Dr. Arabinda Chaudhuri

Contact:

Arabinda Chaudhuri, PhD
ICMR Emeritus Scientist
Department of Chemical Sciences
Indian Institute of Science Education and Research (IISER) Kolkata
Mohanpur Campus, Mohanpur 741 252
West Bengal, India
Email: arabinda.chaudhuri@iiserkol.ac.in; arabindachaudhuri@gmail.com

Professional:

ICMR Emeritus Scientist (2021-Present), IISER Kolkata
Raja Ramanna Fellow (2018-2021), IISER Kolkata
Chief Scientist (2010-2018), CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad
Sr. Principal Scientist (2007-2010), CSIR-IICT, Hyderabad
Principal Scientist (2003-2007), CSIR-IICT, Hyderabad
Sr. Scientist (1999-2003), CSIR-IICT, Hyderabad
Scientist (1994-1999), CSIR-IICT,
Professor of both Chemical and Biological Sciences (2010-2018), Academy of Scientific and Innovative Research (Ac-SIR), CSIR-IICT, Hyderabad
Research Associate (1991-1994), Department of Biological Chemistry and Molecular Pharmacology,Harvard Medical School, Boston
Institute Fellow (1982-1985), Department of Chemistry, Bose Institute, Calcutta

Qualification:

Doctor of Philosophy (PhD, 1991), Rutgers University, New Jersey
Master of Science (MSc, 1980) with Organic Chemistry Major,University of Calcutta.
Bachelor of Science(BSc, 1978)with Honors in Chemistry**,** University of Calcutta.

Honors and Distinctions:

- Selected as Government of India's***ICMR Emeritus Scientist***(2021-present)

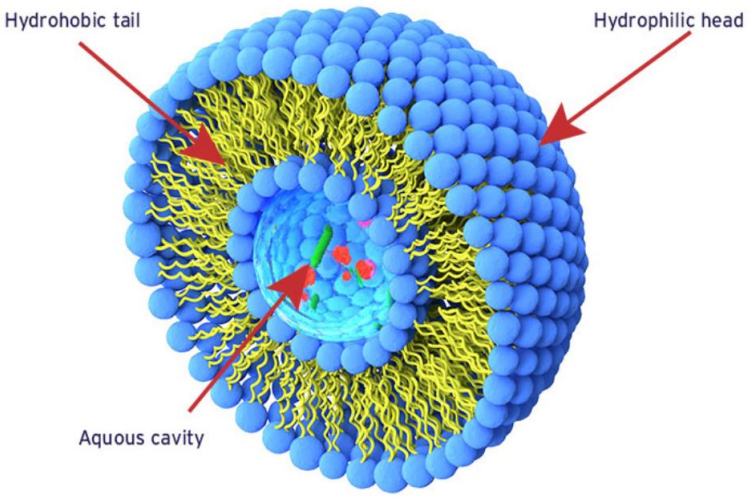
- **2018*Professor J. N. Mukherjee Memorial Award*** from ***Indian Chemical Society***
- Selected as Government of India's ***Raja Ramanna Fellow***(2018-2021)
- Elected as one of the four Vice-Presidents of the **Chemical Biology Society-India** (2018-present)
- Elected ***Fellow of theRoyal Society of Chemistry*** (**FRSC**) since 2017
- Elected ***Fellow of the Indian Academy of Sciences*** (**FASc**) since 2008
- Elected ***Fellow of the Indian Chemical Society*** since 2019
- **2007*Ranbaxy Research Award*** in Pharmaceutical Sciences
- Served as a Co-opted Member of the PAC on Organic Chemistry, SERB, New Delhi (2015-2018)
- **Advisory Editorial Board Member**, ***Biomaterials Science*** (RSC Journal) since 2015
- **Editorial Board Member**, ***Critical ReviewsTM in Therapeutic Drug Carrier Systems*** since 2012
- Received the Honor of serving as the "**Convener**" of the "**International Conference on Chemical Biology: Disease Mechanisms and Therapeutics** (**ICCB-2014**)" jointly organized by the Chemical Biology Society (CBS) of India and CSIR-IICT, Hyderabad.
  Member of the Task Force on "*Drug, Drug Delivery, Biosimilar, Stem cells Vaccines and Clinical trials"* – **DBT-BIRAC** since 2017.

Our Research Interests

"Chaudhuri Group"addresses the challenges of translational medical science by applying principles of both chemistry and biology. We enjoy working at the interface of chemistry and biology.

Our work in the area of Targeted Cancer Therapy:

According to the WHO report published on February 3, 2022, cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, or nearly one in six deaths. Intravenously administered cytotoxic anti-cancer drugs/genes, in addition to reaching cancer cells/tissues, reach non-canceroushealthy body tissues too resulting in adverse side effects. Tothis end, liposomes, spherical vesicles consisting of one (as shown in the cartoonbelow) or more concentric lipid bilayers enclosing discrete aqueous spaces, are finding increasing applications for tumorselective delivery of anti-cancer drugs/genetic materials.



Unilamellar liposome containing an inside aqueous core enclosed by a lipid bilayer.

There are a number of distinguishing therapeutically advantageous features of liposomal drug/gene Delivery systems (**Figure 1**). Liposomes can simultaneously entrap both lipophilic and hydrophilic drugs/genes.Hydrophobic drug molecules get happily solubilized into the non-polarhydrophobic tail regions of liposomes while the hydrophilic drugs/genetic materials get entrapped in their aqueous interiors. T Cell/tissue selective delivery of liposomally entrapped anti-cancer drugs/genesare accomplished by covalent grafting of high-affinity ligands (e.g. mono-clonal antibody, small molecules, peptides, etc.) for receptors over expressed on tumor cell surfaces.Functional groups in the polar head-group regions of liposomes can be covalently conjugated to circulation enhancing polymers, cell selective high affinity peptides/small molecule ligands of receptors over expressed on cell surfaces, proteins, etc. To this end,

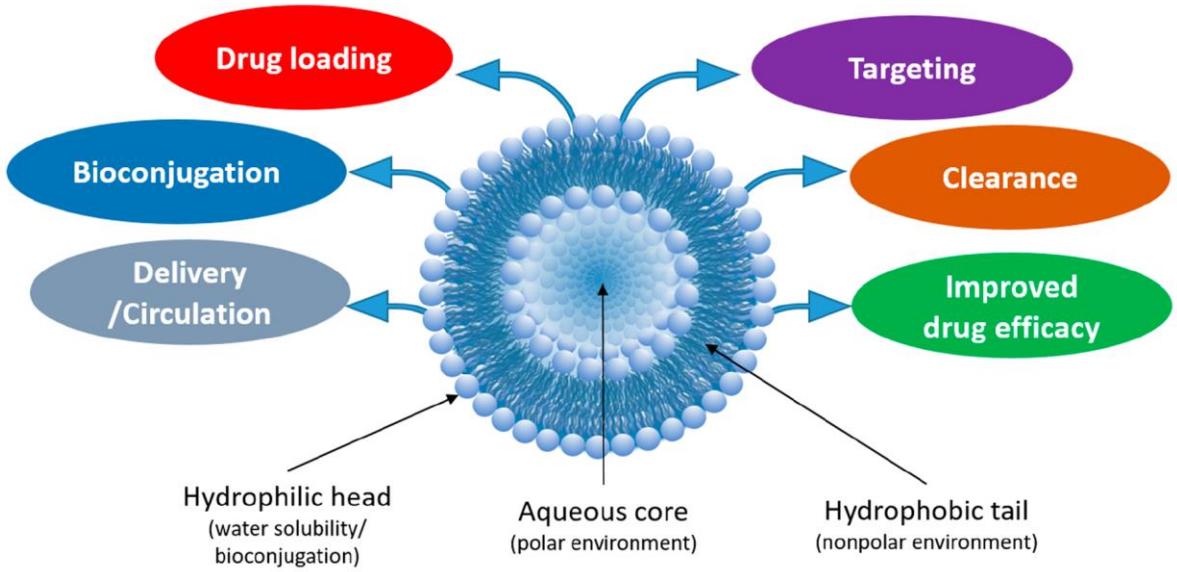


Figure 1. Therapeutically advantageous features of liposomes

we have designed a number of receptor-selective ligand-decorated nanometric liposomal systems to target the liposome-associated anti-cancer drugs/siRNAs selectively to mouse tumors and/or mouse tumor endothelial cells. Using appropriate mouse tumor models, we have demonstrated therapeutic efficacies of our tumor-selective liposomal drug/gene carriers.

Selected Publicationson designingreceptor selective liposomal drug/gene delivery systems for use in targeted cancer therapy:

Vangala, V.; Nimmu, N. V.; Khalid, S.; Kuncha, M.; Sistla, R.; Banerjee, R.; Chaudhuri, A. Combating Glioblastoma by Co-delivering Small Molecule Inhibitor of STAT3 and STAT3siRNA with α5β1 Integrin Receptor Selective Liposomes. ***Mol. Pharmaceutics*** **2020**, *17*, 1859–1874.

Saha, S.; Yakati, V.; Shankar, G.; Jaggarapu, M. M. C.; Moku, G.; Kuncha, M.; Banerjee, R.; Sistla, R; Srinivas, R.; Chaudhuri, A. Amphetamine Decorated Cationic Lipid Nanoparticles Cross Blood-Brain Barrier: Therapeutic Promise for Combating Glioblastoma. ***J. Mater. Chem. B.*****2020**, *8*, 4318-4330.

Majumder, P.; Bhunia, S.; Chaudhuri, A.Lipid-based Cell Penetrating Nano-assembly for RNAi-mediated Anti-angiogenic Cancer Therapy. ***Chem Commun*****2018**, *54*,1489-1492.

Bhunia, S.; Vegesna, R.; Chaudhuri, A. CDC20siRNA and paclitaxel co-loaded nanometricliposomes of nipecotic acid-derived cationic amphiphile inhibit xenograftedneuroblastoma. ***Nanoscale*** **2017**, *9*, 1201-1212.

Barui, S.; Saha,S.; Yakati, V.; Chaudhuri, A.Systemic Co-delivery of a Homoserine Derived Ceramide Analogue and Curcumin to Tumor Vasculature Inhibits Mouse Tumor Growth. ***Mol Pharmaceutics*** **2016,** *13*, 404-419.

Moku, G.; Gulla, S. K.; Nimmu, N. V.; Khalid, S.; Chaudhuri, A.Delivering anti-cancer drugs with endosomal pH-sensitive anti-cancer liposomes. ***Biomater. Sci.*** **2016**, *4*, 627–638.

