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Commentary

Protein Methyltransferase Investigation using Modern Chemical Biology Methods

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DESCRIPTION

A scientific branch called chemical biology integrates the study of both chemistry and life. The study and modification of biological systems is done using chemical tools, analysis, and frequently tiny compounds made by synthetic chemistry. Chemical biology deals with chemistry applied to biology, including the synthesis of biomolecules, the simulation of biological systems, etc. This is in contrast to biochemistry, which involves the study of the chemistry of biomolecules and regulation of biochemical pathways within and between cells. By analysing biological processes at the chemical level, several types of chemical biology try to provide biological questions with answers.

Chemical biology probes systems *in vitro* and *in vivo* with small molecules that have been designed for a specific purpose or identified on the basis of biochemical or cell-based screening, in contrast to biochemistry, genetics, or molecular biology, where mutagenesis can provide a new version of the organism, cell, or biomolecule of interest. For more information, see chemical genetics. One of several interdisciplinary sciences that tends to diverge from more traditional, reductionist fields and aims to describe scientific holism is chemical biology. Medical chemistry, supramolecular chemistry, bioorganic chemistry, pharmacology, genetics, biochemistry, and metabolic engineering are the scientific, philosophical, and historical foundations of chemical biology. Through the creation of novel probes, chemical affinity tags, and enrichment techniques, chemical biologists strive to improve proteomics. The sequence of interest may be highly represented or of low abundance in proteomics sample mixtures, which poses a challenge to their detection. Through the use of affinity chromatography and selective enrichment, chemical biology techniques can lessen sample complexity. Targeting a peptide with a distinctive characteristic like a biotin label or a post translational modification is required for this. Antibodies, lectins to capture glycoproteins, immobilised metal ions to capture phosphorylated peptides, and enzyme substrates to capture specific enzymes are some of the techniques that have been developed. Chemical biologists performed high-throughput analyses of biological processes by automating the production of several small molecule libraries. Small compounds with antibiotic or chemotherapeutic activity might be discovered as a result of such research. These combinatorial chemistry techniques are the exact same ones used in pharmacology. Through the creation of novel probes, chemical affinity tags, and enrichment techniques, chemical biologists strive to improve proteomics. The sequence of interest may be highly represented or of low abundance in proteomics sample mixtures, which poses a challenge to their detection. Through the use of affinity chromatography and selective enrichment, chemical biology techniques can lessen sample complexity.

Targeting a peptide with a distinctive characteristic like a biotin label or a post translational modification is required for this. Antibodies, lectins to capture glycoproteins, immobilised metal ions to capture phosphorylated peptides, and enzyme substrates to capture specific enzymes are some of the techniques that have been developed. Chemical biologists regularly employ fluorescence techniques to look into how biological macromolecules function. In comparison to other techniques, fluorescence has a number of benefits, including high sensitivity, non-intrusiveness, safe detection, and the ability to modify the fluorescence signal. In recent years, it has become possible to more precisely assess the position and function of proteins using green fluorescent protein (GFP), hybrid systems, and quantum dots. The three primary types of fluorophores used are quantum dots, small chemical dyes, and green fluorescent proteins. Small organic dyes, typically less than 1 kDa, have been altered to increase their photostability and brightness while decreasing self-quenching. High molar absorptivity, crisp wavelengths, and quantum yield are all characteristics of quantum dots.

CONCLUSION

Organic and quantum dyes both require immunolabeling since they are unable to identify the target protein without the help of antibodies. Protein of interest can be combined with fluorescent proteins, which are genetically encoded. The tetracysteine biarsenical system is another method for genetically tagging proteins.

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