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Antibody-drug conjugates: the paradigm shifts in the targeted cancer therapy

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Abstract

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Chemicals and CAS Registry Numbers

Abstract

Cancer is one of the deadliest diseases, causing million of deaths each year globally. Conventional anti-cancer therapies are non-targeted and have systemic toxicities limiting their versatile applications in many cancers. So, there is an unmet need for more specific therapeutic options that will be effective as well as free from toxicities. Antibody-drug conjugates (ADCs) are suitable alternatives with the right

potential and improved therapeutic index for cancer therapy. The ADCs are highly precise new class of biopharmaceutical products that covalently linked a monoclonal antibody (mAb) (binds explicitly to a tumor-associated surface antigen) with a customized cytotoxic drug (kills cancer cells) and tied via a chemical linker (releases the drug). Due to its precise design, it brings about the target cell killing sparing the normal counterpart and free from the toxicities of conventional chemotherapy. It has never been so easy to develop potential ADCs for successful therapeutic usage. With relentless efforts, it took almost a century for scientists to advance the formula and design ADCs for its current clinical applications. Until now, several ADCs have passed successfully through preclinical and clinical trials and because of proven efficacy, a few are approved by the FDA to treat various cancer types. Even though ADCs posed some shortcomings like adverse effects and resistance at various stages of development, with continuous efforts most of these limitations are addressed and overcome to improve their efficacy. In this review, the basics of ADCs, physical and chemical properties, the evolution of design, limitations, and future potentials are discussed.

Author keywords

Antibody-drug conjugate (ADC); cancer chemotherapy; payloads; targeted therapy; warheads

Indexed keywords

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