Garu, A.; Moku, G.; Gulla, S.; Pramanik, D.; Majeti, B. K.; Karmali, P.; Shaik, H.; Bojja, S.;Chaudhuri, A. Examples of Tumor Growth Inhibition Properties of Liposomal Formulations of pH-Sensitive Histidinylated Cationic Amphiphiles. ***ACS Biomaterials Science & Engineering*** **2015,** *1*, 646-655.

Majumder, P.; Bhunia, S.; Bhattacharyya, J.; Chaudhuri, A. Inhibiting tumor growth by targeting liposomally encapsulated CDC20siRNA to tumor vasculature: Therapeutic RNA interference. ***J. Control. Release.*****2014**,*180,* 100-108.

Barui, S.;Saha, S.; Mondal, G.; Haseena, S.; Chaudhuri, A. Simultaneous delivery of doxorubicin and curcumin encapsulated in liposomes of pegylated RGDK-lipopeptide to tumor vasculature. ***Biomaterials*** **2014**, *35*, 1643-1656.[#]
[#]Received coverage in ***Nature India***(doi:10.1038/nindia.2014.12; Published online 27 January 2014).

Mondal, G.; Barui, S.;Saha, S.; Chaudhuri, A. Tumor growth inhibition through targeting liposomally bound curcumin to tumor vasculature. ***J. Control. Release.*****2013**,*172,* 832-840.

Mondal, G.; Barui, S.; Chaudhuri, A. The relationship between the cyclic-RGDfK ligand and αvβ3 integrin receptor. ***Biomaterials.*****2013**, *34*, 6249-6260.

Samanta, S.; Ramakrishna, S.; Chaudhuri, A. The use of RGDGWK-lipopeptide to selectively deliver Genesto mouse tumor vasculature and its complexation with p53 to inhibit tumor growth. ***Biomaterials*** **2010,***31*,1787-1797 (this work was cited and discussed in ***Nat. Med***. **2011**, *17*, 1359-1370).

Bhattacharyya, J.; Mondal, G.; Madhusudhana, K.; Agawane, S. B.; Ramakrishna, S.; Gangireddy, S. R.; Madhavi, R. D.; Reddy, P. K.; Konda, V. R.; Rao, S. R.; Udaykumar, P.; Chaudhuri, A.Single Subcutaneous Administration of RGDK-lipopeptide:rhPDGF-B Gene Complex Heals Wounds in Streptozotocin-induced Diabetic Rats. ***Mol. Pharmaceutics.*** **2009,** *6*, 918-927.
(this work received coverage in ***SciBX***, *Science Business Express*, a joint publication of ***Nature*** and ***BioCenturyUSA*****2009** (*SciBX***2** (15); doi:10.1038/scibx.2009.621.

Mukthavaram, R.; Marepally, S.; Mahidhar, Y. Venkata.; Naidu, V. G. M.; Ramakrishna, S.; Chaudhuri, A.Cationic glycolipids with cyclic and open galactose head-groups for the selective targeting of genes to mouse liver. ***Biomaterials*****2009**, *30*, 2369-2384.

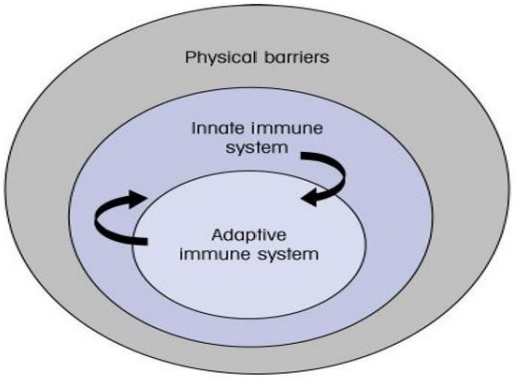
Pramanik, D.; Bharat K. M.; Mondal,G.; Karmali, P.P.; Ramakrishna, S.; Ovula, G. R.; Srinivas, G.; Pande, G.; Chaudhuri, A.Lipopeptide with a RGDK tetrapeptide sequence can selectively target genes to proangiogenic α5β1 integrin receptor and mouse tumor vasculature. ***J. Med. Chem. 2008***, *51*, 7298-7302.
(this work received coverage in:***SciBX***, Science Business Express, a joint publication of **Nature** and

BioCentury USA (SciBX**1** (41); doi:10.1038/scibx.2008.1007) and in***Nature India*;** doi:10.1038/nindia.2008.316). The work was also cited and discussed *in* ***Nat. Rev. Cancer*2010,***10,*** 9-22 and***Adv. Mater.*** **2012**, *24*, 3747-3756).

Our work in the area of Dendritic Cell based Cancer Immunotherapy:

Cancer immunotherapy is arguably the fastest emerging approach for combating cancerin which body's immune cells are turned on tokill cancer cells. Before we delve with our therapeutic approaches in this promising field of dendritic cell based cancer immunotherapy, let us briefly review the working principles of our immune systems.

The world around us is filled with endless pathogenic microorganismsranging from bacterial to virus to fungi that make us sick. Despite suchdangerous neighborhood-thanks to our exquisite immune systems-we manage to stay healthy. Our immune systems consist of essentially three layers of defenses.



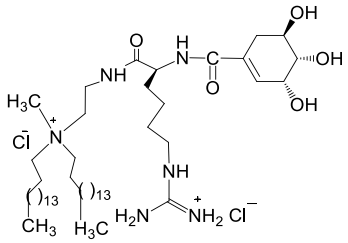
Three layers of vertebrate immune system

When invading pathogens succeed in breaching one layer, the next layer takes over. As depicted in the cartoonabove, the first line of defense consists of physical barriers namely, our skin, the mucosal linings of our respiratory tract, tears, sweat, saliva, etc. all are parts of this physical barriers. These first line of defense mechanism can eliminate some pathogens before they reach our inner body tissues or blood. When, due toour carelessness, we cut our fingers while chopping vegetables with a knife in our kitchen, we open the access doors to the bacteria and other pathogenic microorganisms surrounding us for entering our innerbody tissues or blood. It is at this point, the second line of defense of our immune systems namely, our innate immune systems take over.This second layer of defense mechanisms consist of cells and proteinsthat attack invaders non-specifically. Stated differently, irrespective of the nature of pathogens, the same cells and proteins of our innate immune systems areat work24x7 to protect us from intruders. Cells of innate immunity consist of phagocytes (such as macrophages and neutrophils). They destroy theforeign invaders in our body by phagocytosis. A macrophage first identifies and binds to the invader, engulfs it and destroys the invading microorganism by breakingit down to small pieces intheir lysosomes(loaded withdegradative enzymes). In addition, macrophages also sound an alarm (by producing proteins called cytokines) to recruit other types of white blood cells(including neutrophils, eosinophils and basophils) foreliminating the invader.

The above-mentioned body's second line of defense mechanismis often good enough toeither fully contain theinvading microorganisms, or to significantly limit their spread to other body parts. For instance, the bacteria thatenter through accidental cut on our fingerusually do not spread further into our other body tissues. However, there are situations whenour innate immune system is not enough. At times, the

number of bacteria entering our body could be overwhelmingly high or they may proliferate inside our body too fast.That's whenour adaptive immune systems, body's third line of defense mechanism,come to our rescue.This third level of body's defense mechanism consists of cells tailor-made to get rid of the specific microorganismsthat have succeeded in evading body's second line of defense mechanism. A special type of cells, called dendritic cells (DCs), act as the liaison (point of communication) between innate and adaptive immunity. When macrophagessound alarms by producing cytokines, DCs plays a central role. They crawl to the site of infection, phagocytose the pathogen, tear it apart into small fragments, and thereafter, present these small antigenic fragments in complexation with the major histocompatibility complex I & II to their cell surfaces. Such activated (matured DCs), finally after crawling to the nearby lymph nodes, present the MHCI & II bound small antigenic fragments to the cells of adaptive immunity namely, B-cells and T-cells.

In the still emerging field of dendritic cell (DC)based cancer immunotherapy, effective humoral and cellular immuneresponses againsttumors are mounted by *in vivo* targeting of distinct tumor antigen encoded mRNA/DNA vaccines (i.e. genetic immunization using either DNA or mRNA vaccines) to dendritic cells (DCs), body's most potent antigen presenting cells. To this end, we have developed novel mannose receptor (over expressed on the DC-surface) selective liposomal DNA vaccine carriers. The liposomes were prepared from a cationic amphiphile (**lipid 1**) containing both transfection enhancing guanidine functionality and mannose-mimicking shikimoyl functionality in its polar head-group region. Theliposomes of **lipid 1** were found to be effective in mounting anti-tumorimmunse response by delivering DNA vaccines directly to dendritic cells under *in vivo* conditions.



Lipid **1**

Chemical Structure of our *in vivo* DC-targeting cationic lipid

In addition, we have developed a number of efficient liposomal carriers for *ex vivo* and *in vivo* targeting of tu antigen encoded DNA vaccines to dendritic cells for use in DC-based cancer immunotherapy

Selected Publications in the area of Dendritic Cell based Cancer Immunotherapy:

Garu, A.; Moku, G.; Gulla, S.; Chaudhuri, A. Genetic Immunization with In Vivo Dendritic Cell Targeting Liposomal DNA Vaccine Carrier Induces Long-lasting Anti-tumor Immune Response. ***Molecular Therapy*** **2016**, *24*, 385-397.

Reddy, R. C.; Mukherjee, S.; Patra, C. R.; Chaudhuri, A.Shikimoyl-ligand decorated gold nanoparticles for use in ex vivo engineered dendritic cell based DNA vaccination ***Nanoscale*** **2019**, *11*, 7931-7943.

