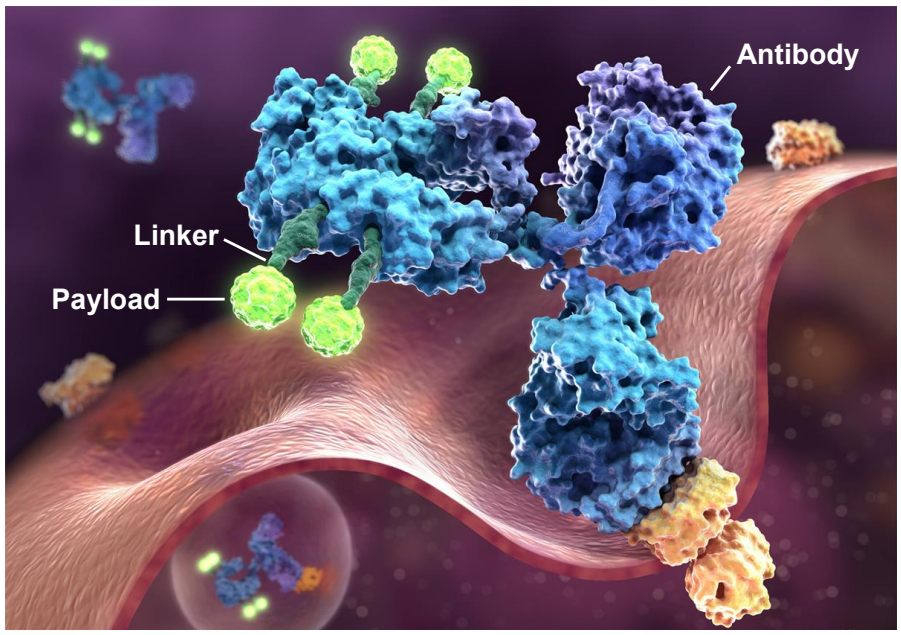
Global Antibody-drug Conjugate (ADC)

As innovative next-generation immunotherapeutic agents, antibody-drug conjugates (ADCs) are being developed worldwide as a major strategy to combat cancer and other immunological disorders. With the combination of a monoclonal antibody and extremely toxic chemical payloads, these bio-macromolecule “warheads” are by far one of the most powerful weapons in the immunotherapy arsenal, bearing the hope as “the beginning of the end” to the battle against cancer.

An ADC is formulated by conjugating a toxic payload with a monoclonal antibody via a small chemical linker. The antibody portion of an ADC serves as a molecular guidance system that accurately delivers the toxic payload to the tumor site for target elimination with minimum collateral damage to the healthy tissues. The payloads used in ADCs interrupt crucial intracellular pathways (microtubule dynamics, DNA structure and integrity, as well as gene transcription and translation…) and often exert extreme toxicity. The chemical conjugation of the payload to the antibody expands the therapeutic window of the payloads and enables the usage of these otherwise lethal compounds into tumor therapy for highly efficient tumor cell elimination by both ADC and bystander killing effects from the cycling free payloads. Linkers are another important component in an ADC that serve as a bridge to covalently connect the antibody and the payload. In the meantime, a linker also dictates the payload release mechanism.



The basic concept of ADC was proposed by German physician Dr. Paul Ehrlich well-known as the “magic bullets” back in 1913. By far, with four FDA-approved ADCs (Mylotarg, Adcetris, Kadcyla, and the newly approved Besponsa) and over 70 new ADCs under clinical evaluation, this concept has become a reality and Dr. Ehrlich’s vision and legacy continues to shape the new era of modern immunology, hematology, and medicine.