

PHARMACOLOGY-III
UNIT-IV
TOPIC: PROTEIN DRUGS



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PROTEIN DRUG:

Linear POLYPEPTIDES that are synthesized on RIBOSOMES and may be further modified, crosslinked, cleaved, or assembled into complex proteins with several subunits. The specific sequence of AMINO ACIDS determines the shape the polypeptide will take, during PROTEIN FOLDING, and the function of the protein.

Therapeutic protein drugs are an important class of medicines serving patients most in need of novel therapies. Recently approved recombinant protein therapeutics have been developed to treat a wide variety of clinical indications, including cancers, autoimmunity/inflammation, exposure to infectious agents, and genetic disorders.

The latest advances in protein engineering technologies have allowed drug developers and manufacturers to fine-tune and exploit desirable functional characteristics of proteins of interest while maintaining (and in some cases enhancing) product safety or efficacy or both. In this review, we highlight the emerging trends and approaches in protein drug development by using examples of therapeutic proteins approved by the U.S. Food and Drug Administration over the previous five years (2011–2016, namely January 1, 2011, through August 31, 2016).

Lepirudin A protein-based direct thrombin inhibitor used to reverse and prevent thrombus formation in heparin-induced thrombocytopenia.

Cetuximab An endothelial growth factor receptor binding fragment used to treat colorectal cancer as well as squamous cell carcinoma of the head and neck.

Dornase alfa A synthetic form of human deoxyribonuclease I used to break down extracellular DNA in the lungs, a major source of mucous viscosity in cystic fibrosis.

Denileukin diftitox A recombinant cytotoxic protein based on a combination of diphtheria toxin fragments and interleukin-2 used to treat cutaneous T-cell lymphoma by targeting the interleukin-2 receptor.

Etanercept A protein therapy based on the binding fragment of the tumour necrosis factor alpha receptor used to treat severe rheumatoid arthritis and moderate to severe plaque psoriasis.

Bivalirudin A direct thrombin inhibitor used to treat heparin-induced thrombocytopenia and to prevent thrombosis during percutaneous coronary intervention.

Leuprolide A protein-based luteinizing hormone antagonist used to treat prostate, endometriosis, and precocious puberty.

alfa-2a A modified form of recombinant human interferon used to stimulate the innate antiviral response in the treatment of hepatitis B and C viruses.

Alteplase A recombinant form of human tissue plasminogen activator used in the emergency treatment of myocardial infarction, ischemic stroke, and pulmonary emboli.

Sermorelin For the treatment of dwarfism, prevention of HIV-induced weight loss