Gulla, S. K.; Rao, B. R.; Moku, G. K.; Jinka, S.; Nimmu, N. V.; Khalid, S.; Patra, C. R.; Chaudhuri, A.*In vivo* targeting of DNA vaccines to dendritic cells using functionalized gold nanoparticles. ***Biomaterials***

***Science*2019**, *7*, 773-788.

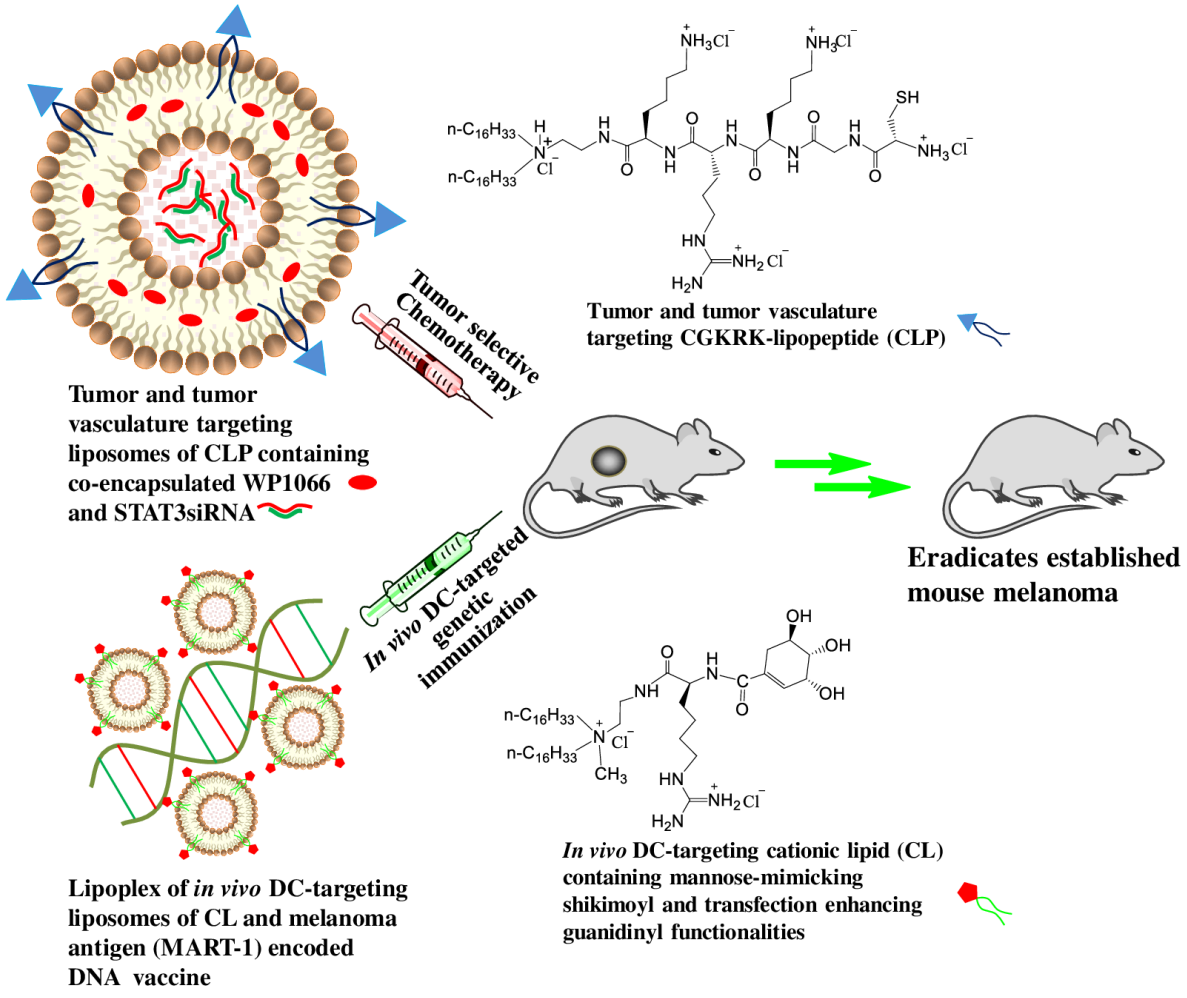
Voshavar, C.*; Meka, R. C.; Samanta, S.; Marepally, S.; Chaudhuri, A. Enhanced Spacer Length between Mannose Mimicking Shikimoyl- and Quinoyl- Head Groups and Hydrophobic Region of Cationic Amphiphile Increases Efficiency of Dendritic Cell based DNA Vac-cination: A Structure-Activity Investigation. ***J. Med. Chem.* 2017**, *60*, 1605-1610.

Srinivas, R.; Garu, A.; Moku, G.; Agawane, S.; Chaudhuri, A. A long-lasting dendritic cell DNA vaccination system using lysinylated amphiphiles with mannose-mimicking head-groups. ***Biomaterials* 2012**, *33*, 6220-6229.

Srinivas, R.; Karmali, P. P.; Pramanik, D.; Garu, A.; Mahidhar, Y. V.; Majeti, B. K.; Ramakrishna, S.; Srinivas, G.; Chaudhuri, A. Cationic amphiphile with shikimic acid head-group shows more systemic promise than its mannosylanalog as DNA vaccine carrier in dendritic cell based genetic immunization. ***J. Med. Chem.* 2010,** *53*, 1387-1391.

On-going Research on Dendritic Cell based Cancer Immunotherapy:

We have been currently evaluating the therapeutic promises of a potentially platform strategy for Treatment of cancer. In our combination approach (shown schematically in the cartoon below for combating melanoma), we are combining *in vivo* DC-targeted genetic immunization withtutor-selective chemotherapy (both using liposomal drug/gene carriers) using appropriate mouse tumor models.



Our combination approach has:

Substantially enhanced (by 350-500%) overall survivability of mice bearing orthotopically established mouse glioblastoma&pancreatic tumors and has eradicated established mouse melanoma

Saha, S.; Yakati, V.; Bhattacharya, D.; Kompella, S. D.; Madhusudana, K.; Chakravarty, S.; Ramakrishna, S.; Chaudhuri, A. Combating Established Mouse Glioblastoma through Nicotinylated Liposomes Mediated Targeted Chemotherapy in Combination with Dendritic Cell Based Genetic Immunization. ***Advanced Biosystems*** **201*7*,** *1*,1600009. (The journal renamed as ***Advanced Biology***. This work received Coverage in ***Advance Science News*** (postedon January 27, 2017);

Bhunia, S.; Vangala, V.; Bhattacharya, D.; Ravuri, H. G.; Kuncha, M.; Chakravarty, S.; Ramakrishna, S.; Chaudhuri, A. Large Amino Acid Transporter 1 Selective Liposomes of L-DOPA Functionalized Amphiphile for Combating Glioblastoma***.Molecular Pharmaceutics*,* 2017***, *14*, 3834-3847.

Madamsetti V. S.; Mukhopadhyay, D.; Chaudhuri, A. A method for regressing pancreatic tumor by a liposomal formulation along with DNA Vaccine. **US10611796B2**, Granted on April 7, 2020;

Barui, S.; Saha, S.; Chaudhuri, A. Cationic lipid formulations for regressing established tumor. **US 9,944,676 B2**, Granted on 17/04/2018

Mechanistic studies aimed at understanding the observed dramatic synergy between the *in vivo* DC-targeted genetic immunization (using tumor antigen encoded DNA vaccines) and chemotherapy encapsulated within tumor selective liposomes are currently under progress.

In another majorcurrently on-going projects sponsored by Covaxin Pioneer Bharat Biotech InternationalLimited, Hyderabad, we are designing up-scalable self-assembling lipid nanoparticles to target DNA/mRNA vaccines to dendritic cells under *in vivo* settings for combating infectious diseases.

Our earlier work in the area of non-viral gene delivery:

During the last two decadesThe Chaudhuri Group has developed a number of efficient lipid-based gene delivery systems for use in the field of non-viral gene therapy. The molecular structures of cationic transfection lipids consist of a positively charged polar head-group functionality and a non-polar hydrophobic region (usually two aliphatic hydrocarbon chains or a cholesterol unit) covalently tethered by a linker functionality such as ester, amides, ether, carbamates, etc (**Figure 2**).

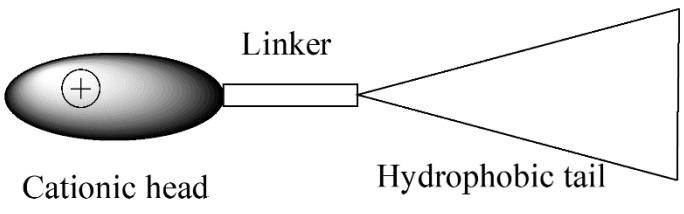


Figure 2. Cartoon for the general structure of cationic amphiphiles.

We demonstrated for the first time that the efficiency of liposomal gene transfer to cells could be dramatically sensitive even to minor changes in the molecular architectures of lipids such as mere reversal of linker group structural orientation under both *in vitro* and *in vivo* conditions.

Srujan, M.; Chandrashekhar, V.; Reddy, R. C.; Prabhakar, R.; Sreedhar, B.; Chaudhuri, A. The influence ofthe structural orientation of amide linkers on the serum compatibility and lung transfection properties of cationic amphiphiles. ***Biomaterials*2011,***32*, 5231-5240.

Rajesh, M.; Sen, J.; Srujan, M.; Mukherjee, K.; Bojja, S.; Chaudhuri, A. Dramatic Influence of the Orientation of Linker between Hydrophilic and Hydrophobic Lipid Moiety in Liposomal Gene Delivery. ***J. Am. Chem. Soc.*2007**, *129*, 11408-11420.

Selected Publications in the area of designing lipid-based gene transfer systems:

Chandrashekhar, V.; Srujan,M.; Prabhakar, R.; Reddy, R. C.; Sreedhar, B.; Rentam, K. R.; Kanjilal, S.; and Chaudhuri, A. Cationic Amphiphiles with Fatty Acyl Chain Asymmetry of Coconut Oil Deliver Genes Selectively to Mouse Lung. ***Bioconjugate Chem.* 2011**, *22*, 497-509.

Srinivas, R.; Samanta, S.; Chaudhuri, A. Cationic Amphiphiles: Promising Carriers of Genetic Materials in Gene Therapy. ***Chem. Soc. Rev.* 2009**, *38*, 3326-3338 (*Invited Review Article*).

Mukherjee, K.; Bhattacharyya, J.; Ramakrishna, S.; Chaudhuri, A. Covalent Grafting of Common Tri-hydroxymethylaminomethane in the Head-group Region Imparts High Serum Compatibility and Mouse Lung Transfection Property to Cationic Amphiphile.***J. Med. Chem.* 2008,** *51*, 1967-1971.

Karmali, P. P. andChaudhuri, A.Cationic Liposomes as Non-Viral Carriers of Gene Medicines: Resolved Issues, Open Questions and Future Promises. ***Med. Res. Rev*. 2007**, *27*, 696-722 *(Invited Review Article).*

Karmali, P. P.; Majeti, B. K.; Bojja S.;andChaudhuri, A.In Vitro Gene Transfer Efficacies and Serum Compatibility Profiles of Novel Mono, Di- and Tri-Histidinylated Cationic Transfection Lipids: A Structure-Activity Investigation. ***Bioconjugate Chem.* 2006**, *17*, 159-171.

