Curriculum Vitae

Dr. Saswati Adhikary

Associate Scientist:

Aragen Life Sciences Pvt. Ltd., Hyderabad, India.

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Mobile: (+91)-9831130215

Google Scholar:

https://scholar.google.com/citations?user=5RnA6ogAAAAJ&hl=en

Profile Summary and Key Research Area:

1. Sound knowledge in straightforward synthetic organic chemistry involving green methodologies coupled with several modern synthetic techniques.

2. Involved in development and possess optimization of advanced chemistry and design strategies of different class of heterocycles that is capable for bioimaging and biosensing (Organelle Targetable Fluorescent Probes like mitochondria, lysosome, cytoplasm etc.).

3. Diverse hands-on experience in the field of organic synthesis with special emphasis on the compounds containing aromatic, heteroaromatic and aliphatic motifs.

4. Design and synthesis of extended π - conjugated molecules through one-pot and multi-step synthesis using modern synthetic methods, i.e. metal catalyzed reactions, metal-free reactions, low temperature reactions, various air-free techniques.

5. Strong analytical capabilities in multi-disciplinary areas aiding new product developments.

6. Good knowledge in isolation of desired compounds with high purity by applying various techniques like column chromatography (silica-gel, alumina, flash), preparative TLC and recrystallization.

7. Expertise in characterization and analysis of compounds using different spectroscopic analysis including e.g. NMR, UV-vis spectrometers, IR, Fluorescence and Mass techniques.

8. Mentoring students in different projects including design, synthesis and documentation work for achieving goals within time and budget.

9. Good knowledge in scientific literature search, scientific writing for research publication associated with projects including reviewing scientific publications.

10. Continuous modification towards the evolution of the laboratory's technology and strategy.

11. Good teaching experience in undergraduate college for two years (Scottish Church College, university of Calcutta, India).

EDUCATION:

2014-2019 **Doctor of Philosophy (Ph. D.) in Chemistry**
Supervisor: Dr. Biswadip Banerji, Senior Principal Scientist
Indian Institute of Chemical Biology, 4, Raja Subodh Chandra Mallick Rd, Poddar Nagar, Jadavpur, Kolkata, West Bengal 700032, India.
Thesis Title: "***DEVELOPMENT OF METAL-FREE NEW SYNTHETIC METHODOLOGY TO CONSTRUCT SMALL HETEROCYCLIC SCAFFOLDS***"

2010-2012 University of Calcutta, Kolkata, India. **Master of Science (M. Sc.) in Chemistry**-7.73 CGPA (1st Division)

2006-2010 University of Calcutta, Kolkata, India. **Bachelor of Science (B. Sc.) in Chemistry**-62.25 % (1st Division)

RESEARCH EXPERIENCE:

11/2021-09/2023 **Associate Scientist: Aragen Life Sciences Pvt. Ltd., Hyderabad, India.**

04/2021-11/2021 (Post Ph. D. research) **Post-doctoral fellow:** Tata Institute of Fundamental Research- Hyderabad.

***Key Projects handled*: Synthesis of bio-fluorophore for understanding the cross-talk between mitochondria and lysosome.**

2014-2019 (Doctoral Research) **Ph. D. in Chemistry** under supervision of **Dr. Biswadip Banerji**, Senior Principal Scientist, CSIR-Indian Institute of Chemical Biology, India.

