

Curriculum Vitae

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▪ Objective:

Interested in supramolecular chemistry. Synthesis of small organic molecules, their applications. Looking for PhD in this field.

Want to continue research through- DST-INSPIRE Fellowship (*provisional offer letter accepted*).

▪ Academic Records:

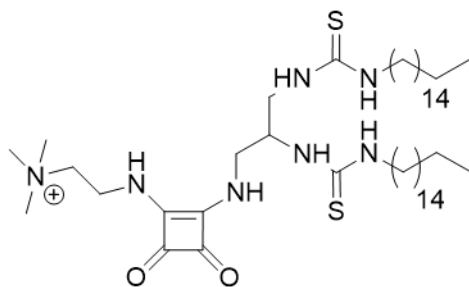
Degree	Board/University	Subjects	Marks (%)	Year of Passing
10 th (Madhyamik)	West Bengal Board of Secondary Education	Bengali, English, Mathematics, Physical Science, Life Science, History, Geography	87.87	2010
12 th (Higher Secondary)	West Bengal Council of Higher Secondary Education	Bengali, English, Mathematics, Physics, Chemistry, Biology	86.40	2012
B.Sc.	Calcutta University (Ramakrishna Mission Residential College, Narendrapur)	Chemistry (Hons.), Physics, Mathematics	68.00	2015
M.Sc.	Indian Institute of Technology, Guwahati	Chemistry	8.23 (CGPA)	2017

▪ Research Experiences:

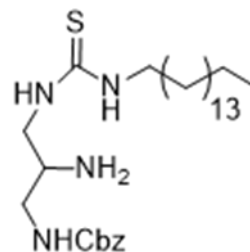
1. M.Sc. project entiled ‘Synthesis of squaramide based lipid as artificial ion transporter and drug delivery system using thiourea linkage’ under the guidance of Dr. Debasis Manna, Dept. of Chemistry IIT Guwahati during January-April, 2017.

The transmembrane ion transport is a very important biological process to live. This ion transportation occurs through the ion channels present in the cell membrane in our body. However, malfunctioning of these ion channel may cause severe disease like channelopathies of which cystic fibrosis is most common. In this case chloride transportation to the cytosol is disrupted. So artificial or synthetic ion transporters have got high level of interest in medicinal science. Notably cation transport is quite easier in comparison to the transportation of anion in our body, because a several number of cation binding host molecules are present than that of anion. So, the major challenge in anion transportation is the choice of host and also the binding. In this regard, researchers are trying to synthesis artificial and unnatural lipid by changing the head group, the hydrophobic tail group and/or the linkage through which the head and the tail groups are connected to each other.

Main objective of this project work was to use this moiety as the head group in the desired lipid, which contains the long carbon chain as the tail group through the thiourea linkage. We designed the molecule in such a way that, it could bind with Cl^- anion through the squaramide moiety and also through the nitrogens present in thiourea moiety. It can also be used as a potential drug delivery system as here lipophilicity of the compound has been enhanced greatly by introducing two long aliphatic chains. To synthesize the targeted compound we have performed a branch of chemical reaction. We have started with commercially available 3-amino 1,2-diol and then synthesized the tail part of our desired lipid. For the synthesis of squaramide lipid molecule we had to perform the coupling reaction with squaramide head group. The products obtained from each step of the reaction scheme were characterized by thorough ^1H NMR analysis.



Squaramide based lipid
(Targeted molecule)



Synthesized product

2. Worked as project assistant, under the supervision of Dr. Debasis Manna at Dept. of Chemistry, IIT Guwahati during July- November, 2017.

Nowadays the life-threatening disease cancer is getting much of scientist's interest. Chemotherapy is still the first choice though the problem is the nature of the action of the drugs. The major problem is the selectivity of the drugs towards cancer cells. Toxic nature of the drugs also affect the nearby normal cells. So, the challenge is to target the drug towards the tumour cells or the cancer cells. Different chemical approaches are being undertaken either to modify the chemical environment of drug molecules or to apply different targeting agents as drug carrier. In this context, vitamin assisted targeting is becoming a wonderful concept to deliver drugs. Vitamins are essential for the cells during their life cycle. Rapid growth and intense metabolic activity suggest the strong use of vitamins. So the vitamin accepters present on the cell surface are overexpressed. This concept is being used in a therapeutic point of view and drugs can be targeted more specifically. Folic acid, biotin, riboflavin etc. are essential for cell division, especially in tumor cells. These vitamins are experimented as targeting agent recent days. Amongst biotin is much more potential because uptake of biotin is a receptor-mediated process. So, our goal was to synthesize a biotin based backbone attached to BSA protein chain as the delivering agent.

Starting from malic anhydride we ultimately ended up with the biotin based structure (fig. A) via nucleophilic addition with glycine in acetic acid. It is noteworthy here that, tactful use of acetic acid solution having concentration of 30 vol% is very crucial to make the reaction favourable.

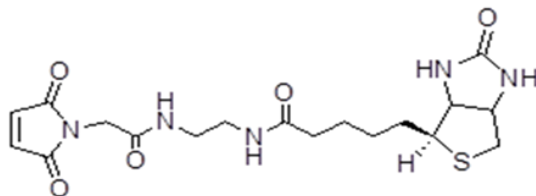


Fig. A: Biotin based targeting agent

▪ **Awards:**

1. Topper in H.S exam, 2012 among the schools under Durgapur Diocese.
2. Qualified JAM 2015 (AIR 167).
3. Selected for INSPIRE scholarship (DST, Govt. of India) during B.Sc. and M.Sc.

Declaration:

I hereby declare that all the particulars given in the above statement are true and complete to the best of my knowledge and belief.

Date: 03.03.2018

Sheelbhadra Chatterjee