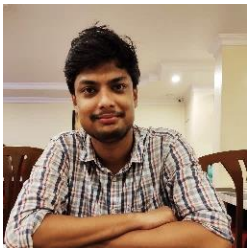
Ankan Kumar Sarkar, Ph.D.
Postdoctoral Research Associate,
Institute for Quantitative Health Science and Engineering, Michigan State University

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Education and Academic Positions

- **Doctor of Philosophy (Ph.D.) (July, 2019 - August, 2024) (degree received on 13th January, 2025)**
  School of Materials Sciences, Indian Association for the Cultivation of Science, India.
  Supervisor: **Prof. Nikhil Ranjan Jana**
  Thesis title: ***"Designed Nanodrugs for Subcellular Targeting and Prevention of Neurodegenerative Disease."***
  Area of study: Nanoparticle synthesis, Surface functionalization, Nanoparticle-cell interaction, Endocytosis mechanism, Direct membrane penetration, Drug delivery, Protein delivery, Gene delivery, Subcellular targeting (Nucleus), Nanomedicine-based cell therapy, Reactive oxygen species (ROS) generation, Autophagy induction, clearing toxic polyglutamine aggregates (mutant huntingtin) from neuronal cells, Blood-brain barrier crossing by nanoparticles, developing tumor spheroid model.

- **Visiting Research Fellow (April, 2022, July, 2023 and July, 2024 - September, 2024)**
  School of Bioscience and Biotechnology, Indian Institute of Technology Kharagpur (IIT Kharagpur), India.
  Supervisor: **Prof. Nihar Ranjan Jana**
  Area of study: Autophagy, Huntington's disease, Blood-Brain-Barrier, Animal model (mice), Immunohistochemistry, Immunocytochemistry, Immunoblotting (western blot).

- **Visiting Research Fellow (February, 2023 and February, 2024 - March, 2024)**
  Molecular and Cellular Neuroscience, National Brain Research Center, India.
  Supervisor: **Prof. Pankaj Seth**
  Area of study: Blood-brain barrier setup and experiments, primary cell culture, stem cell culture etc.

- **Master of Science (M.Sc. degree) in Chemistry (July, 2017-June, 2019)**
  Indian Institute of Technology Guwahati (IIT Guwahati), India.
  CGPA= 9.13
  Project Supervisor: **Dr. Sunanda Chatterjee**
  Project Title: *"Short Peptide-Based Hydrogel as Dye Absorbents"*

- **Bachelor of Science (B.Sc. degree) in Chemistry (July, 2014 - July, 2017)**
  Ramakrishna Mission Vivekananda Centenary College, Rahara, India
  West Bengal State University, West Bengal, India
  Marks obtained 80.13%

Academic Achievements and Fellowship

- **Research Associate:** Indian Association for the Cultivation of Science, August 2024- March 2025.
- **Senior Research Fellow:** Council of Scientific and Industrial Research, Government of India. August 2021- July 2024.
- **Junior Research Fellow:** Council of Scientific and Industrial Research, Government of India. July 2019- July 2021.

✞ **Qualified National Eligibility Test (NET):** All India rank 49 (June 2018), All India rank 70 (December 2017)

✞ **Qualified Graduate Aptitude Test in Engineering (GATE):** All India rank 278 in Chemistry (2019)

✞ **Qualified IIT-Joint Admission Test for Masters (IIT-JAM):** All India rank 202 in chemistry (2017)

✞ **University 2nd Rank Holder:** Bachelor of Science in Chemistry (2017) Silver Medalist.

