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EDITORIAL

The Looming Success in Cancer Vaccination

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Abstract: Cancer vaccination projects are on trial worldwide and the results are far-off being a remarkable success. Albeit, thousands of clinical trials are taking place, only a several of those are producing a significant result to increase the survival rate of the patients. Four vaccines (Human papillomavirus - HPV vaccines, Hepatitis B virus - HBV vaccines, Sipuleucel-T and Oncophage) are approved for market in the United States and Russia so far. Most of the prototype vaccines are yielding at phase III clinical trials after being successful at phase I and II. Apparently, new visions and approaches are required to guide these projects to harvest better results.

Keywords: Vaccination; Cancer; Clinical trial

The idea of vaccination of a metastatic cell seemed like a silver bullet at first, but unfortunately not resulting as presumed! Recent results from clinical trials are ended in high deviation from the expectation to shut the possibility of rapid deployment of this relatively novel therapy[1]. National Cancer Institute (NCI) already supported 5465 clinical trials of different cancer vaccines[2]. Albeit, some of the candidates (e.g. GVAX) showed better performance in phase I and II, but, the phase III clinical trials appeared very difficult to exceed[3]. Only two preventive vaccines have approved in the United States (Human papillomavirus-HPV vaccines, Hepatitis B virus - HBV vaccines) and one (Oncophage) has received a license to market in Russia[4]. Treatment vaccine against prostate cancer, sipuleucel-T (Provenge®) was approved by FDA in 2010. Among other vaccines, idiotype or immunoglobulin-based vaccine, BiovaxID failed in two phase III clinical trial[5]. In phase III clinical trials, MyVax, Favid and Biovaxid also result in a failure[6]. The results from MyVax concluded discovery and validation of immunologic and clinical responses biomarkers are critical for identifying patients more likely to get benefitted[7]. In phase III clinical trial, Vitespen, a protein-based vaccine against melanoma and advance renal cell carcinoma, also yielded to generate a substantial survival rate[8, 9]. A similar type Gp100 was unsuccessful in the reduction of tumor size[10]. The difficulty with peptide-based vaccines is the short and free peptides are likely to be discarded rapidly from the system before drawing an immune response. GVAX, an autologous whole-tumor-cell vaccine, showed no protection against prostate cancer in phase III clinical trials[11]. Prostate-specific-antigen-targeted vaccine ProstVac is currently at phase III trials against prostate cancer, despite its failure to improve progression-free survival rates from the phase II[12, 13]. Vaccines produced from tumor-cell, algenpantucel-L and OncoVAX, are in Phase III clinical trial[14] before any conclusive decision[15, 16]. Another therapeutic vaccine IMA901 to cure metastatic renal cell carcinoma showed prolonged survival in Phase I and II[17], but, resulted unsuccessful to increase the survival rate in Phase III clinical trials[18]. So, the overall scenario is not very promising at this moment.

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Vaccination is a straight-forward solution, eliminating the excessive study of risk factors[19], but, it is also apparent that novel approaches are required to generate success for these 'on trial' vaccines. Other associative methods along with the therapeutic vaccination require to be designed and developed and to employ for increasing the survival rate at the critical stage. Extensive study of biomarkers, scrutiny and analysis of the prior results have no alternative. Population-based personalized screening can also be implemented. In final words, the far-off dream of eradicating an enduring crisis with a silver bullet may take longer before displaying remarkable success.

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