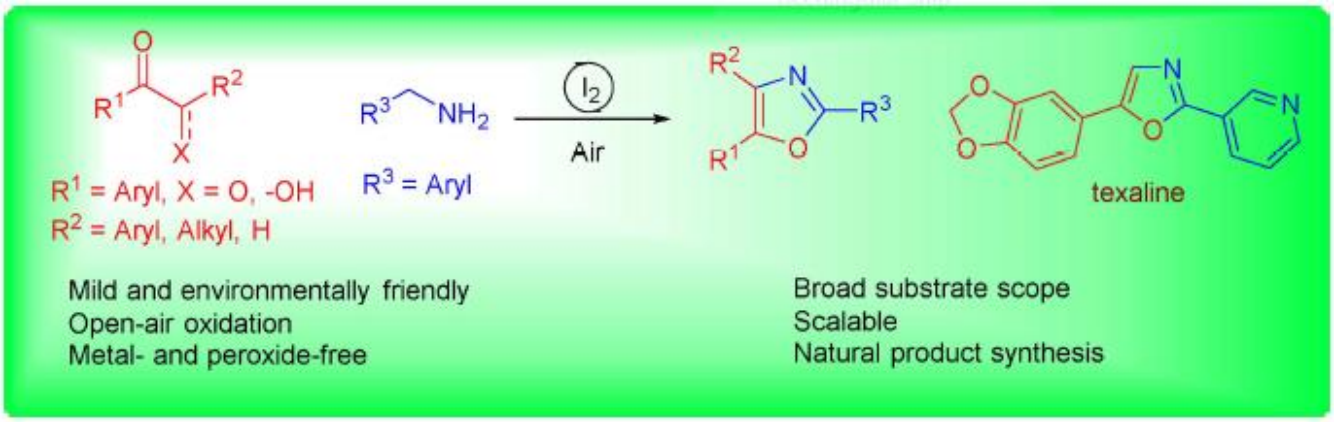
1. Worked in the field of metal-free new organic synthetic methodologies: synthesis of **extended π - conjugated symmetrically / unsymmetrically substituted heterocycles** like oxazoles and imidazole in **one step green** synthetic procedure, purification, and characterization.
2. Multi-step metal catalyzed organic synthesis of **Quinazolinone-/Phenanthridine-Fused Heteropolycycles**, vigilant purification, and characterization.

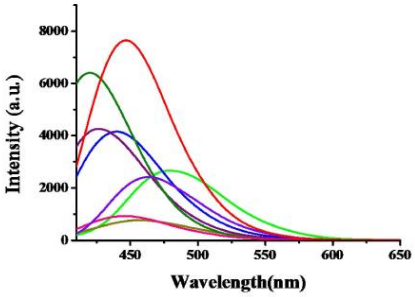
3. Designing of different class of heterocycles triggering bioimaging and biosensing (**Organelle Targetable Fluorescent Probes like mitochondria, lysosome, cytoplasm** etc.).

LIST OF PUBLICATIONS:

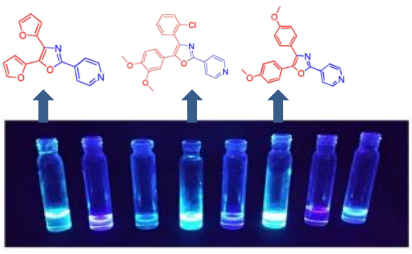
1. A Green Synthetic Approach towards Polyarylated Oxazoles via Iodine-Catalyzed One-Pot sp3 C-H Functionalization in Water: From Natural Product Synthesis To Photophysical Studies, Banerji, B.; **Adhikary, S.;** Majumder, L.; Ghosh, S. ***Asian J. Org. Chem***. **2019**, *8*, 514-525. **(https://doi: 10.1002/ajoc.201800742)**

Iodine catalysed, **water mediated**, **environmentally benign** synthetic organic method was developed for the synthesis of **highly substituted oxazoles** through **oxidative cyclization**. The **diverse substituted oxazoles** were synthesized from readily available starting materials. The reaction efficiently transforms **unsymmetrical di-ketone** into **one desired oxazoles regioselectively** and it is **scalable up** to **gram scale level**. The protocol is able to synthesize **anti-mycobacterial natural product Texaline** effectively without any difficulty. Due to **extended π-conjugation** oxazole derivatives showed **good fluorescence response** in solution as well as solid state. Among them, few derivatives showed **excellent fluorescence responses** in both **liquid and solid phase** may be due to **charge transfer**.

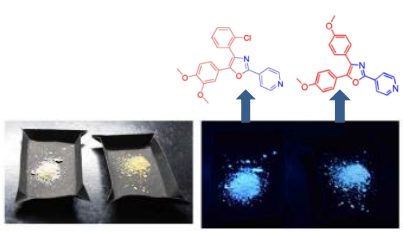




Fluorescence spectra of some Selected compounds (10 µM in DMSO, λex=330–360 nm)



