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Molecular hybridization: Novel methodology for the investigation of biological active heterocyclic moieties

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Molecular hybridization is a strategy of rational design of ligands or prototypes based on the recognition of pharmacophoric sub-units in the molecular structure of two or more known bioactive derivatives which, through the adequate fusion of these sub-units, lead to the design of new hybrid architectures. Hybrid drugs are basically designed to counterbalance the known side effects associated with the other hybrid part or to amplify its effect through action on another bio target or to interact with multiple targets as one single molecule lowering the risk of drug-drug interactions and minimizing the drug resistance. Heterocyclic and fused heterocyclic compounds for chemical classes have been identified through molecular biology, molecular modelling, drug designing, empirical screening and rational drug development for evaluation of anticancer agents during the past decades. Purine, quinazoline, s-triazine, imidazopyrazine, benzimidazole and naphthalimide are most pervasive heterocyclic ring systems found in nature and are pharmaceutically important classes of compounds. In medicinal chemistry, these motifs have attracted a great deal of research interest due to their preponderance in pharmaceutically indispensable compounds. Thus, new hybrids molecules by the combination of imidazopyrazine and benzimidazole as well as naphthalimide and benzimidazole have been synthesized. These hybrid molecules are then evaluated in vitro for 60 human cancer cell lines for one dose and five doses. The mechanism of possible activity of these compounds is further evaluated with DNA for their interaction studies using UV-visible and fluorescence spectroscopy.

Speaker Biography

Kamaldeep Paul has received his MSc degree from Department of Pharmaceutical Sciences in 2000, and PhD in Synthetic Organic Chemistry from Department of Chemistry, Guru Nanak Dev University, Amritsar in 2006. He is working as an Associate Professor in School of Chemistry and Biochemistry, Thapar University, Patiala, India. His area of research is Synthetic Organic and Medicinal Chemistry where his research is broadly focused on multistep synthesis of heterocyclic molecules and their in vitro evaluation for anticancer activity. He has published more than 60 papers in reputed journals and has been serving as reviewers of repute.

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