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## Editorial

# Recent developments in cancer therapy: A brief journey during the last 12 years

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Cancer is still the leading cause of death globally and resulted in nearly 10 million deaths in 2020 as per the last report available from World Health Organization. India's ICMR-NCDIR National Cancer Registry Programme estimates 12% increase in cancer cases in the country by 2025. The most prevalent types of cancer globally include breast, lung, colon, prostate, skin and stomach cancer. However, cervical cancer is the most common type of cancer found in 23 countries.

Surgery still continues to be the first-line treatment for many cancer types. Surgeries are now less invasive and involves the use of artificial intelligence (AI) and robotics. Chemotherapy regimens and precision radiotherapy have made a lot of progress over the years improving quality of life of cancer patients. The survival rates of cancer patients have considerably gone up with the advent new and improved therapeutic options and technologies. Liquid biopsy sampling techniques, have improved resulting in early detection of cancer. AI technologies are able to detect progress patterns and zones of improvement in tumour tissues which was inaccessible to human eye.<sup>1-6</sup>

Customized vaccines, AI assessments, cell-based therapy, increased access to gene editing tools have tremendously contributed in cancer treatment. Personalized oncology services offering therapeutic vaccines that are designed for individual needs. Identification of the DNA sequences causing mutations and the ones that are more

likely to develop the same are improving therapeutic outcomes. The advent of CRISPR/Cas9 has reduced the burden of gene editing researchers by reducing time and complexity in modifying DNA sequences. Researchers are employing CRISPR/Cas9 to isolate a gene from immune T cells that encodes for a protein that shields tumour cells against an immune response.

The recent breakthroughs were reported by researchers worldwide in the area of Immunotherapy due to increased access to improved detection and molecular characterization technologies. Increased understanding of proteomics and genomic have facilitated the characterization of cancer types at a microscopic level and clinical correlation of cancer types with cancer specific biomarkers.

If we look into the progress made in the last 10 to 12 years, we see the first human cancer vaccine that came to the limelight in the year 2010. The first cancer treatment vaccine "Sipuleucel-T", developed from the patient's own immune cells, for the treatment of metastatic prostate cancer resistant to hormonal therapy (Kantoff, Higano et al. 2010). It was a huge progress back then in the year 2010 and it opened increased areas of research in immunotherapy. Subsequently, USFDA approved Ipilimumab, a monoclonal antibody, for the treatment surgically impossible metastatic melanoma was discovered (Hodi, O'Day et al. 2010). In 2013, USFDA approved ado-trastuzumab-emtansine (T-DM1) a microtubule formation blocker for the treatment of HER2-positive breast cancer patients who previously received

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trastuzumab/taxane therapy (Amiri-Kordestani, Blumenthal et al. 2014). The year 2014 saw another milestone with the advent of another cancer vaccine “Gardasil 9” that protects against Human papilloma virus mediated cervical cancer (Mboumba Bouassa, Nodjikouambaye et al. 2019). The year 2017 saw the use of two CART T cell Therapies for customised or personalised therapy by using tisagenlecleucel against a specific variant of acute lymphoblastic leukemia and axicabtagene-ciloleucel against a variant of B-cell lymphomas (Maude, Laetsch et al. 2018, Roberts, Better et al. 2018). Finally, in the year 2020, we could come to a platform where we saw researchers investigate 2658 whole genomes obtained from 38 different types of cancer. The study named as “The PAN-Cancer Analysis of Whole genomes study investigated the detrimental role of the genomes in cancer progression and development (The, of Whole et al. 2020).<sup>7</sup>

If we look back on the history, we feel proud to have made long strides in ameliorating cancer, however, there is a lot more to accomplish before we can tame cancer.


### 1. Conflict of Interest

None.

### References

- Kordestani LA, Blumenthal GM, Xu QC, Zhang L, Tang SW, Ha L, et al. FDA approval: ado-trastuzumab emtansine for the treatment of patients with HER2-positive metastatic breast cancer. *Clin Cancer Res*. 2014;20(17):4436–41. doi:10.1158/1078-0432.CCR-14-0012.
- Hodi FS, Day SJO, McDermott DF, Weber RW, Sosman JA, Haanen JB, et al. Improved survival with ipilimumab in patients with metastatic melanoma. *New Engl J Med*. 2010;363(8):711–23. doi:10.1056/NEJMoa1003466.
- Kantoff PW, Higano CS, Shore ND, Berger ER, Small EJ, Penson DF, et al. Sipuleucel-T immunotherapy for castration-resistant prostate cancer. *New Engl J Med*. 2010;363(5):411–22. doi:10.1056/NEJMoa1001294.
- Maude SL, Laetsch TW, Buechner J, Rives S, Boyer M, Bittencourt H, et al. Tisagenlecleucel in children and young adults with B-cell lymphoblastic leukemia. *New Engl J Med*. 2018;378(5):439–48. doi:10.1056/NEJMoa1709866.
- Bouassa RS, Nodjikouambaye ZA, Sadjoli D, Adawaye C, Péré H, Veyer D, et al. High prevalence of cervical high-risk human papillomavirus infection mostly covered by Gardasil-9 prophylactic vaccine in adult women. *PLoS One*. 2019;14(6):217486. doi:10.1371/journal.pone.0217486.
- Roberts ZI, Better M, Bot A, Roberts MR, Ribas A. Axicabtagene ciloleucel, a first-in-class CAR T cell therapy for aggressive NHL. *Leuk lymphoma*. 2018;59(8):1785–96. doi:10.1080/10428194.2017.1387905.
- The I, P T, Whole CAO, Consortium G. Pan-cancer analysis of whole genomes. *Nature*. 2020;578(7793):82–93.

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