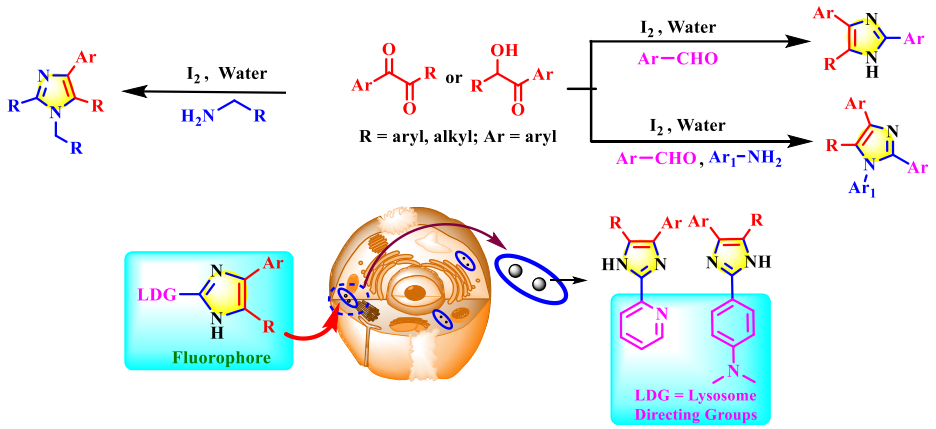
10 µM DMSO solution of selected compounds captured by irradiating at 365 nm.

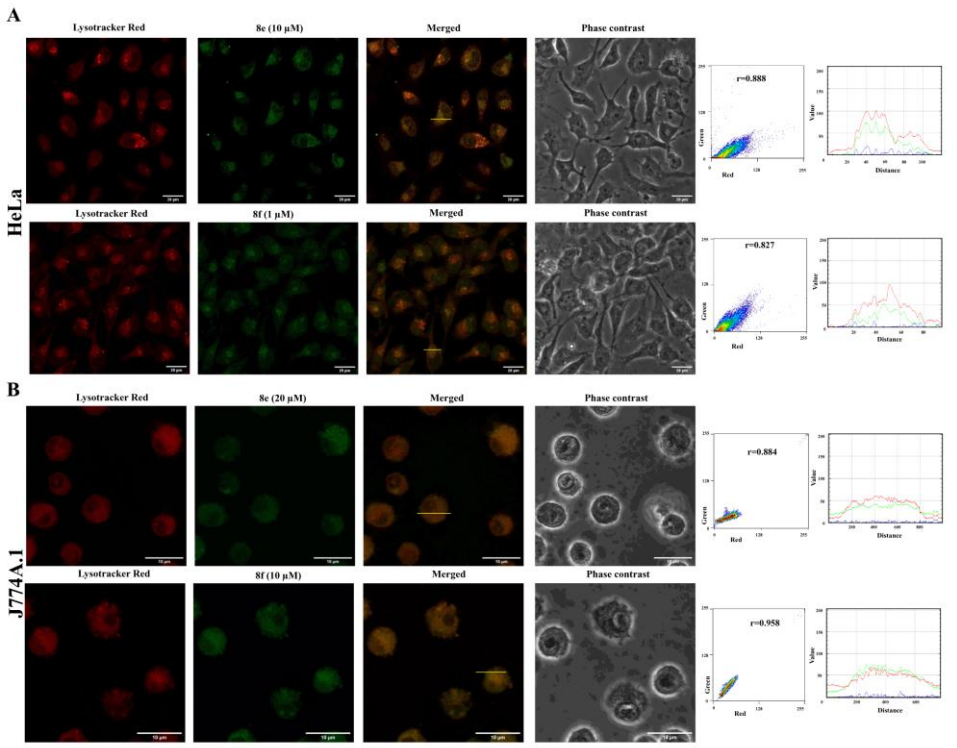


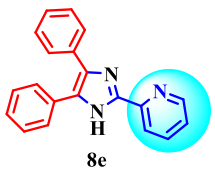
Normal light (left) and solid state fluorescence of selected compounds captured by irradiating at 365 nm (right).

