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Short Communication

Protein-Protein Interactions: Biological Regulation of Enzyme Function

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DESCRIPTION

Protein-Protein Interactions (PPIs) are highly specialized physical contacts that develop between several protein molecules as a result of biochemical reactions influenced by interactions such as electrostatic forces, hydrogen bonds, and the hydrophobic effect. There are a large number of physical connections in a cell or in a living thing that involve molecular links between chains and occur in a specific biomolecular context.

PPIs have been studied using a variety of approaches and viewpoints, including those from the fields of quantum chemical analysis in biochemistry, molecular situations, and signal transmission [1,2].

Protein interactions, or PPIs, serve as regulating elements in a variety of cell-signaling pathways that are associated with the hallmarks of the carcinoma. PPIs have been identified as interesting targets for cancer and are currently the subject of both academic and commercial drug discovery efforts. These PPIs are intimately causally connected to cell survival and communication. Protein-protein interactions between enzymes and proteins that isn't necessarily necessary for enzyme function may also play a significant role in regulation [3-5].

Among the biological activities that are mediated by protein-protein interactions are cell-to-cell communication, hormone control, and the management of developmental processes. The in-depth research of PPIs has sped up the modeling of functional pathways to show the molecular mechanisms of cellular functions. Change the properties of catalysts;

- Serve as an all-encompassing system that permits substrate channelling.
- Create a second permanent location for less disruptive particles.
- Restrict or inactivate a protein.
- Change a protein's explicitness for its substrate by interacting with different partners that have restrictions.
- Either act as an upstream or downstream regulator.

Drug targets can be found by revealing information about protein-protein interactions. PPIs serve as broad points of entry for small-molecule medicines that can disrupt or stabilizes the surface of two interacting intracellular proteins or protein structures [6,7].

Types of Protein-Protein interactions

The Protein-Protein interactions have following types:

- Homo and Hetro oligomer complexes
- Non-obligate and obligate complexes
- Transient and permanent complexes

Homo and hetro oligomer complexes

Exact or dissimilar chains can interact with other proteins. Protein oligomers that contain identical or homologous protein units can be arranged symmetrically either homogeneously or heterogeneously. The same surface of both monomers forms a homogeneous bond when they are joined by a twofold axis of symmetry. Heterogeneous assemblies can oligomerize over several surfaces, as opposed to homogeneous assemblies, which can only do so across one. Without the closed symmetry, additional oligomerization is still feasible, providing an endless number of aggregation options [8].

Non-obligate and obligate complexes

There are two distinct types that can be distinguished depending on whether a complex is necessary or not. Protomers are not identifiable, permanent structures found in required PPIs of living beings. These complexes are typically functionally related. For instance, arcpressor dimers are necessary for DNA binding. Unintentional connections between independently existing protomers occur in a large number of hetero-oligomeric protein structures, such as intracellular signalling complexes, antibody antigens, receptor ligands, and enzyme inhibitor complexes [9].

Transient and permanent complexes

Transient interactions between proteins are quickly formed and broken connections that are important in numerous situations of unit activity. These techniques are used to identify different forms of fleeting protein-protein interactions. The role of transient connections in protein-protein interaction networks

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and how these interactions affect various network properties. Usually, interactions that are necessary for structure or function are persistent [10].

CONCLUSION

Macromolecular interactions play a major role in controlling fundamental cell development. Here, protein-protein interactions are important, and their dysregulation may contribute to the development of many illnesses. Although PPIs were once thought to be promising pharmaceutical targets, this was years ago. Currently, their main use is for therapeutic interruption with a few numbers of compounds. It is known that there are a number of theoretical and technical constraints, as well as other limiting factors, which combined explain why research in this area is somewhat slow.

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