

Keywords: *[faded text]*

Introduction

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Antisense drug oligonucleotides (A) are a class of small molecules that bind to specific mRNA sequences, leading to the degradation of the target mRNA and subsequent inhibition of protein synthesis. This mechanism of action is highly specific and reversible, making antisense oligonucleotides a promising therapeutic approach for various diseases, including cancer, viral infections, and genetic disorders. The development of antisense oligonucleotides involves the identification of target mRNA sequences and the synthesis of complementary oligonucleotides. The binding of the oligonucleotide to the target mRNA is mediated by Watson-Crick base pairing, forming a double-stranded complex. This complex is then recognized by cellular enzymes, leading to the cleavage of the mRNA and the release of the oligonucleotide. The resulting fragments of mRNA are rapidly degraded, preventing the translation of the target protein. Antisense oligonucleotides can also be used for gene silencing and the study of gene function in cell culture and animal models. The use of antisense oligonucleotides in clinical trials has shown promising results, particularly in the treatment of cancer and viral infections. However, the development of antisense oligonucleotides as drugs faces several challenges, including low bioavailability, off-target effects, and the need for improved delivery systems. Despite these challenges, antisense oligonucleotides remain a promising area of research in drug development.

Antisense drug oligonucleotides

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