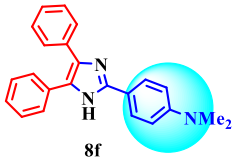
2. Polysubstituted Imidazoles as LysoTracker Molecules: Their Synthesis via Iodine/H2O and Cell-Imaging Studies, Adhikary, S.; Majumder, L.; Pakrashy, S.; Srinath, R.; Mukherjee, K.; Mandal,C.; Banerji,B.; ***ACS Omega* 2020**, *5*, 14394–14407. **(https://doi.org/10.1021/acsomega.0c00934)**

Transition-metal-free, iodine catalyzed, **one-pot, green synthetic methodology** has been developed for the **synthesis** of **tri and tetra substituted imidazoles**. This **aerobic and water-mediated cyclization** reaction is simple and works well with **diverse amines/aldehydes by multiple C-N bond formations** in single operation with satisfactory yield. The methodology is **regioselective** as well as **scalable**. These imidazole derivatives showed **excellent fluorescent properties** both in the solid and solution phase, which further extended to **live-cell imaging**. Due to the decent fluorescent properties of these scaffolds, **lysosome**-directing groups were incorporated in two of these derivatized imidazoles to track the intracellular lysosome. Successfully, those molecules showed bright blue fluorescence by detecting lysosome in **human/murine cells** and can be considered as **rapid lysosome staining probe**.



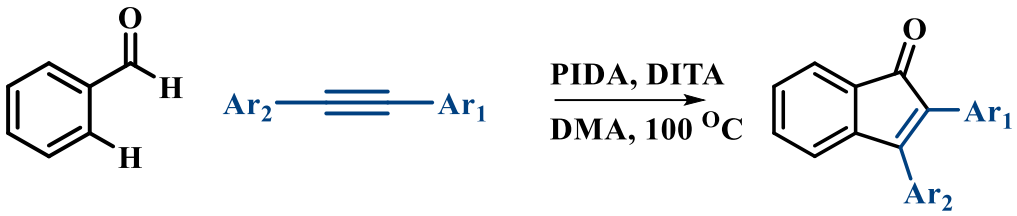






HeLa cells (A) and J774A.1 cells (B) were stained with LysoTracker Red (100 nM) and compounds 8e or 8f were imaged via confocal microscopy to observe cellular localization of synthesized dyes. Colocalization between a synthesized dye (green channel) and LysoTracker (red channel) was calculated from Pearson's correlation coefficient from 2D histograms. Intensity profiles of RGB channels along a linear region of interest (ROI) as indicated with a yellow line, were also analyzed.

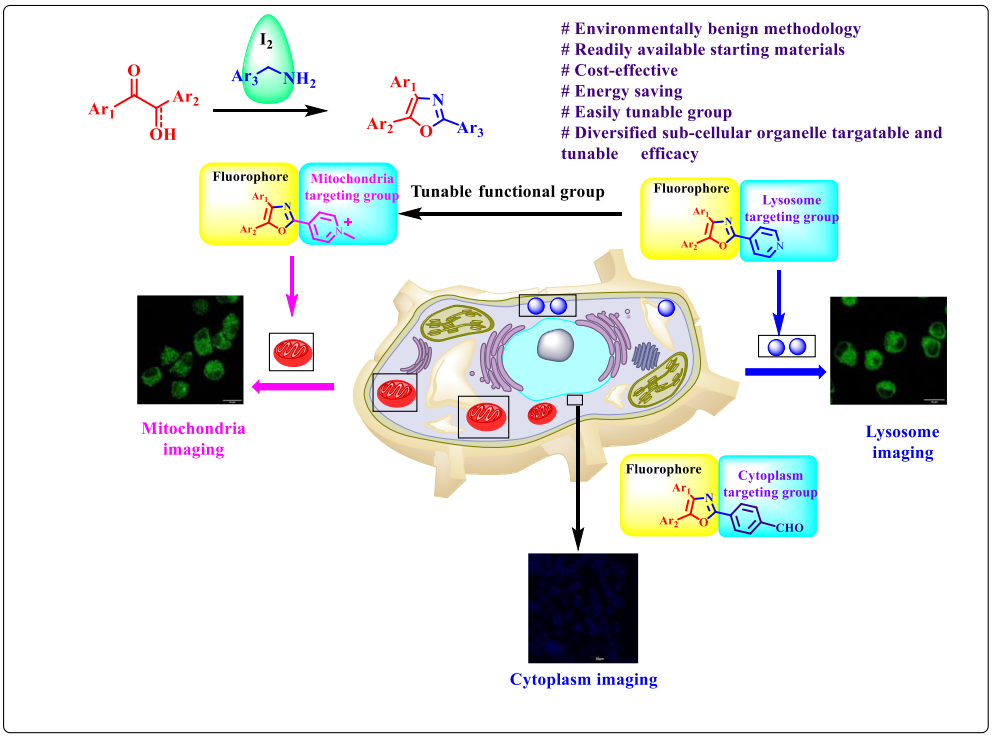
3. A Metal-Free Oxidative Carboannulation Approach towards Synthesis of 2, 3-Diarylindenones and Its Regioisomers, Banerji, B.; Majumder, L.; **Adhikary, S.**; ***ChemistrySelect*, 2018,** *3*, 1381-1384. **(https://doi.org/10.1002/slct.201702843).**

