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Meeting to Explain the Latest Information of Molecular Membrane Biology Online

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INTRODUCTION

Enzymes can change their shape slightly upon substrate binding, improving the fit and promoting catalysis. Proteins rarely work alone; they often collaborate through protein-protein interactions to carry out complex tasks. These interactions are crucial for cell signalling, gene regulation, and the formation of large molecular complexes. One classic example of protein-protein interactions is the formation of dimers or multiverse. Many proteins have multiple subunits that come together to create functional complexes. Haemoglobin, the protein responsible for oxygen transport in blood, is composed of four subunits that interact to bind oxygen. Protein-protein interactions also play a critical role in cell signalling pathways. Receptor proteins on the cell surface recognize specific signalling molecules, initiating a cascade of protein interactions that ultimately transmit the signal to the nucleus and affect gene expression. DNA-protein interactions are fundamental to gene expression regulation. Proteins called transcription factors bind to specific DNA sequences to activate or repress the transcription of nearby genes [1-3]. The specific recognition of DNA sequences by transcription factors is crucial for their function. The interaction between a transcription factor and a regulatory DNA sequence can determine whether a gene is turned on or off, leading to changes in the cell's behaviour and identity. Cell signalling, the process by which cells communicate with each other, relies heavily on molecular interactions.

DESCRIPTION

Signalling molecules, such as hormones and growth factors, bind to receptors on the cell surface, initiating a cascade of interactions that lead to cellular responses. The interaction between signalling molecules and receptors is highly specific. Different receptors recognize distinct signalling molecules, ensuring that cells respond selectively to the appropriate cues. Molecular interactions are the threads that weave the fabric of life. From the precise binding of enzymes to their substrates to the orchestrated dances of protein complexes, these interactions drive the fundamental processes of molecular biology. The specificity, elegance, and complexity of molecular recognition reveal the marvels of cellular function and open doors to applications in medicine, drug discovery, biotechnology, and beyond. As scientists continue to unravel the mysteries of molecular interactions, new horizons emerge, offering insights into the complexities of life itself. The study of these interactions not only deepens our understanding of biology but also fuels the innovation that propels science and technology forward. Cell signalling is a mechanism by which cells communicate with each other and respond to extracellular cues. Signalling molecules, such as hormones, growth factors, and neurotransmitters, bind to specific receptors on the cell surface, initiating a cascade of events within the cell [4,5]. One common signalling pathway is the receptor tyrosine kinase pathway.

CONCLUSION

Upon ligand binding, receptor proteins dimerize and activate intracellular kinases. These kinases phosphorylate downstream proteins, ultimately leading to changes in gene expression, metabolism, or cell division. Cell signalling is a tightly regulated process that ensures cells respond appropriately to their environment, promoting homeostasis and coordinated multicellular behaviours. DNA repair mechanisms are essential for maintaining the integrity of the genetic material. DNA is constantly exposed to damaging agents such as radiation and chemicals, and errors can occur during replication. Various DNA repair pathways exist to correct different types of damage. Base excision repair, for instance, fixes single-base lesions, while nucleotide excision repair removes bulky DNA lesions.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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