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Opinion Article

Protein Oligonucleotides and its Importance in Biomolecules

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DESCRIPTION

Two of the most important types of functional macromolecules are proteins and nucleic acids. A wide variety of functional molecules that take advantage of both the programmability and recognition potential of nucleic acids and the structural, chemical and functional diversity of proteins are made available by the ability to access specific protein oligonucleotide conjugates. Here, it explains many conjugation techniques that can be used to obtain such chimeric molecules and highlight some significant case study examples from the industry to demonstrate the effectiveness and practicality of such technology. Since proteins and nucleic acids are the two major categories of biologically useful molecules, it makes sense that each of these biomolecules is crucial for the development of biological chemistry and chemical biology. However, because of the underlying differences between the classes, which are also present in biology, they are frequently used for various purposes. Together with their well-defined hydrogen bonding capabilities, the few structural parts that make up nucleic acids give them a special programmability and make it simple to forecast overall geometry. Because of these factors nucleic acids are frequently utilized to recognize certain partner strands, enabling the creation of defined Nano objects or to physically convey information through conformational change by serving as molecular circuits.

Since proteins and nucleic acids are the two major categories of biologically useful molecules, it makes sense that each of these biomolecules is crucial for the development of biological chemistry and chemical biology. Due to these factors, nucleic acids are frequently utilized as molecular circuits to physically convey information through conformational change or for the particular recognition of partner strands that enables the construction of defined Nano objects. It's crucial to remember that these systems can use both natural DNA and synthetic nucleic acids. While proteins and nucleic acids alone possess enormous strength and utility from a functional standpoint their combined power and utility can be endlessly increased. This however depends on being able to perform such a combination in a programmable and controllable manner. As a result the fundamental conjugation chemistries that are available ultimately determine whether such an effort will be successful. Because many functional groups are common in biological molecules, performing precision chemistry on them is difficult by nature. As a result, only a limited number of chemical alterations are useful in this situation. While proteins and nucleic acids alone possess enormous strength and utility from a functional standpoint, their combined power and utility can be endlessly increased. While most methods for conjugating proteins and nucleic acids are chemical in nature, the subset of these reactions that are appropriate in a given situation depends on the decision of whether to use a naturally occurring reactive handle (most commonly lysine or cysteine) or an artificial one. Although naturally occurring moieties are practically easy to obtain in terms of substrate, they can have issues with specificity. On the other hand having access to reactive handles that don't exist naturally offers chemical specificity, but at the expense of difficulties in getting the beginning protein. Covalent bond formation between proteins and DNA has become a crucial stage in a variety of new biotechnological applications. Although native amino acids can be targeted for DNA conjugation, this method has a low selectivity. To increase conjugation selectivity protein engineering techniques ranging from single site-directed amino acid changes to non-canonical amino acid incorporation to the creation of fusion proteins can be used. More advanced conjugation strategies have been developed, but they can be costly in terms of oligonucleotide modifications and have lower yields.

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