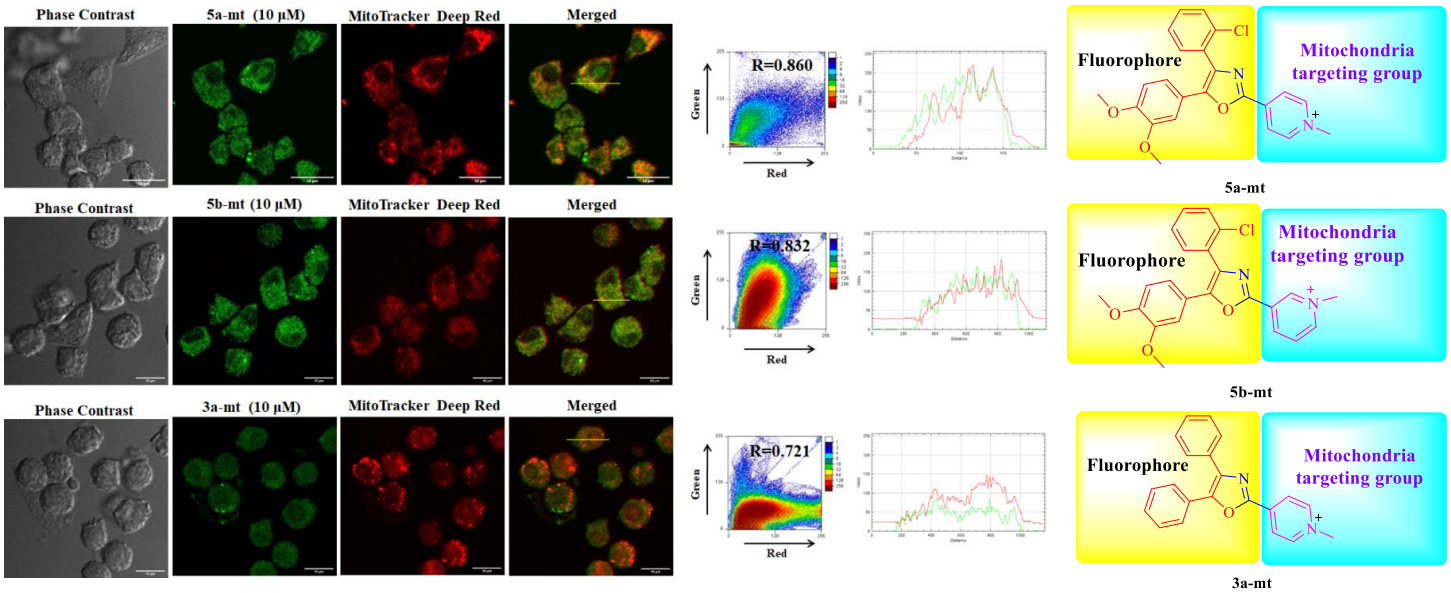


4. Regioselective Synthesis of Quinazolinone-/Phenanthridine-Fused Heteropolycycles by Pd-Catalyzed Direct Intramolecular Aerobic Oxidative C-H Amination from Aromatic Strained Amides, Banerji, B.; Bera, S.; Chatterjee, S.; Killi, S. K.; **Adhikary, S.** ***Chem. Eur. J.*** **2016,** *22*, 3506-3512. **(https://doi: 10.1002/chem.201504186).**

