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New insight into strategies used to develop long-acting G-CSF biologics for neutropenia therapy

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Over the last 20 years, granulocyte colony-stimulating factors (G-CSFs) have become the major therapeutic option for the treatment of patients with neutropenia. Most of the current G-CSFs require daily injections, which are inconvenient and expensive for patients. Increased understanding of G-CSFs' structure, expression, and mechanism of clearance has been very instrumental in the development of new generations of long-acting G-CSFs with improved efficacy. Several approaches to reducing G-CSF clearance via conjugation techniques have been investigated. PEGylation, glycosylation, polysialylation, or conjugation with immunoglobulins or albumins have successfully increased G-CSFs' half-lives. Pegfilgrastim (Neulasta) has been successfully approved and marketed for the treatment of patients with neutropenia. The rapidly expanding market for G-CSFs has increased demand for G-CSF biosimilars. Therefore, the importance of this review is to highlight the principle, elimination's route, halflife, clearance, safety, benefits, and limitations of different strategies and techniques used to increase the half-life of biotherapeutic G-CSFs. Understanding these strategies will allow for a new treatment with more competitive manufacturing and lower unit costs compared with that of Neulasta.

Biography

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