

Title: rRNA Selective Fluorescent Bio-probe For Tracking Viscoelastic Nature of Intracellular Nucleolus

Technology USP

- ❑ Newly designed fluorescence probe of staining live cells for bio-imaging, including novel fluorescent cell labelling dye for Lipid droplet imaging and analysis in real-time/Live samples.
- ❑ Optimal for imaging viscoelastic nature of Live nucleolar rRNA both in vitro and in vivo and bacterial cells.
- ❑ The developed probe is easy to synthesize, which lowers the cost of available dyes in the market to stain nucleolar rRNA.

Background

The existing fluorescence probes for staining nucleolar rRNA suffers with fluorescence crosstalk, high cost, background noise and unable to measure the viscoelastic nature of the nucleolus in diseased condition in real time imaging.

Scientific merit

Indole based fluorescence probe enables the following features of viscoelastic nature of nucleolus in live cell:

- ❑ High Selectivity
- ❑ Cell membrane permeability in Live and fixed condition
- ❑ Low Fluorescence cross talk
- ❑ Viscosity sensitive to monitor minor changes in local environment of nucleolus

Societal Relevance

In order to monitor the viscoelastic nature of nucleolus to understand the ribosomal biogenesis during disease progression in Live/ Fixed cells in various cancer/non-cancer cells via confocal imaging the NucNK can be widely used.

Market size/Commercial Potential

Hospital, laboratories, the pharmaceutical industry and medical research, vaccine and drug development and disease diagnosis at initial stages, flow cytometry uses dyes to detect or measure the characteristics of cells or tissues.

TRL

Current Technology Readiness Level (TRL): 5

USP of technology

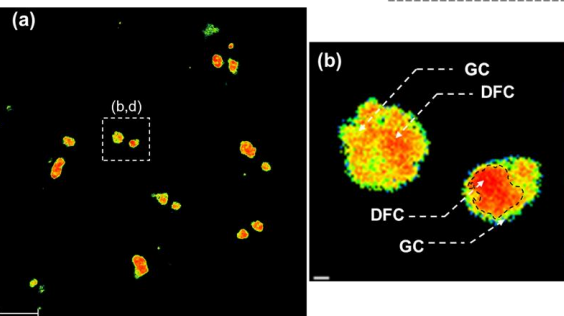
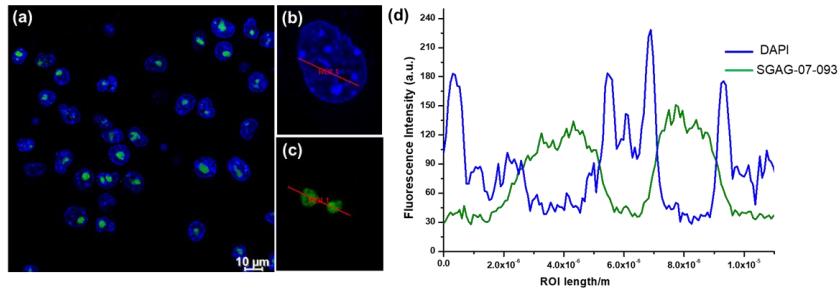
There are few fluorescence dye probes available for LDs: SYTO RNA-Select is the only commercial probes for nucleolar imaging, but their imaging performance is often unsatisfactory due to the small Stokes shift, and the high cost of purchase respectively.

Title: rRNA Selective Fluorescent Bio-probe For Tracking Viscoelastic Nature of Intracellular Nucleolus

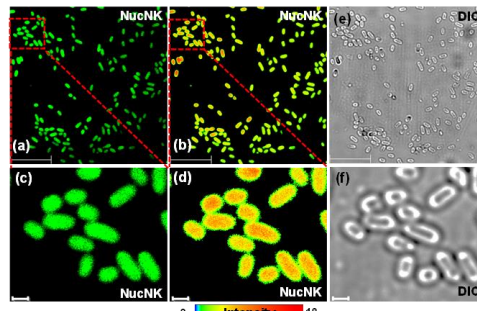
Overseas market penetration

Fluorescent dyes are in growing demand in academics Biopharmaceutical, Hospital and Commercial Laboratories, etc. and the market is expected to grow (CAGR 2023-2030). The global Fluorescent Dye market was valued at US\$ 909.8 million in 2023 and is anticipated to reach US\$ 1231.1 million by 2030, Asia Pacific is Expected to Grow the fastest during the forecast period.

High Resolution image of the technology prototype



CSLM fluorescence intensity images of NucNK in Human cells



CSLM fluorescence intensity images of NucNK in E.coli

Number of samples tested/validated

Nucleolar rRNA imaging in live Cancer cells (neuroblastoma), and bacterial cells of *E.coli*

Cost of Sampling

INR approx. 15,000/- per 100gm of NucNK

Studies conducted for getting regulatory approval NIL

Any other information relevant for evaluating the technology

NIL

Patent Details

Indian Patent Application No. 202311085302;
Date of Filing: December 2023

Details of PIs, funding agency and third party, if involved in development

PI: Aakriti Garg, Parasuraman Jaisankar, Sreya Gupta,
Velayutham Ravichandiran, Arun Bandyopadhyay.

Funding agency: NIPER-Kolkata & CSIR-IICB