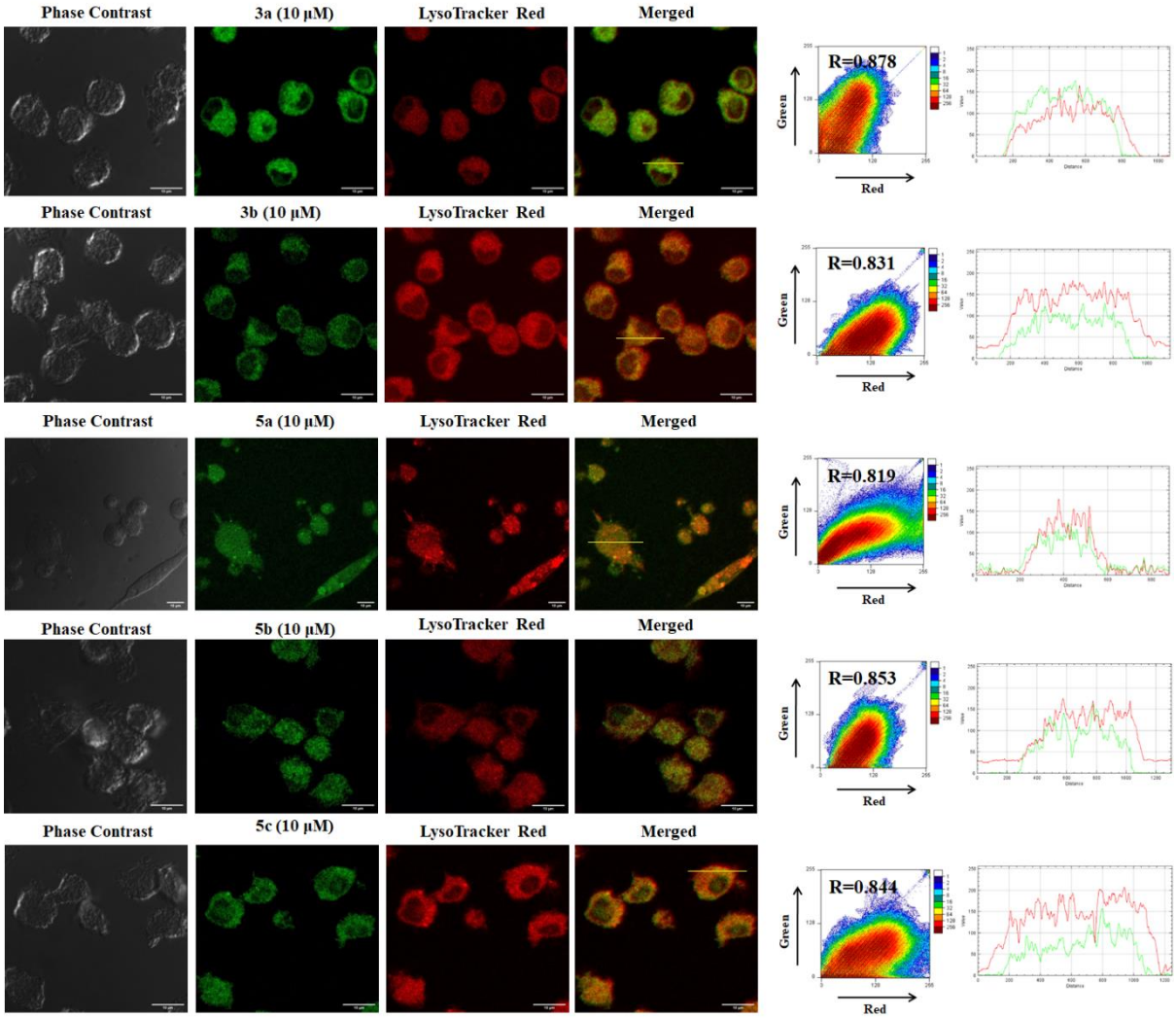
A new path for the synthesis of specific regioisomer of quinazolinone- and phenanthridine-fused heterocycles through a palladium-catalyzed regioselective intramolecular oxidative C−H amination from cyclic strained amides of aromatic amido–amidine systems (quinazolinones) has been developed. The amine functionalization of an aromatic C−H bond from a strained amide nitrogen involved in aromaticity has been a challenging work so far. The fusion of two heterocyclic cores, quinazolinone and phenanthridine, can occur in two different ways (linear and angular), but under the conditions reported here, only linear type isomer is exclusively produced. This approach provides a variety of substituted quinazolinone- and phenanthridine-fused derivatives in moderate to excellent yields. Moreover, such fused molecules show excellent fluorescent properties and have great potential to be a new type of fluorophores for the use in medicinal and material science.