Sen, J. and Chaudhuri, A. Design, Syntheses and Transfection Biology of Novel Non-Cholesterol based Guanidinylated Cationic Lipids.***J. Med. Chem*.2005**, *48*, 812-820.

Bharat M. K.; Karmali, P. P.; Reddy, B. S.; Chaudhuri, A. In Vitro Gene Transfer Efficacies of N,N-dialkyl-pyrrolidinium Chlorides: A Structure-Activity Investigation. ***J. Med. Chem*.2005**, *48*, 3784-3795.

Mahidhar, Y. V., Rajesh, M.; Chaudhuri, A. Spacer-Arm Modulated Gene Delivery Efficacies of Novel Cationic Glycolipids: Design, Synthesis and In Vitro Transfection Biology.***J. Med. Chem*.2004**, *47*, 3938-3948.

Mahidhar, Y. V., Rajesh, M.; Madhavendra, S. S.; Chaudhuri, A. Distance of Hydroxyl Functionality from the Quaternized Center Influences DNA-binding and In Vitro Gene Delivery Efficacies of Cationic

Lipids with Hydroxyalkyl Head-groups.***J. Med. Chem***.**2004**, *47*, 5721-5728.

Singh, R. S.; Gonçalves, C.; Sandrin, P.;Pichon, C.; Midoux, P.; Chaudhuri, A. On the Gene Delivery Efficacies of pH-Sensitive Cationic Lipids via Endosomal Protonation: A Chemical Biology Investigation. ***Chem. Biol.*** **2004**,*11*, 713-723.

Majeti, B. K.; Singh, R. S.; Yadav, S. K.; Reddy, S. B.; Ramkrishna, S.; Diwan, P. V.; Madhavendra, S. S.; Chaudhuri, A. Enhanced Intravenous Transgene Expression in Mouse Lung using Cyclic-head Cationic Lipids. ***Chem. Biol.*****2004**,*11*, 427-437.

Karmali, P. P.; Valluripalli, V. K.; Chaudhuri, A. Design, Syntheses and In Vitro Gene Delivery Efficacies of Novel Mono-, Di- and Trilysinated Cationic Lipids: A Structure-Activity Investigation.***J. Med. Chem.*** **2004**, *47*, 2123-2132.

Kumar, V. V.; Pichon, C.; Refregiers, M.; Guerin, B.; Midoux, P.; Chaudhuri, A. Single Histidine Residue in Head-Group Region is Sufficient to Impart Remarkable Gene Transfection Properties to Cationic Lipids: Evidence for Histidine-Mediated Membrane Fusion at Acidic pH.***Gene Ther.*****2003**, *10*, 1206-1215.
Singh, R. S.; Mukherjee, K.; Banerjee, R.; Chaudhuri, A.; Hait, S. K.; Moulik, S. P.; Ramadas, Y.; Vijayalakshmi, A.; and Rao, N. M. Anchor Dependency for Non-Glycerol Based Cationic Lipofectins: Mixed Bag of Regular and Anomalous Transfection Profiles.***Chem. Eur. J.*** **2002**, *8*, 900-909.

Banerjee, R.; Mahidhar, Y. V.; Chaudhuri, A. Gopal, V.; Rao, N. M. Design, Synthesis, and Transfection Biology of Novel Cationic Glycolipids for Use in Liposomal Gene Delivery.***J. Med. Chem.*****2001**, *44*, 4176-4185.

Banerjee, R.; Das, P. K.; Srilakshmi, G. V.; Chaudhuri, A.; and Rao, N. M. A Novel series of non-glycerol based cationic transfection lipidsfor use in liposomal gene delivery ***J. Med. Chem ,*** **1999**, *42*, 4292-4299.

Patents Granted/filed:

Garu, A.; Moku, G.; Agawane, S.; Chaudhuri, A. Mannose-receptor selective lysinylated cationic amphiphiles and a process for preparation thereof. US9840530B2, Granted on December 12, 2017; WO 2014106856 A1 (Publication date: July 10, 2014; PCT/IN2013/000806 filed on 27/12/2013; Indian Patent Application No. 0017/DEL/2013, filed on January 3, 2013).

Majeti, B.K.; Karmali, P.P.; Pramanik, D.; Chaudhuri, A. α5β1 Integrin binding RGD-Lipopeptides with gene transfer activities. Japan Patent No. 5078987 (Granted on 07/09/2012); EP2004239 Granted on 03/02/2010; US9403869B2, Granted on August 2, 2016.

Madamsetti V. S.; Mukhopadhyay, D.; Chaudhuri, A. A method for regressing pancreatic tumor by a liposomal formulation along with DNA Vaccine. US10611796B2, Granted on April 7, 2020; Indian Patent Application No. 201611009088, filed on March 17, 2016.

Barui, S.; Saha, S.; Chaudhuri, A. Cationic lipid formulations for regressing established tumor. US 9,944,676 B2, Granted on 17/04/2018; Indian Patent Application No. 2442/DEL/2013 filed on

19/8/2013.

Garu, A.; Moku, G.K.; Agwane, S. B.; Chaudhuri, A. Processes for synthesizing Histidinylated cationic amphiphiles, a new class of anti-cancer compounds. Indian Patent Documents filed (CSIR Ref No. 0091NF2012; Indian Patent Application No. 3767/DEL/2012 filed on December 7, 2012; PCT/IN2013/000751 filed on 06/12/2013; European Patent Application No./Patent No. 13821730.2-1452, dt. 10.07.15).

Marepally, S.; Radha Madhavi K.; Tumuru, M.; Nandigama, H.; Chaudhuri, A. Liposomal encapsulation of rhBNP for improving its therapeutic efficiency Indian Patents filed. (Patent Application No. PT-488/06 filed July1, 2010).

Srinivas, R.; Garu, A.; Agwane, S. B.; Chaudhuri. A. Novel Cationic Amphiphiles with Mannose-mimicking Head-groups for Targeting DNA Vaccines to Dendritic Cells. US8703824 B2, Granted Apr 22, 2014; Indian Patent Application No. 2170/DEL/2010, filed 14.09.2010; International Patent Application No. PCT/IN2011/000629; CSIR Ref No. NF-126/08).

Bhattacharyya, J.; Pramanik, D.; Ramakrishna, S.; Diwan, P. V.; Nandigala, H.; Murali, T.; Chaudhuri, A. Pharmaceutical Compositions and Methods for Improved Healing of Chronic Wounds. Indian Patent filed by Virchow Biotech. Patent filing No. 842/CHE/2009.
Majeti, B. K.; Ramdas, Y.; Rao, N.M.; Chaudhuri, A. Cationic amphiphiles for intracellular delivery of therapeutic molecules and its composition, process and method of treatment.
US Patent 7,297,71210/106849 (Granted in Nov' 2007).

Mahidhar, Y. V.; Chaudhuri, A. and Mukherjee, R. Process for synthesis of glycomimicking cationic amphiphiles. Indian Patent Application No. 359/DEL/2006; Filed on 07-02-2006; International Patent Application No. PCT/IB 2007/000281, filed on 07.02.2007, Publication No. WO/2008/001166, Publication date: 03.01.2008.; Process for the synthesis of Novel glycomimicking cationic Amphiphiles for intracellular delivery of Biological macromolecules; US Patent No. 8278483 (Granted on 02/10/2012).

Verma, S.K.; Mani, P.; Sharma, N.R.; Krishnan, A.; Valluripalli, V.K.; Reddy, B.S.; Chaudhuri, A.; Sarkar, D.P. A Process for Producing Modified Reconstituted Sendai Viral Envelope Specific for Drug and/or Gene Delivery to Liver Cells. International Patent Application No. PCT/IN2006/000061, filed on 24.02.2006; WIPO Publication No. WO/2006/111982, published on 26.10.2006; Indian Patent Application No. 1003/Del/05, filed on 21.04.2005.

Alumni and Their Current Affiliations:

Alumni from CSIR-IICT, Hyderabad:

Dr. Prasanta Kumar Das (**Ph.D. 2000**; pursued post-doctoral research at Massachusetts Institute of Technology; presently Senior Professor and Chair, School

of Biological Sciences, Indian Association for the Cultivation of Science, Kolkata)

Dr. Rajkumar Banerjee (**Ph.D. 2000**, pursued post-doctoral research at University of Pittsburgh; presently Senior Principal Scientist, CSIR-Indian Institute of Chemical Technology, Hyderabad)

Dr. Venkata SrilakshmiP(**Ph.D. 2002**, pursued post-doctoral research at Purdue University;presently Professor and Head, Department of Chemistry, National Institute of Technology, Warangal)

Dr. Rajkumar Sunil Singh (**Ph.D. 2004**; pursued post-doctoral research at University of California, School of Medicine, Los Angeles, USA; presently Assistant Professor, North Eastern Hill University, Shillong)

Dr.Valluripalli Vinod Kumar (**Ph.D. 2005**; pursued post-doctoral research at Cedars-Sinai Medical Center, Los Angeles and University of Southern California; Thereafter, on pressing health issues, Vinod had to leave the field of experimental Science. After gaining six years of experience in development and implementation of SAP Enterprise Data Warehousing and Business Intelligence Solutions, he ispresently working as a SAP Certified Consultant (HANA, BW andBOBJ WEBI) for Kubota Tractor Corporation, Torrance, California.