Key Research Techniques and Skills

✞ **Nanomaterial synthesis (3-100 nm):**
(Learned at Indian Association for the Cultivation of Science)

- Semiconductor quantum dots (CdSe/ZnS core/shell).
- Magnetic nanoparticles (γ-Fe_3O_4 and γ-Fe_2O_3).
- Plasmonic and anisotropic nanomaterials (gold and silver)
- Piezoelectric nanoparticles (hydroxyapatite and barium titanate nanorods, nanowires and nanospheres)
- Polymeric nanoparticle and micelle
- Nanodroplets and microbubbles
- Liposomes

✞ **Evolution of coating chemistry (Phase Transformation Methods):**
(Learned at Indian Association for the Cultivation of Science)

- Silica coating.
- Polyacrylate coating.
- Imidazole coating.
- Polyglycerol coating.
- Amphiphilic poly (amino acid) coating.

✞ **Design and development of functional nanoparticles to control cellular interaction:**
(Learned at Indian Association for the Cultivation of Science)

- Designing polymeric nanoparticles for direct membrane penetration via forming transient pore along the cell membrane.
- Delivery of large proteins as well as genes into cell nucleus within 5 min by polymer micelle.
- Delivering 7 different small molecular drugs into the nucleus of 10 different cells (incl. stem cells) within 5 min by polymer micelle.
- Development of nanodrugs for cell therapy.
- Designing nanodrugs for clearing toxic huntingtin protein aggregates from neuronal cells.
- Designing polymer micelles for crossing blood-brain barrier via transcytosis both *in vitro* models (transwell-based model and tumor spheroid) and *in vivo* animal model.

✞ **Cellular biology:**
(Learned at Indian Association for the Cultivation of Science and National Brain Research Center)

- Mammalian cell culture: Neural stem cells (progenitors), progenitor-derived astrocytes, SHSY5Y derived neurons, HeLa, KB, CHO, HepG2, HT22, HD150Q, Neuro 2A, U87, SHSY5Y
- In vitro model construction: Transwell-based blood-brain barrier model, Tumor spheroids.
- Microscopy: Confocal, apotome, fluorescence, and bright field microscopy.

✞ **Molecular biology and biochemical techniques:**
(Learned at Indian Institute of Technology Kharagpur and National Brain Research Center)

- RNA and DNA extraction, purification, quantification, and profiling.
- qPCR, Agarose and polyacrylamide gel electrophoresis, analysis, quantification.
- Immunoblotting (Western Blotting).
- Immunohistochemistry (IHC) and Immunocytochemistry (ICC).

✞ **Animal handling:**
(Learned at Indian Institute of Technology Kharagpur)

- Handling, feeding, breeding, marking.
- Perfusion.
- Dissection of the adult mouse.
- Cryo sectioning of the tissue.
- Administration in mice through IP, IT, IV, and oral routes.

✞ **Expertise in the operation/utilization of high-end instruments:**

(Learned at Indian Association for the Cultivation of Science)

- UV-Vis/IR/Fluorescence spectroscopy
- DLS, Zeta instruments, Scanning electron microscopy, Cryo -Transmission electron microscopy.
- NMR, High resolution Mass spectrometry (HR-MS), Matrix assisted Laser desorption Ionization spectrometry (MALDI).

List of Publications

19. Designed Polymer Micelles for Crossing of Blood-Brain Barrier.
Ankan Kumar Sarkar, Sudipta Jana, Guneet Kaur, Sourav Barman, Santanu Shaw, Nayana Mukherjee, Himali Arora, Amit Ranjan Maity*, Pankaj Seth*, Nihar R. Jana*, Nikhil R. Jana*.
[manuscript under preparation]

18. Ru(III)-PhI(OAc)$_2$─A Combination for Generation of Isocyanate Intermediate from Benzimidate through a Rearrangement: Synthesis of Unsymmetrical Urea, Carbamate, and Chiral Analogues.
Shobhon Aich, Mriganka Saha, Debasish Ghosh, Sabir Ali Molla, **Ankan Kumar Sarkar**, Debanjana Bag, Rajjakfur Rahaman, Saikat Khamarui*, Dilip K. Maiti*.
Org. Lett. **2024**. (**Just accepted)**

17. Designing Nano-Hemin for Ferroptosis Mediated Cell Death via Enzymatic Hemin Digestion.
Abu Raihan Sarkar, Nayana Mukherjee, **Ankan Kumar Sarkar**, Nikhil Ranjan Jana*.
ACS Appl. Mater. Interfaces **2024**, *16*, 64628-64637.

