs and the cost to treat the side-effects, the majority of the population in the developing world is unable to afford these drugs. Accordingly, there is a high unmet medical need for a broadly effective, low toxicity cancer immunotherapy drug that could be afforded by economically disadvantaged cancer patients. The immunotherapy drugs with the greatest potential for broad applicability against all types of tumors is the subclass of therapeutic cancer vaccines. This type of immunotherapy approach is designed to educate the immune system to specifically recognize tumors and thus create "hot" tumors as well as support the development of immune memory which provides long-term protection against recurrence of the targeted tumor without need for further treatment. Unfortunately, therapeutic cancer vaccines alone or in combination with checkpoint blockade have had disappointing results in the clinic. The failure of therapeutic vaccines is attributed to the multiplicity of complex immunosuppressive and immunoavoidance mechanisms employed by tumors to evade immune elimination. We have developed a new generation of therapeutic vaccines that are designed to provide non-toxic tumor debulking immunity and disease stabilization that are available in an "off-the-shelf " format that potentially can make these vaccines "affordable to the masses".

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