Dr. Koushik Mukherjee (**Ph.D. 2005**; pursued post-doctoral research at Massachusetts Institute of Technology; worked at Procter & Gamble, Beijing as Technology Manager, R&D (Product & Formulation; presently Program Manager, Beauty & Personal Care, Agriculture & Process Industry,Momentive, Bengaluru)

Dr.Yenugonda Venkata Mahidhar (**Ph.D. 2005**; pursued post-doctoral research at Georgetown University Medical Center, Washington DC, presently Director, Translational Experimental Therapeutics,and Associate Professor, Translational Neuro-oncologyand Neurotherapeutics, John Wayne Cancer Institute, Santa Monica, California)

Dr.Majeti Bharat Kumar (**Ph.D. 2005**; pursued post-doctoral research at University of School of Medicine, San Diego; presentlySenior Director, LNP Delivery Platform Develo BioPharma Inc, San Diego, California)

Dr.Joyeeta SenChowdhury (**Ph.D. 2005**; pursued post-doctoral research at University of North Carolina, Chapel Hill; presently Senior Scientist at TCG Life Sciences, Kolkata)

Dr. Priya Prakash Karmali (**Ph.D. 2005**; pursued post-doctoral research at Burnham Cancer Research Institute, California;worked as Vice President, Technology Innovation and Development, Arcturus Therapeutics, Sand Diego, California; presently working as Chief Technology Officer, Capstan Therapeutics, San Diego, California)

Dr.Mukthavaram. Rajesh (**Ph.D. 2007**; pursued post-doctoral research at University of California, School of Medicine, San Diego; presently Senior Manager, Formulation Development, Arcturus Therapeutics**,** San Diego, California)

Dr. Jayanta Bhattacharya (**Ph.D. 2010**, pursued post-doctoral research at Duke University, Division of Biomedical Engineering; presently Assistant Professor, Department of Biomedical Engineering, Indian Institute of Technology, Delhi)

Dr. Dipankar Pramanik (**Ph.D. 2010**; pursued post-doctoral research at Johns Hopkins University School of Medicine, Baltimore; presently Assistant Professor, Department Of Chemistry, Haldia Government College, West Bengal)

Dr.Ramishetti Srinivas (**Ph.D. 2010**; pursued post-doctoral research at University of North Carolina, Chapel Hill and Tel Aviv University; presently, Vice President of Technology, Neo Vac, Oxfordshire, England)

Dr. Sanjoy Samanta (**Ph.D. 2011**; pursued post-doctoral research at University of Massachusetts Medical School, Worcester, presently working at CSIR-Indian Institute of Chemical Technology, Hyderabad as Ramalingaswami Fellow, Department of Biotechnology, Government of India)

Dr.MarepallySrujan Kumar (**Ph.D. 2011**; pursued post-doctoral research at Florida A&M University;presently Scientist at Centre for Stem Cell Research, Christian Medical College (CMC), Vellore)

Dr. V. Chadrasekhar (**Ph.D. 2011**; pursued post-doctoral research at Wayne State University;presently pursuing a second post-doctoral research at Florida A&M University, Tallahassee)

Dr. Goutam Mondal (**Ph.D. 2012**, pursued post-doctoral research at University of Nebraska MedicalCenter and at National Center for Natural Products Research, School of Pharmacy University of Mississippi, Mississippi; presently Scientist II, Capstan Therapeutics, San Diego, California)

Dr. Sugata Barui (**Ph.D. 2014**, pursued post-doctoral research at the University of Texas, MD Anderson Cancer Center, Houston, and as a Marie Curie-Sklodowska Individual Fellowat Politecnico di Torino, Torino, Italy; presently working as Senior Scientific Manager,Aragen Life Sciences, Hyderabad)

Dr.Poulami Majumdar (**Ph.D. 2014**, pursued post-doctoral research at National Cancer Institute, NIH, Frederick, Maryland; presentlyResearch Advisor, Bioproduct R&D at Eli Lilly & Company, Carmel, Indiana)

Dr.Anubhab Mukherjee (**Ph.D. 2015**, pursued post-doctoral research at John Wayne Cancer Institute,California; presently Principal Scientist, Head-R&D in EspererOnco NutritionPvt. Ltd, Hyderabad)

Dr. Gopi Krishna Moku (**Ph.D. 2016**; pursued post-doctoral research at University of Minnesota; presently Assistant Professor in Chemistry, Department of Physical Sciences, Kakatiya Institute of Technology and Science, Warangal, India)

Dr.SoumenSaha (**Ph.D. 2016**, currently Senior Research Scientist in Chilkoti Lab, Department of Biomedical Engineering, Duke University)

Dr. Sukanya Bhunia (**Ph.D. 2017**; currently pursuing post-doctoral research at Herbert Wertheim College of Medicine, Florida International University)

Dr. Vijay Sagar Madamsetty (**Ph.D. 2018**; pursued post-doctoral research at Mayo Clinic, Florida; presently Investigator, Seqirus, Cambridge, Massachusetts)

Dr. Suresh Kumar Gulla (**Ph.D. 2018**; currently pursuing post-doctoral research at University of Oklahoma Health Sciences Center)

Dr. Venugopal Vangala (**Ph.D. 2020**, currently pursuing post-doctoral research at Penn State College of Medicine, Hershey, Philadelphia)

Dr.YakatiVenu (**Ph.D.2020**, currently pursuing post-doctoral research at University of Alabama, School of Medicine).

Alumni from IISER Kolkata:

Dr.Mousumi Mandal(pursued post-doctoral research in our group at IISER Kolkata during 2021-22; currently pursuing post-doctoral research at The University of Tennessee Health Science Center);

Mr. Swapnil Mukherjee (**BS-MS Chemistry Major 2017, IISER Kolkata**; pursued BS-MS final year thesis research, andthereafter, 1 year project research within our group; currently pursuingdoctoral study in the Department ofChemistry and Biochemistry,Ohio State University)

Mr. Diptomit Biswas (**BS-MS Biology Major 2017, IISER Kolkata**;pursued BS-MS final year thesis research, and thereafter, pursued project research within our group; currently pursuing doctoral study in the Huck Institute of Life Sciences at Pennsylvania State University)

Current Group at IISER Kolkata:

Dr.SutapaMahata, Post-doctoral Research Associate

Dr.RajatsubhraGiri, Post-doctoral Research Associate

Dr. Sonia Agrawal, Post-doctoral Research Associate

Ms. Wahida Rahaman (Institute PhD Fellow, IISER Kolkata)

Mr. GobindaDolai (Project Fellow, IISER Kolkata)

Complete List of Publications:

75. Vangala, V.; Nimmu, N. V.; Khalid, S.; Kuncha, M.; Sistla, R.; Banerjee, R.; Chaudhuri, A. Combating Glioblastoma by Co-delivering Small Molecule Inhibitor of STAT3 and STAT3siRNA with α5β1 Integrin Receptor Selective Liposomes. ***Mol. Pharmaceutics*** **2020**, *17*, 1859–1874.
74. Saha, S.; Yakati, V.; Shankar, G.; Jaggarapu, M. M. C.; Moku, G.; Kuncha, M.; Banerjee, R.; Sistla, R; Srinivas, R.; Chaudhuri, A. Amphetamine Decorated Cationic Lipid Nanoparticles Cross Blood-Brain Barrier: Therapeutic Promise for Combating Glioblastoma. ***J. Mater. Chem. B.*****2020**, *8*, 4318-4330.
73. Reddy, R. C.; Mukherjee, S.; Patra, C. R.; Chaudhuri, A.Shikimoyl-ligand decorated gold nanoparticles for use in ex vivo engineered dendritic cell based DNA vaccination ***Nanoscale*** **2019**, *11*, 7931-7943.
72. Gulla, S. K.; Rao, B. R.; Moku, G. K.; Jinka, S.; Nimmu, N. V.; Khalid, S.; Patra, C. R.; Chaudhuri, A.*In vivo* targeting of DNA vaccines to dendritic cells using functionalized gold nanoparticles. ***Biomaterials Science*****2019**, *7*, 773-788.
71. Majumder, P.; Bhunia, S.; Chaudhuri, A.Lipid-based Cell Penetrating Nano-assembly for RNAi-mediated Anti-angiogenic Cancer Therapy. ***Chem Commun*****2018**, *54*,1489-1492.
70. Gulla, S. K.; Kotcherlakota, R.; Nimushakavi, N.; Nimmu, N. V.; Khalid, S.; Patra, C. R.; Chaudhuri, A. Au-CGKRK nanoconjugates for combating cancer through T cell driven therapeutic RNA interference. ***ACS OMEGA*** **2018**, *3*, 8663-8676.
69. Rao, B. R.; Kotcherlakota,R.; Nethi, S. K.; Puvvada, N.; Sreedhar, B.;Chaudhuri, A.; Patra, C. R.. $Ag_2[Fe(CN)_5NO]$ Nanoparticles Exhibit Antibacterial Activity and Wound Healing Properties. ***ACS Biomater. Sci. Eng.*****2018**, *4*, 3434−3449.
68. Bhunia, S.; Vegesna, R.; Chaudhuri, A. CDC20siRNA and paclitaxel co-loaded nanometric liposomes of nipecotic acid-derived cationic amphiphile inhibit xenografted neuroblastoma. ***Nanoscale*** **2017**, *9*, 1201-1212.
67. Voshavar, C.*; Meka, R. C.; Samanta, S.; Marepally, S.; Chaudhuri, A.Enhanced Spacer Length between Mannose Mimicking Shikimoyl- and Quinoyl- Head Groups and Hydrophobic Region of Cationic Amphiphile Increases Efficiency of Dendritic Cell based DNA Vac-cination: A Structure-Activity Investigation. ***J. Med. Chem.*** **2017**, *60*, 1605-1610.
66. Bhunia, S.; Vangala, V.; Bhattacharya, D.; Ravuri, H. G.; Kuncha, M.; Chakravarty, S.; Ramakrishna, S.; Chaudhuri, A. Large Amino Acid Transporter 1 Selective Liposomes of L-DOPA Functionalized Amphiphile for Combating Glioblastoma***.Molecular Pharmaceutics,*** **2017**, *14*, 3834-3847.
65. Das, K.; Nimushakavi, S.; Chaudhuri, A.; Das, P. K. An Integrin-Targeting RGDK-Tagged Nanocarrier: Anticancer Efficacy of Loaded Curcumin.**ChemMedChem. 2017,** *12*, 738-750**.**
64. Hiwale, A. A.; Voshavar, C.; Dharmalingam, P.; Dhayani, A.; Mukthavaram, R.; Nadella, R.; Sunnapu, O.; Gandhi, S.; Naidu, V. G. M.; Chaudhuri, A.;Marepally, S.; Vemula, P. K. Scaling the effect of hydrophobic chain length on gene transfer properties of di-alkyl, di-hydroxyethylammonium chloride based cationic amphiphiles. ***RSC Adv.*** **2017**,*7,* 25398-25405.
63. Saha, S.; Yakati, V.; Bhattacharya, D.; Kompella, S. D.; Madhusudana, K.; Chakravarty, S.; Ramakrishna, S.; Chaudhuri, A. Combating Established Mouse Glioblastoma through Nicotinylated Liposomes Mediated Targeted Chemotherapy

in Combination with Dendritic Cell Based Genetic Immunization. ***Advanced Biosystems* 201*7*, *1*,1600009.#**

Received Coverage in ***Advance Science News*** (posted on January 27, 2017)