5. Cell-Imaging Studies of Highly Substituted Oxazole Derivatives as Organelle Targeting Fluorophores (OTFPs). S Adhikary, K Mukherjee, B Banerji. ***Scientific Reports*** **2022**, *12*, 16555 **(https://doi.org/10.1038/s41598-022-20112-y).**

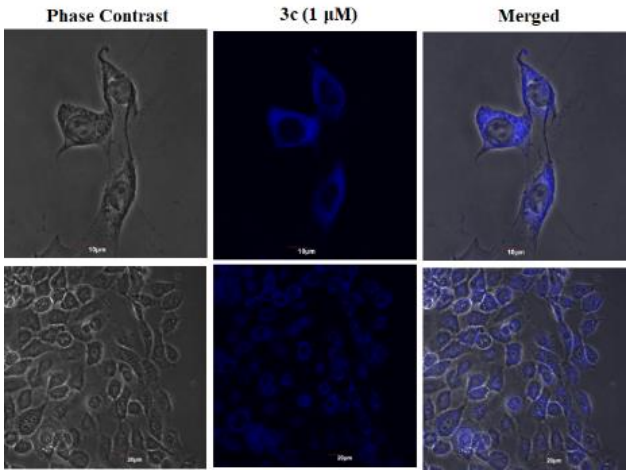


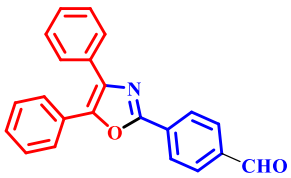


MDA-MB-231 cells were stained with **5a-mt**, **5b-mt**and **3a-mt** compounds (10 μM) along with Mitotracker Deep Red (60 nM). Cells were observed via confocal microscopy. Fluorescent signals of synthesized compounds are coloured green for easy observation. Colocalization between the synthesized molecules (green channel) and Mitotracker Deep Red dye (red channel) was quantified from Pearson's correlation coefficients. Two-dimensional (2D) histograms, intensity profiles of RGB channels along selected linear region of interest (yellow lines) have been shown.



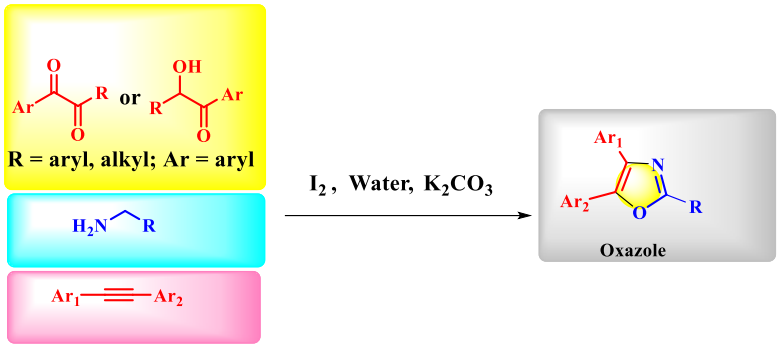
MDA-MB-231 cells were stained with **3a, 3b, 5a, 5b,** and **5c** (10 µM) respectively along with LysoTracker Red (75 nM) dyeimaged via confocalmicroscopy to observe cellular colocalization. Colocalization between the synthesized molecules (green channel) and LysoTracker Red (red channel) was quantified by calculating Pearson's correlation coefficient. Two-dimensional (2D) histograms as well as intensity profiles of RGB channels along selected linear region of interest (yellow lines) are also shown.





MDA-MB-231 cells were stained with **3c** (10 μM) for 30 min at 37°C, fixed and observed by confocal microscopy. Cells were also imaged at higher magnification to check for the localization of the dye in the cytosol. A zoomed in view of cells have also been provided.

6. Iodine Mediated One-Pot Synthesis of Polyarylated-Oxazoles from Internal Alkynes. Adhikary, S.; Banerji, B.; *ChemistrySelect* **2023**, *8*, e202300076.



