

Recent Developments in Gene Therapy and Immunotherapy

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Editorial

In 2017, 8 of the 10 most popular drugs belong to large molecules such as antibodies (Humira/Adalimumab, Remicade/infliximab, Qituxan/Rituximab, Avastin/Bevasizumab, Herceptin/Trastuzumab, Opdivo/Nivolumab) or proteins (Enbrel/Etnaercept and Eylea/Aflibercept). The only two small molecule drugs are Revlimid/Lenalidomide and Xarelto/Rivaroxaban.

The editor intends to start a new column to summarize the recent developments in gene therapy and immunotherapy in an outline format every 2-3 months.

Here is the outline format of recent developments as follows:

Motzer et al. reported that the combination of Nivolumab (PD-1) with ipilimumab (CTLA-4) resulted in significant higher overall survival and response rates of patients with renal-cell carcinoma [1].

It was reported that combination of nivolumab with ipilimumab which are the medications for treating cancer is active in melanoma brain metastases and may be considered for the first-choice therapy [2].

Ferrari et al. expanded the therapy in the natural killer (NK) cell field where they designed the antibodies to inhibit tumor growth by stopping the shedding of cell surface MICA and MICB by human cancer cells which are recognized by NK cells to attack tumor cells [3].

Vonderheide commented that CD40 which is an receptor found on antigen presenting cell may play a critical role in increase the response rate in the immunotherapy [4]. Porter et al. showed the Penn grading on the CAR T therapy [5]. June et al. shared a review on CAR T cell immunotherapy [6].

Armand et al. confirmed the safety and efficacy of Nivolumab based on the study of an extended follow-up response of 205 treated patents [7].

Burnett et al. reported the importance of B cells and uncovered the 'secret weapon' of the immune system [8].

Eggermont et al. showed a "significant longer recurrence-free survival than placebo, with no new toxic effects identified" [9].

Szabados et al. found that 'the activity of chemotherapy was maintained despite previous exposure to immune therapy' [10]. Inherently, in another study, Tomasini et al. showed that durvalumab after chemoradiotherapy may also be a new treatment option [11].

Chester et al. showed the combination of PD1 and a tumor necrosis factor receptor 4-1BB expressed on T and NK Cells results in cytokine secretion and increase antibody-dependent cell mediated cytotoxicity is another promising immunotherapy [12].

Rossin et al. reported a non-internalising antibody-drug conjugates (ADCs) for drug release at a specific target site [13].

Qi et al. [14] reported their bi-specific antibodies (biAbs) battle tumors by targeting a membrane-proximal epitope of ROR1. The biAbs seems another promising strategy for cancer treatment, which has been growing rapidly in the last two years.

Imkeller et al. showed that the circumsporozoite protein of the malaria parasite plasmodium falciparum (PfCSP) could improve the B cell activation [15].

However, bad news on these treatments was also reported.

Moslehi et al. [16] used Vigibase to study the outcomes of the immune checkpoint inhibitor-based therapy (combination PD-1 and CTLA-4) and found 46 out of 101 treated patient were dead because of severe myocarditis, which casted a shadow over the immune based therapy.

Ratner et al. [17] reported that the unexpected treatment results of three patients with adult T-cell leukemia-lymphoma (ATLL). In all three cases, rapid progressions of the disease were observed after a single dose of nivolumab.

In May, FDA alerted that the decreased survival for patients treated with Keytruda or Tecentriq compared to those treated with platinum-based chemotherapy [18].

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