62. Dharmalingam, P.; Rachamalla, H. K. R.; Lohchania, B.; Bandlamudi, B.; Thangavel, S.; Murugesan, M. K.; Banerjee, R.; Chaudhuri, A.;Voshavar, C.; Marepally, S. Green Transfection: Cationic Lipid Nanocarrier System Derivatized from Vegetable Fat, Palmstearin Enhances Nucleic Acid Transfections. ***ACS Omega*2017**, *2*, 7892-7903.
61. Meka, R.R.; Godeshala, S.; Marepally, S.; Thorat, K., Rachamalla, H. K. R.; Dhayani, A.; Hiwale, A.; Banerjee, R.; Chaudhuri, A.; Vemula, P. K. Asymmetric cationic lipid based non-viral vectors for an efficient nucleic acid delivery. ***RSC. Adv.* 2016**, *6*, 77841-77848.
60. Garu, A.; Moku, G.; Gulla, S.; Chaudhuri, A. Genetic Immunization with In Vivo Dendritic Cell Targeting Liposomal DNA Vaccine Carrier Induces Long-lasting Anti-tumor Immune Response. ***Molecular Therapy* 2016**, *24*, 385-397.
59. Barui, S.; Saha,S.; Yakati, V.; Chaudhuri, A.Systemic Co-delivery of a Homoserine Derived Ceramide Analogue and Curcumin to Tumor Vasculature Inhibits Mouse Tumor Growth. ***Mol Pharmaceutics* 2016,***13*, 404-419.
58. Moku, G.; Gulla, S. K.; Nimmu, N. V.; Khalid, S.; Chaudhuri, A. Delivering anti-cancer drugs with endosomal pH-sensitive anti-cancer liposomes. ***Biomater. Sci.* 2016**, *4*, 627–638.
57. Garu, A.; Moku, G.; Gulla, S.; Pramanik, D.; Majeti, B. K.; Karmali, P.; Shaik, H.; Bojja, S.; Chaudhuri, A. Examples of Tumor Growth Inhibition Properties of Liposomal Formulations of pH-Sensitive Histidinylated Cationic Amphiphiles. ***ACS Biomaterials Science & Engineering* 2015,** *1*, 646-655.
56. Majumder, P.; Bhunia, S.; Bhattacharyya, J.; Chaudhuri, A. Inhibiting tumor growth by targeting liposomally encapsulated CDC20siRNA to tumor vasculature: Therapeutic RNA interference. ***J. Control. Release.*2014**,*180*, 100-108.
55. Barui, S.;Saha, S.; Mondal, G.; Haseena, S.; Chaudhuri, A. Simultaneous delivery of doxorubicin and curcumin encapsulated in liposomes of pegylated RGDK-lipopeptide to tumor vasculature. ***Biomaterials*2014**, *35*, 1643-1656.#

#Received coverage in ***Nature India***(doi:10.1038/nindia.2014.12; Published online 27 January 2014).

54. Mukherejee, A.; Bhattacharyya, J.; Chaudhuri, A. On the possible involvement of bovine serum albumin precursor in lipofection pathway. ***J. Biosci.*2014**, *39*, 43-52.
53. Chilakamarthi, U.; Kandhadi, J.; Srinivas G; Raj. T. A.; Jerald, M. K.; Giribabu L; Reddy, R. C.; Chaudhuri, A.; Pande, G. Synthesis and Functional Characterization of a Fluorescent Peptide Probe for Non invasive Imaging of Collagen in live Tissues. ***Exp. Cell. Res.*2014**,*327*, 91-101.
52. Darshan, V. D.; Chandar, B. G. N.; Srujan, M.; Chaudhuri, A.; Prabhakar, S. Electrospray ionization tandem mass spectrometry study of six isomeric cationic amphiphiles with ester/amide linker. ***Rapid Commun.Mass Spectrom.*2014**,*28*, 1209-1214.
51. Mukherjee, A and Chaudhuri, A.Non-viral siRNA Delivery in RNA Interference: Accomplishments, Set-backs and Future Promises. ***J. Indian. Chem. Soc.*2013**, *90*, 1861-1869 (*Invited Review Article*).

50. Mondal, G.; Barui, S.;Saha, S.; Chaudhuri, A.Tumor growth inhibition through targeting liposomally bound curcumin to tumor vasculature. ***J. Control. Release.*2013**,*172*, 832-840.

49. Mondal, G.; Barui, S.; Chaudhuri, A.The relationship between the cyclic-RGDfK ligand and αvβ3 integrin receptor. ***Biomaterials.*****2013**, *34*, 6249-6260.
48. Desai, P.; Marepally, S.; Patel,A.; Chaudhuri, A.; Singh, M. Topical delivery of anti-TNFα siRNA and capsaicin via novel keratolytic lipid-polymer hybrid nanoparticles can efficiently inhibits skin inflammation *in vivo*. ***J. Control. Release.*****2013,***170*, 51-63.
47. Mukherjee, A.; Bhattacharyya, J.; Sagar, M. V.; Chaudhuri, A.Liposomally encapsulated CDC20 siRNA inhibits both solid melanoma tumor growth and spontaneous growth of intravenously injected melanoma cells on mouse lung. ***Drug Deliv. Transl. Res.*** **2013**, *3*, 224-234.
46. Srinivas, R.; Garu, A.; Moku, G.; Agawane, S.; Chaudhuri, A. A long-lasting dendritic cell DNA vaccination system using lysinylated amphiphiles with mannose-mimicking head-groups. ***Biomaterials*****2012**, *33*, 6220-6229.

47. Srujan, M.; Chandrashekhar, V.; Reddy, R. C.; Prabhakar, R.; Sreedhar, B.; Chaudhuri, A. The influence of the structural orientation of amide linkers on the serum compatibility and lung transfection properties of cationic amphiphiles. ***Biomaterials*****2011,***32*, 5231-5240.

44. Chandrashekhar, V.; Srujan,M.; Prabhakar, R.; Reddy, R. C.; Sreedhar, B.; Rentam, K. R.; Kanjilal, S.; and Chaudhuri, A. Cationic Amphiphiles with Fatty Acyl Chain Asymmetry of Coconut Oil Deliver Genes Selectively to Mouse Lung. ***Bioconjugate Chem.*** **2011**, *22*, 497-509.

43. Srinivas, R.; Karmali, P. P.; Pramanik, D.; Garu, A.; Mahidhar, Y. V.; Majeti, B. K.; Ramakrishna, S.; Srinivas, G.; Chaudhuri, A. Cationic amphiphile with shikimic acid head-group shows more systemic promise than its mannosylanalog as DNA vaccine carrier in dendritic cell based genetic immunization.***J. Med. Chem.*** **2010,** *53*, 1387-1391.

42. Samanta, S.; Ramakrishna, S.; Chaudhuri, A. The use of RGDGWK-lipopeptide to selectively deliver genes to mouse tumor vasculature and its complexation with p53 to inhibit tumor growth.***Biomaterials*****2010,***31*, 1787-1797.[#]
[#]received coverage in ***Nat. Med***. **2011**, *17*, 1359-1370.
41. Srinivas, R.; Samanta, S.; Chaudhuri, A. Cationic Amphiphiles: Promising Carriers of Genetic Materials in Gene Therapy. ***Chem. Soc. Rev.*** **2009**, *38*, 3326-3338 (*Invited Review Article*).

40. Wang, X.; Sarkar, D. P.; Mani, P.; Steer, C. J.; Chen, Y.; Guha, C.; Chandrasekhar, V.; Chaudhuri, A.; Roy-Chowdhury, N.; Kren, B. T.; Roy-Chowdhury, J.* Long-term reduction of jaundice in Gunn rats by non-viral liver-targeted delivery of Sleeping Beauty transposon. ***Hepatology*** **2009,***50*, 815-824.

39. Bhattacharyya, J.; Mondal, G.; Madhusudhana, K.; Agawane, S. B.; Ramakrishna, S.; Gangireddy, S. R.; Madhavi, R. D.; Reddy, P. K.; Konda, V. R.; Rao, S. R.; Udaykumar, P.; Chaudhuri, A.Single Subcutaneous Administration of RGDK-lipopeptide:rhPDGF-B Gene Complex Heals Wounds in Streptozotocin-induced Diabetic Rats. ***Mol. Pharmaceutics.*** **2009,** *6*, 918-927.[#]
[#]received coverage in ***SciBX***, *Science Business Express*, a joint publication of ***Nature*** and ***BioCenturyUSA*****2009** (*SciBX***2** (15); doi:10.1038/scibx.2009.621.

38. Mukthavaram, R.; Marepally, S.; Mahidhar, Y. Venkata.; Naidu, V. G. M.; Ramakrishna, S.; Chaudhuri, A.Cationic glycolipids with cyclic and open galactose head-groups for the selective targeting of genes to mouse liver. ***Biomaterials*2009**, *30*, 2369-2384.

37. Pramanik, D.; Bharat K. M.; Mondal,G.; Karmali, P.P.; Ramakrishna, S.; Ovula, G. R.; Srinivas, G.; Pande, G.; Chaudhuri, A.Lipopeptide with a RGDK tetrapeptide sequence can selectively target genes to proangiogenic α5β1 integrin receptor and mouse tumor vasculature. ***J. Med. Chem. 2008***, *51*, 7298-7302. [#]
[#]received coverage in:***SciBX***, Science Business Express, a joint publication of **Nature** and **BioCentury USA** (SciBX**1** (41); doi:10.1038/scibx.2008.1007);***Nat. Rev. Cancer*2010,***10*, 9-22; ***Adv. Mater.*2012**, *24*, 3747-3756and***Nature India***(doi:10.1038/nindia.2008.316).

36. Mukherjee, K.; Bhattacharyya, J.; Ramakrishna, S.; Chaudhuri, A. Covalent Grafting of Common Tri-hydroxymethylaminomethane in the Head-group Region Imparts High Serum Compatibility and Mouse Lung Transfection Property to Cationic Amphiphile.***J. Med. Chem.* 2008,** *51*, 1967-1971.

35. Rajesh, M.; Sen, J.; Srujan, M.; Mukherjee, K.; Bojja, S.; Chaudhuri, A. Dramatic Influence of the Orientation of Linker between Hydrophilic and Hydrophobic Lipid Moiety in Liposomal Gene Delivery. ***J. Am. Chem. Soc.*2007**, *129*, 11408-11420.

