A BRIEF TIMELINE OF CANCER IMMUNOTHERAPY

1891 — COLEY'S TOXINS

William Coley first tests theory of post-surgical infections provoking an immune response in patients with cancer. By 1899 Coley's Toxins were available via Parke-Davis & Co. (now Pfizer).

1901 — RADIATION THERAPY

Development of x-rays and radiation therapy as potential cancer treatment shows great promise, with researchers exploring the possibilities of the new technology.

1957 — THALIDOMIDE DISASTER

Thalidomide first marketed in West Germany. By the early 60s Thalidomide was banned following 10,000 documented cases of children born with phocomelia. The disaster prompts many countries to introduce tougher rules for the testing and licensing of drugs, including the Kefauver Harris Amendment which makes Coley's Toxins illegal in the US.

1975 — HYBRIDOMA TECHNOLOGY

Georges Köhler & César Milstein produce hybridoma technology enabling the production of monoclonal antibodies for therapeutic use.

1997 — RITUXIMAB APPROVED

First antibody treatment approved for use by the FDA (rituximab). Following this approval, eleven other antibodies approved to treat cancer including alemtuzumab, ofatumumab and ipilimumab.

2010 — CANCER VACCINE & C.A.R. THERAPY

First cell-based immunotherapy cancer vaccine approved for treatment of prostate cancer (Provenge) following development by Dendreon. Separately, Steven Rosenberg discovers Chimeric Antigen Receptor Therapy (CAR), prompting the formation of several new clinical-stage biopharma companies such as Kite Pharma, Juno Therapeutics and Northwest Biotherapeutics.

2011 — THE DEMISE OF DENDREON

Dendreon loses two third of its market value after abandoning its forecast for Provenge. In 2014, Dendreon files for Chapter 11 bankruptcy protection, with Valeant Pharma acquiring Dendreon's assets in 2015.

2014 — CHECKPOINT INHIBITORS

FDA begins approving checkpoint inhibitors such as PD-L1 inhibitor atezolizumab and PD-1 inhibitors nivolumab & pembrolizumab (Keytruda).

EVOLUTION BIOSCIENCE

EVOLUTION GLOBAL TALENT ATTRACTION