16. Designed Nanodrugs for Ultrasonic Removal of Toxic Polyglutamine Aggregates from Neuron Cells.
Ankan Kumar Sarkar, Abu Raihan Sarkar, Rajkumar Sahoo, Nihar R. Jana*, Nikhil R. Jana*.
Nano Lett. **2024**, *24*, 13473-13480.

15. Ultrasound-Responsive Nanodroplet-Based Targeted Therapy via Conversion to Microbubbles.
Rajkumar Sahoo, **Ankan Kumar Sarkar**, Haydar Ali, Nikhil R. Jana*.
ACS Appl. Bio Mater. **2024,** 18, 1852-1861.

14. Autophagy-Induced Nanoparticle-Based Clearing of Toxic Huntingtin Protein Aggregates from Neuron Cells.
Ankan Kumar Sarkar, Guneet Kaur, Pankaj Seth, Nihar R. Jana*, Nikhil R Jana*.
ACS Appl. Nano Mater. **2024,** 7, 3468-3478.

13. New Routes of Azomethine Ylide Generation from Prolines to Synthesize Diverse N-Heterocycles: A DFT Supported Endo Selective Mechanism.
Radha M. Laha, Shobhon Aich, **Ankan Kumar Sarkar**, Tanmoy Dutta, Narendra Nath Ghosh, Saikat Khamarui, Dilip K. Maity*.
Org. Biol. Chem. **2024,** *22*, 7411-7424.

12. Guanidinium-Terminated Gold Nanoparticles for Protein Delivery to Cell Nucleus.
Nayana Mukherjee, **Ankan Kumar Sarkar**, Prasanta Panja, Nikhil R. Jana*.
New J. Chem. **2024,** 48, 6553.

11. Acidic pH-Triggered Release of Doxorubicin from Ligand-Decorated Polymeric Micelles Potentiates Efficient Against Cancer Cells.
Sayani Maitra Roy, Sourav Barman, Purvi Kishore, Bhaskar Chatterjee, Pousali Bag, Tapas Ghatak, Arnab Basu, Surya K. Ghosh, Anjaneyulu Dirisala, **Ankan Kumar Sarkar**, Ali Hossain Khan, Somasish Ghosh Dastidar, Amit Ranjan Maity*.
ACS Appl. Nano Mater. **2023,** 6, 18988-18998.

10. Protein Delivery to the Cytosol and Cell Nucleus via Micellar Nanocarrier-Based Nonendocytic Uptake.
Santanu Shaw, **Ankan Kumar Sarkar**, Nikhil R. Jana*.
ACS Appl. Bio Mater. **2023,** 6, 4200-4207.

9. Nuclear Transport of Molecular Drug via Nanocarrier-Based Nonendocytic Cellular Uptake.
Ankan Kumar Sarkar, Santanu Shaw, Himali Arora, Pankaj Seth, Nikhil R. Jana*.
ACS Appl. Mater. Interfaces **2023,** 15, 39176-39185.

8. Biodegradable Poly (trehalose) Nanoparticle for Preventing Amyloid Beta Aggregation and Related Neurotoxicity.
Suman Mandal, Debabrata Jana, Jayanta Dolai, **Ankan Kumar Sarkar**, Binay K. Ghorai, Nikhil R. Jana*.
ACS Appl. Bio Mater. **2023,** 6, 2102–2110.