34. Mockey, M.; Bourseau, E.; Chadrasekhar, V.; Chaudhuri, A.;Lafosse, S.; Cam, E. L.; Quesniaux, V. F. J.; Ryffel, B.; Pichon, C.; Midoux, P. mRNA-based cancer vaccine: Prevention of B16 melanoma progression and metastasis by systemic injection of MART1 mRNA histidylatedlipopolyplexes.***Cancer Gene Therapy*2007**, *14*, 802-814.

33. Karmali, P. P. andChaudhuri, A.Cationic Liposomes as Non-Viral Carriers of Gene Medicines: Resolved Issues, Open Questions and Future Promises. ***Med. Res. Rev***. **2007**, *27*, 696-722 *(Invited Review Article).*

32. Karmali, P. P.; Majeti, B. K.; Bojja S.;Chaudhuri, A.In Vitro Gene Transfer Efficacies and Serum Compatibility Profiles of Novel Mono, Di- and Tri-Histidinylated Cationic Transfection Lipids: A Structure-Activity Investigation. ***Bioconjugate Chem.* 2006**, *17*, 159-171.

31. Verma, S. K.; Mani, P.; Sharma, N. R.; Krishnan, A.; Valluripalli, V. K.; Reddy, B. S.; Chaudhuri, A.; Roy, R. P.; Sarkar, D. P. Histidylated Lipid-Modified Sendai Viral Envelopes Mediate Enhanced Membrane Fusion and Potentiates Targeted Gene Delivery. ***J. Biol. Chem.* 2005**, *280*, 35399-35409.

30. Mukherjee, K. M., Sen, J. and Chaudhuri, A.Common co-lipids, in synergy, impart high gene transfer properties to transfection-incompetent cationic lipids. ***FEBS Letters*2005**, *579*, 1291-1300.

29. Bharat M. K.; Karmali, P. P.; Chaudhuri, A. Example of Fatty Acid Loaded Lipoplex in Enhancing In Vitro Gene Transfer Efficacies of Cationic Amphiphiles.***Bioconjugate Chem.* 2005**, *16*, 676-684.

28. Sen, J. and Chaudhuri, A. Gene Transfer Efficacies of Novel Cationic Amphiphiles with Alanine, beta-Alanine, and Serine Headgroups: A Structure-Activity Investigation.***Bioconjugate Chem.*** **2005**, *16,* 903-912.

27. Sen, J. and Chaudhuri, A. Design, Syntheses and Transfection Biology of Novel Non-Cholesterol based Guanidinylated Cationic Lipids.***J. Med. Chem.***2005, *48,* 812-820.

26. Bharat M. K.; Karmali, P. P.; Reddy, B. S.; Chaudhuri, A. In Vitro Gene Transfer Efficacies of N-N-dialkyl-pyrrolidinium Chlorides: A Structure-Activity Investigation. ***J. Med. Chem.***2005, *48,* 3784-3795.

25. Valluripalli, V. K. and Chaudhuri, A. On the disulfide-linker strategy for designing efficacious cationic transfection lipids: An unexpected transfection profile.***FEBS Letters***2004, *571,* 205-211.

24. Mahidhar, Y. V., Rajesh, M.; Chaudhuri, A. Spacer-Arm Modulated Gene Delivery Efficacies of Novel Cationic Glycolipids: Design, Synthesis and In Vitro Transfection Biology.***J. Med. Chem.***2004, *47,* 3938-3948.

23. Mahidhar, Y. V., Rajesh, M.; Madhavendra, S. S.; Chaudhuri, A. Distance of Hydroxyl Functionality from the Quaternized Center Influence DNA-binding and In Vitro Gene Delivery Efficacies of Cationic Lipids with Hydroxyalkyl Head-groups.***J. Med. Chem.***2004, *47,* 5721-5728.

22. Singh, R. S.; Gonçalves, C.; Sandrin, P.;Pichon, C.; Midoux, P.; Chaudhuri, A. On the Gene Delivery Efficacies of pH-Sensitive Cationic Lipids via Endosomal Protonation: A Chemical Biology Investigation.***Chem. Biol.*** **2004**,*11,* 713-723.

21. Majeti, B. K.; Singh, R. S.; Yadav, S. K.; Reddy, S. B.; Ramkrishna, S.; Diwan, P. V.; Madhavendra, S. S.; Chaudhuri, A. Enhanced Intravenous Transgene Expression in Mouse Lung using Cyclic-head Cationic Lipids. ***Chem. Biol.***2004,*11,* 427-437.

20. Karmali, P. P.; Valluripalli, V. K.; Chaudhuri, A. Design, Syntheses and In Vitro Gene Delivery Efficacies of Novel Mono-, Di- and Trilysinated Cationic Lipids: A Structure-Activity Investigation.***J. Med. Chem.*** **2004**, *47,* 2123-2132.

19. Singh, R. S. and Chaudhuri, A. Single additional methylene group in the head-group region imparts high gene transfer efficacy to a transfection-incompetent cationic lipid.***FEBS Letters***2004, *556,* 86-90.

18. Valluripalli, V. K.; Singh, R. S ; Chaudhuri, A. Cationic Transfection Lipids in Gene Therapy: Successes, Set-backs, Challenges and Promises.***Curr. Med. Chem.*** **2003**, *10,* 1297-1306(*Invited Review Article*).

17. Kumar, V. V.; Pichon, C.; Refregiers, M.; Guerin, B.; Midoux, P.; Chaudhuri, A. Single Histidine Residue in Head-Group Region is Sufficient to Impart Remarkable Gene Transfection Properties to Cationic Lipids: Evidence for Histidine-Mediated Membrane Fusion at Acidic pH.***Gene Ther.***2003, *10,* 1206-1215.

16. Singh, R. S.; Mukherjee, K.; Banerjee, R.; Chaudhuri, A.;Hait, S. K.; Moulik, S. P.; Ramadas, Y.; Vijayalakshmi, A.; Rao, N. M. Anchor Dependency for Non-Glycerol

Based Cationic Lipofectins: Mixed Bag of Regular and Anomalous Transfection Profiles.***Chem. Eur. J.*** **2002**, *8*, 900-909.

15. Srilakshmi, G. V.; Sen, J.; Chaudhuri, A., Ramadas, Y.; Rao, N. M. Anchor-dependent Lipofection with Non-Glycerol based Cytofectins containing Single 2-Hydroxyethyl Head Groups.***Biochim. Biophys. Acta (Biomembranes)*****2002**, *1559*, 87-95.

14. Banerjee, R.; Mahidhar, Y. V.; Chaudhuri, A. Gopal, V.; Rao, N. M. Design, Synthesis, and Transfection Biology of Novel Cationic Glycolipids for Use in Liposomal Gene Delivery.***J. Med. Chem.*****2001**, *44*, 4176-4185.

13. Ayyagari, A. A., Vijayalakshmi, P., Kaimal, T. N. B.; Chaudhuri, A.; Ramadas, Y. and Rao, N. M. Novel Non-Glycerol based Cytofectins with Lactic Acid derived Head-groups.***Biochem. Biophys. Res. Commun.***, **2001**, *289*, 1057-1062.

12. Srilakshmi, G. V. and Chaudhuri, A. Snap-Shooting the Interface of AOT Reverse Micelles: Use of Chemical Trapping.***Chem. Eur. J.*****2000**, *6*, 2847-2853.

11. Das, P. K. and Chaudhuri, A. On the origin of unchanged lipase activity profile in cationic reverse micelles. ***Langmuir*** **2000**, *16*, 76-80.

10. Banerjee, R.; Das, P. K.; Srilakshmi, G. V**.; Chaudhuri, A**.; and Rao, N. M. A Novel series of Non-glycerol based cationic transfection lipidsfor use in liposomal gene delivery ***J. Med. Chem ,*** **1999**, *42*, 4292-4299.

9. Das, P. K.and Chaudhuri, A. Are the interfacial basicities of aqueous cationic micelles and cationic reverse microemulsions different by orders of magnitude? ***Langmuir*** **1999**, *15*, 8771-8775.

8. Das, P. K. and Chaudhuri, A., Saha, S.; Samanta, A. First simultaneous estimates of the water pool core size and the interfacial thickness of a cationic water-in-oil microemulsion by combined use of chemical trapping and time-resolved fluorescence quenching. ***Langmuir*****1999**, *15*, 4765-4772.

7. Das, P. K.; Srilakshmi, G. V.;Chaudhuri, A. Experimental probing of water and counterion concentrations inside a reversed micelle water-pool: An overlooked parameter in micellar enzymology? ***Langmuir*****1999**, *15*, 981-987.

6. Banerjee, R.; Das, P. K.; Chaudhuri, A. Interfacial Indazolization: novel chemical evidence for remarkably high exo-surface pH of cationic liposomes used in gene transfection. ***Biochim. Biophys. Acta (Biomembranes)*****1998**, *1373*, 299-308.

1. Das, P. K. and Chaudhuri, A.; T. N. B. Kaimal,; and Bhalerao, U. T. Isolation of gamma-Oryzanol through calcium ion induced precipitation of anionic micellar aggregates. ***J. Agric. Food Chem.*****1998**, *46*, 3073-3080.

4**.** Chaudhuri, A.; Romsted, L. S.; Yao, J. Arenediazonium Salts: New Probes of the Interfacial Compositions of Association Colloids. II. Binding Constants of Butanol and Hexanol in Aqueous Three Component Cetyltrimethylammonium Bromide Microemulsions. ***J. Am. Chem. Soc.*****1993**, *115*, 8362-8367.

3. Chaudhuri, A.; Loughlin, J. A.; Romsted, L. S.; Yao, J. Arenediazonium Salts: New Probes of the Interfacial Compositions of Association Colloids. I. Basic Approach. Methods and Illustrative Applications. ***J. Am. Chem. Soc.*****1993**, *115*, 8351-8361.

2. Ma, Yu-T.; Chaudhuri, A.; Robert R. Rando. Substrate Specificity of the Isoprenylated Protein Endoprotease. ***Biochemistry*** **1992**, *31*, 11772-11777.

1. Chaudhuri, A. and Romsted, L. S. Simultaneous Determination of Counterion, Alcohol and Water Concentrations at a Three Component Microemulsion Interface using Product Distributions from a Dediazoniation Reaction. ***J. Am. Chem. Soc.*****1991**, *113*, 5052-5054.