An environmentally benign, efficient, practically applicable and C(sp3)-H functionalization of primary amines for the synthesis of highly substituted oxazoles from easily available internal alkynes was developed. This synthesis is toxic chemicals, transition-metal free as well as mild and regioselective. This one-pot methodology with broad substrate scope unlocks a green avenue for the synthesis of highly functionalized oxazole derivatives with excellent yields.

MANUSCRIPT UNDER PREPARATION

7. Exploration of Sub-cellular Organelle Specific Small Bio-fluorophores Through Green Synthetic Avenue: A personal review. Adhikary, S.; Banerji, B.;

RESEARCH WORK PRESENTATIONS

1. Poster presentation on "**Exploration of Sub-cellular Organelle Specific Bio-fluorophores Through Green Synthetic Approach**" 27th CRSI-National symposium in Chemistry, September 26-29th 2021, Indian Institute of Science Education and Research, Kolkata, India.

2. Oral presentation on "**Exploration of small organic bio-fluorophores using one-pot aerobic green synthetic methodology**" National Conference on Sustainability, Medicine and Clean Energy Organized by Department of Chemical Science, Tezpur University, India.

3. Poster presentation on "**Exploration of Diversified Bio-fluorophores Using One-pot Green Synthetic Methodology**" Organized by University of Rajasthan.

AWARDS AND HONORS:

1. Qualified **UGC (Chemical Science)** – Junior and Senior Research Fellowship (**JRF& SRF)** and Eligible for Lectureship (**NET**) conducted by Joint Council of Scientific and Industrial Research (CSIR)-University Grants Commission (UGC) National Eligibility Test (NET), India in **December 2013**.

2. Qualified Graduate Aptitude Test Engineering (**GATE)-2012**, conducted by Indian Institute of Technology Delhi, on behalf of the National Coordination Board, Graduate Aptitude Test in Engineering Department of Higher Education, Ministry of Human Resource Development (MHRD), Government of India (GoI).

3. Awarded **POST-GRADUATE INDIRA GANDHI SCHOLARSHIP FOR SINGLE GIRL CHILD (2010-12)** by UGC**.**

PERSONAL DETAILS:

Date of Birth	:	06.11.1987.
Sex	:	Female.
Nationality	:	Indian.
Marital status	:	Single.
Languages known	:	English, Hindi and Bengali.

Permanent Address: C/O - Pranaya Kumar Adhikary, Moyna, Barasat, 24 parganas (north), P.O.- Noapara, Kolkata-700125, West Bengal, India.

Present Address: 1-8 Nishi 5 Kita 17 Kita ku, Sapporo, Carrera Hokudai Mae, 001-0017, Japan.

Personal Attributes: Interdisciplinary, co-operative (teamwork), experienced and capable for managing and supervising team members, technical and independent research abilities in diverse areas.

LIST OF REFEREES:

Ph. D. Supervisor:

1. **Dr. Biswadip Banerji,** Senior Principal Scientist

Indian Institute of Chemical Biology, 4, Raja Subodh Chandra Mallick Rd, Poddar Nagar, Jadavpur, Kolkata, West Bengal 700032, India.

Tel: (+) 91 9903752881;

E-mail: **biswadip.banerji@gmail.com**

ORCID ID: Biswadip Banerji: 0000-0001-9898-253X

2. **Prof. Chittaranjan Sinha**, Professor of Chemistry, Jadavpur University

132, Raja Subodh Chandra Mallick Rd, Jadavpur, Kolkata, West Bengal 700032

Phone : (+) 91 7044231277

Email: **crsjuchem@gmail.com**

3. **Prof. Chitra Mandal,** SERB Distinguished Fellow.

Cancer Biology and Inflammatory Disorder Division, CSIR-Indian Institute of Chemical Biology, 4, Raja Subodh Chandra Mallick Rd, Poddar Nagar, Jadavpur, Kolkata, West Bengal 700032, Kolkata, India.

Phone : +91-33-24995-717

Email: **chitra_mandal@yahoo.com; cmandal@iicb.res.in**

DECLARATION:

The above given information is true to the best of my knowledge, and I will be responsible for any discrepancies.

November, 2023 – Sapporo, Japan. **(Dr. Saswati Adhikary**