Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Genetically targeted fluorophores as molecular tools beyond visualisation

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Fluorescence microscopy is vital to biology. Many critical insights have been learned by watching biomolecules move in living cells. Consequently, significant effort is dedicated to developing fluorescence microscopy techniques to image faster, longer, in higher resolution, with multiple colours, and in bigger and thicker samples. To keep up with these developments, new fluorophores are being made with higher brightness and photostability. These efforts, however, are primarily focused on improving visualisation quality. I have made rhodamine dyes that allow both fluorescence visualisation and manipulation of biomolecules. These dual-functional dyes combine the best of two worlds: acute onset and dosage control of small molecules with the specificity of genetics. I will demonstrate their potential with two examples. biotin-rhodamine-HaloTag ligand for time-resolved antibody-free affinity capture of intracellular organelles/proteins, and JQ1-rhodamine-HaloTag ligand for altering chromatin dynamics. I will also show that this strategy is extendable to visualise and manipulate other biomolecules (e.g., DNA, lipids). These dual-functional dyes represent a new avenue in designing dye-based tools for biology. Given the importance of small molecules to biology and medicine, this general concept will apply to thousands of available small-molecule ligands (e.g., drugs, pheromones, toxins) to enable new live-cell experiments and mechanistic evaluation of small-molecules' action.

Monday, Feb 12th 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H