7. Efficient Antibacterial Activity of α-MSH Using Chitosan-Based Versatile Nanoconjugates.
Sourav Barman, Asmita Chakraborty, Sujata Saha, Kunal Sikder, Sayoni Maitra Roy, Barkha Modi, Sarbanee Bahadur, Ali Hossain Khan, Dipak Manna, Pousali Bag, **Ankan Kumar Sarkar**, Rishi Bhattacharya, Arnab Basu*, Amit Ranjan Maity*.
ACS Omega **2023,** 8, 12865-12877.

6. Subcellular Targeting-Based Advanced Therapy via Chemically Designed Nanodrug.
Ankan Kumar Sarkar, Nikhil R. Jana*.
iSci. Note. **2022,** 7, DOI: 10.22580/iSciNoteJ7.7.3 **[Invited review article]**

5. Hemin-Based Cell Therapy via Nanoparticle-Assisted Uptake, Intracellular Reactive Oxygen Species Generation and Autophagy Induction.
Abu Raihan Sarkar, Suman Pal, **Ankan Kumar Sarkar**, Nikhil R Jana*.
New J. Chem. **2022,** 46, 21746-21755.

4. Direct Cytosolic Delivery of Exogenous Genetic Material and Protein via Colloidal Nano-Assemblies with Biopolymer.
Ankan Kumar Sarkar, Koushik Debnath*, Himali Arora, Pankaj Seth, Nihar R. Jana*, Nikhil R. Jana*.
ACS Appl. Mater. Interfaces **2022,** 14, 3199–3206.

3. Inhibiting Protein Aggregation by Small Molecule-Based Colloidal Nanoparticles.
Koushik Debnath, **Ankan Kumar Sarkar**, Nihar R. Jana*, Nikhil R. Jana*.
Acc. Mater. Res. **2022,** 3, 54-66. **[Featured as Editors' choice]**

2. Co-Assembly of charge Complementary Peptides and Their Applications as Organic Dye/Heavy Metal Ion (Pb^{2+}/Hg^{2+}) Absorbents and Arsenic (III/V) Detectors.
Karabi Roy, Monikha Chetia, **Ankan Kumar Sarkar**, Sunanda Chatterjee*.
RSC Adv. **2020,** 19, 1721-1731.

1. Peptide Hydrogels as Platforms for Sustained Release of Antimicrobial and Antitumor Drugs and Proteins.
Karabi Roy, Gopal Pandit, Monikha Chetia, **Ankan Kumar Sarkar**, Sumit Choudhury, Anil P. Bidkar, Sunanda Chatterjee*.
ACS Appl. Bio Mater. **2020,** 3, 6251-6262.

Conference Presentation

Conference Name: School of Materials Sciences Day (March, 2022)
Organizers: Indian Association for the Cultivation of Science
Presentation Title: *"Direct Cytosolic Delivery of Protein and Genetic Material via Biopolymer Micelle"* (Awarded Best Oral Presentation Award)

Conference Name: BIO-Remedi, 2022, International Conference on Biomaterials, Regenerative Medicine and Devices. (December, 2022)
Organizers: Indian Institute of Technology Guwahati (IIT Guwahati)
Presentation Title: *"Direct Cytosolic Delivery of Exogenous Genetic Material and Protein by Bio-Compatible Polymeric Micelle"*

Conference Name: Emerging Materials (July, 2023)
Organizers: Indian Institute for Science and Educational Research, Pune (IISER Pune)
Presentation Title: *"Nucleus Delivery of Molecular Drugs by Polymeric Micelle via Direct Cell Translocation"*

Conference Name: SPSI-Macro, International Conference on Polymer Science and Technology.
Organizers: Indian Institute of Technology Guwahati (IIT Guwahati)
Presentation Title: *"Direct Cytosolic Delivery of Protein and Genetic Material via Biopolymer Micelle"* (Awarded Best Oral Presentation Award)

Reviewer Activity

✞ BMC Pharmacology and Toxicology

Declaration

I hereby declare that the particulars given herein are true to my knowledge and belief.



Ankan Kumar Sarkar