Conference Volume:

Patra C. R. and Chaudhuri, A. Chemical Biologists Meet at ICCB-2014, the First Annual Conference of the Newly Born Chemical Biology Society of India, at the City of Pearls. ***ACS Chem Biol*** **2014**, *9*, 1224-1229.[#]
[#]Coverage of **International Conference on Chemical Biology** (**ICCB-2014**) jointly hosted by Chemical Biology Society of India and CSIR-Indian Institute of Chemical Technology during February 6-8, 2014 at CSIR-IICT, Hyderabad.
Invited Book Chapters:

1. Authors: Banerjee, R.; Das, P. K.; Srilakshmi, G. V.; Rao, N. M.; Chaudhuri, A.

   Title of the Book: ***Adsorption and Aggregation of Surfactants in Solution***.
   Chapter 28, page 603-618.
   Chapter Title*: Novel Cationic Transfection Lipids for Use in Liposomal Gene Delivery*.
   Editors: K. L. Mittal and Dinesh O. Shah
   Publisher: **MARCEL DEKKER, INC New York, NY 10016, USA**. (published on **November 6, 2002**).

2. Authors: Majumder, P; Chaudhuri, A.

   Title of the Book: *"**Integrins in Pharmacology**" in the book series Methods in Pharmacology and Toxicology* pp 1-24(Published on April 8, 2016).
   Book Chapter Title*: Integrin mediated targeting of liposomally bound siRNAs to tumor vasculatures;* **Guest Editor**: Eleonora Patsenker, PhD
   Publisher: ***Springer Science*** **(**www.springer.com**)**

3. Authors: Sukanya Bhunia*; Arabinda Chaudhuri

   Title of the Book: *"**Brain Tumors**"*, PUBLISHED on April 20, 2022; DOI 10.5772/intechopen.94814; ISBN 978-1-83969-804-0; COPYRIGHT YEAR 2022; Academic Editor: Amit Agrawal, All India Institute of Medical Sciences, New Delhi
   Title of the Book Chapter: Crossing Blood-Brain Barrier with Nano-drug Carriers for Treatment of Brain Tumors: Advances and Unmet Challenges.

Completed/ongoing Research Projects during the last ten years:

1. "Self-assembled Up-scalable lipid-nanoparticles for *in vivo* targeting of mRNA vaccines to dendritic cells" Sanctioned budget: **Rs. 35 lac for 1 year** (Jan'1-Dec'31, 2022) for IISER Kolkata sponsored by the Covaxin (Covid 19 vaccine) Developer Bharat Biotech Pvt Ltd, Hyderabad, India.

2. Raja Ramanna Fellowship at IISER Kolkata (after Superannuation from CSIR-IICT, Hyderabad).Sanctioned Budget from Govt of India: **Rs. 54.9 lacs** (2018-2021).

3. Supra-Institutional Network Project "Advanced Drug Delivery Systems (**ADD**)" involving CSIR-IICT (**Nodal Lab**), CSIR-NCL, CSIR-CDRI, CSIR-CLRI, CSIR-IGIB, CSIR-IITR, IISc, IACS and KEM-Hospital, Mumbai. **Project Coordinators**: Dr. Arabinda Chaudhuri/Dr. Rajkumar Banerjee.Sanctioned Budget: **Rs. 15.7 Crore** (2012-2017).

4. CSIR-Mayo Clinic, USA Collaboration for Innovation and Translational Research" on "Novel Delivery Systems for Targeting Lung Cancer, Pancreatic Cancer and Cancer Stem Cells".
   CSIR-IICT's Project Coordinators: Dr. Arabinda Chaudhuri/Dr. Rajkumar Banerjee
   Sanctioned Budget for IICT: **Rs. 1.5 Crore** (2012-2017).

5. CSIR Network Project "Genome Dynamics in Cellular Organization, Differentiation and Enantiostasis" (**GENCODE**; BSC0123)" involving CSIR-IGIB (**Nodal Lab**), CSIR-IICT, CSIR-IICB and CSIR-NCL.
   Project Coordinators: Dr. Arabinda Chaudhuri/Dr. Rajkumar Banerjee. Sanctioned Budget for CSIR-IICT: **Rs. 3.80 Crore** (2012-2017).

Selected Invited lectures delivered:

Vaccines Summit Ohio (on-line) held at Sheraton, Columbus Capitol Square, Columbus, USA during March 1-3, 2021.

Jadavpur University jointly organized by the Department of Chemistry, Jadavpur University and the Indian Society for Surface Science and Technologyon January 22, 2020.

"The 2nd Annual "Cell and Gene Therapy Symposium" organized by Centre for Stem Cell Research (a Unit of inStem, Bangalore) at CMC Vellore during September 7-8, 2017.

"International Symposium on Chemical Biology and Drug Discovery (ISCBDD – 2016)" jointly organized by Chemical Biology Society-India, National Institute of Pharmaceutical Education and Research-Kolkata, and Bose Institute, Kolkata, during March 1-3, 2016 at Taj Bengal Hotel, Kolkata.

As Colloquium Speaker at Indian Association for the Cultivation of Science, Kolkata, on February 29, 2016.

"IUPAC's International Symposium on Bioorganic Chemistry (ISBOC-10)" held at IISER, Pune, India, during January 11-15, 2015.

"International Symposium on Chemical Biology Approach to Metabolomics, Chemical Genomics and Second Annual Meeting of Chemical Biology Society, India" held at University of Mysore, during February 18-19, 2015.

Center for Cancer Research, National Cancer Institute, NIH, Frederick, Maryland, on May'28, 2015.

Department of Microbiology & Immunology, University of Maryland School of Medicine, Baltimore, on May'27, 2015.

International Conference on "Recent Advances in Research and Treatment of Human Diseases and 4th Annual Meeting of Indian Academy of Biomedical Sciences" held at CSIR-IICT, Hyderabad during January 9-11, 2015.
International symposium on "Challenges in Chemical Biology" jointly hosted by CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata and National Institute of Pharmaceutical Education and Research, Kolkata, during January 27-29, 2013.

International symposium on "Multidisciplinary Frontiers of Medicinal Chemistry: Synthesis, Molecular Biology and Technology" held at Department of Chemistry, SASTRA UNIVERSITY, Tanjavur, Tamil Nadu, India, during January 18-19, 2013.

As Colloquium Speaker, Department of Chemistry, Indian Institute of Science Education and Research (IISER), Pune, on January 15, 2013.

The 3rd India-Korea Joint Workshop on "NanoBio and Emerging Healthcare Technology" held at Coex, Seoul, South Korea during August 16-17, 2012.

Department of Chemistry, Indian Institute of Chemical Technology, Kharagpur, on Jan'16, 2012.

Department of Pharmaceutical Sciences, University of Minnesota, Minneapolis, on Sept'19, 2011.

Department of Pharmaceutical Sciences, University of North Carolina, Chapel Hill, on Sept'15, 2011.

CSIR- Central Drug Research Institute, Lucknow, on July 19, 2010 on the occasion of the Diamond Jubilee Year of the Institute.

The 239th American Chemical Society National Meeting held at Moscone Center, San Francisco, in honor of Professor Clifford A. Bunton on the occasion of his 90th birthday during March 21-22, 2010.

The Biochemistry and Molecular Biology (BMB) seminar Series, Department of Biochemistry & Molecular Biology, Mayo Clinic, Minnesota during March 30, 2010.

Department of Pharmaceutical Sciences, Wayne State University, Detroit, Michigan on March 29, 2010.

The 3rd Chemical Research Society of India/Royal Society of Chemistry, London, joint Symposium in Chemistry held at National Chemical Laboratory, Pune, on February 5, 2009.

Center for Cancer Nanotechnology of Excellence, University of California, San Diego, Medical Center, Moores Cancer Center, on March 25, 2010.

The 19th Mid-Year Meeting of Indian Academy of Sciences, Bangalore held at Indian Institute of Science, Bangalore during July 4-5, 2008.

The 8th International symposium on "Biochemical Roles of Eurokaryote Cell Surface Macromolecules (ISCSM-2008)" held at Centre for Cellular and Molecular Biology (CCMB), Hyderabad, during January 21-25, 2008.

The Indo-Europe Workshop on "Cationic Amphiphiles:DNA Interactions: Basics to Technology" held at Devvaya Resort, Goa during February 22-25, 2007.

International symposium on "Recent Trends in Surface and Colloid Science (ISSCS-2007)" held at Indian Statistical Institute (ISI), Kolkata, during November 15-16, 2007 to commemorate the 75th Year of Indian Statistical Institute (ISI), Kolkata.

International Symposium on "Organic Chemistry-Today and Tomorrow" held at Indian Institute of Science, Bangalore, during January 4-7, 2006.

International Symposium on "Advances in Organic Chemistry and Chemical Biology" jointly hosted by the American Chemical Society (ACS) and the Council of Scientific and Industrial Research (CSIR) held at Indian Institute of Chemical Technology (IICT), Hyderabad, during January 11-12, 2006.

International Symposium on "Structure and Dynamics: From Micro to Macro" held at University of Calcutta, during December 15-17, 2006, to commemorate the Post Centenary Golden Jubilee Year of University of Calcutta.

The 14th International Symposium on "Surfactants in Solution" (SIS-2002) held at University of Barcelona, Spain, on June 13, 2002.

The 13th International Symposium on "Surfactants in Solution" (SIS-2000) held at University of Florida, Gainesville, USA, during June 11-16, 2000.

Graduate Level Course taught at IISER Kolkata during 2019-2022:

Frontiers at the Chemistry/Biology Interface **(**CH4215, covering important emerging aspects at the interface of chemistry and biology including targeted cancer therapy, non-viral gene therapy, use of phage display techniques, cancer immunotherapy, etc.); Research Methodology (CH4207)

Manuscript Reviewing Experience:

Reviewed manuscripts submitted to
J. Am. Chem. Soc., Adv. Mater., J. Med. Chem., Biomaterials, Adv. Functional Materials, Small, ACS Appl Mat Interfaces, J. Controlled Release, ChemComm, Nanoscale, Chem. Eur. J., Acta Biomaterialia, Advanced Healthcare Materials, J. Gene. Med., Biomacromolecules, Drug Discovery Today, Curr. Med. Chem., ChemMedChem, Bioconjugate Chem., J. Phys. Chem., ACS Omega, Biochim. Biophys. Acta., Lipids, Langmuir, J. Colloid. Int. Sci., Expert Opin. Drug. Delivery., Experts OpinTher. Patents., Biochimie, J. Agric. Food. Chem., J. Chemical. Sciences., J. Biochem. Eng., Ind. J. Biotechol., Aus. J. Chem., Int. J. Pharm., Current Science., J. Biosciences and Ind. J. Chem.