Dr. Saami Ahmed

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Room No.202, Second Floor
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Personal Details:

Name : Saami Ahmed
Father's Name : Mr. Zameer Ahmed
Spouse's Name : Mr Faiz Khan
Date of birth : 11th Nov 1987
Gender : Female
Marital Status : Married
Nationality : Indian

Work experience (in chronological order).

1) Currently working as PGT chemistry in **New Horizon School** since from 22.01.2023
2) Working as Block resource person in SCERT from 12 November 2021 to 21.01.2023
3) Working as Assistant professor in ZHD College, University of Delhi, 01.01.2020 to 20.5.2020
4) Working as Assistant professor in ZHD College, University of Delhi, 22.08.2019 to 16.12.2019
5) Working as Assistant professor in Miranda house College, University of Delhi, 22.07.2019 to 22.08.2019
6) Working as Assistant professor in ZHD College, University of Delhi (as Guest)
7) Working as Assistant professor in SGTB Khalsa College, University of Delhi (as Guest)
8) Working as Assistant professor in Rajguru College, University of Delhi (as Guest)

9) Working as Assistant professor in ANDC College, University of Delhi (as Guest)

10) Working as Assistant professor in Jamia Hamdard College, University of Delhi (as Guest)

11) Working as Assistant professor in Jamia Millia Islamia, University of Delhi (as Guest)

Publications: ***(List of papers published in SCI Journals, in year wise descending order).***

1) Chaudhary, Swati, Mahima Kaushik, **Saami Ahmed**, and Shrikant Kukreti. "Exploring potential of i-motif DNA formed in the promoter region of GRIN1 gene for nanotechnological applications." *Results in Chemistry* (2020): 100086.
2) Bansal, Aparna, Shikha Kaushik, **Saami Ahmed**, and Shrikant Kukreti. "Autosomal dominant Polycystic Kidney Disease: A Review." *Journal of Biomedical and Therapeutic Sciences* 6, no. 1 (2019): 15-23.
3) **Saami Ahmed**, Mahima Kaushik, Swati Chaudhary, and Shrikant Kukreti. Formation of G-wires, bimolecular and Tetramolecular quadruplex: Cation induced structural polymorphs of G-rich DNA sequence of Human *SYTX* gene. "*Biopolymers"* 2018, e23115.
4) **Saami Ahmed**, Mahima Kaushik, Swati Chaudhary, and Shrikant Kukreti. Structural polymorphism of a cytosine-rich DNA sequence forming i-motif structure: Exploring pH based biosensors. "*International journal of biological macromolecules"* 2018, 111, 455-461.
5) Swati Chaudhary, Mahima Kaushik, **Saami Ahmed**, Ritushree Kukreti and Shrikant Kukreti. Structural switch from hairpin to duplex/ antiparallel G-quadruplex at Single Nucleotide Polymorphism (SNP) site of human Apolipo protein E (APOE) gene coding region. "*ACS Omega"* 2018, 3(3), 3173-3182.
6) Arif, Rizwan, Sarfraz Ahmed, **Saami Ahmed**, and Mohammad Abid. "Synthesis, In Vitro Biological Evaluation and In Silico Studies of Some New Heterocyclic Schiff Bases." *Chemistry Select* 3, no. 47 (2018): 13517-13525.
7) Mahima Kaushik, Swati Chaudhary, Swati Mahendru, **Saami Ahmed**, Ankit Kumar Pathak and Shrikant Kukreti. MicroRNA: A Multi-Facet Biological Target for Cancer and other Diseases. *"Clinical Cancer Drugs"*2017, 4(1), 2-9
8) Mahima Kaushik, Anju Singh, Mohan Kumar, Swati Chaudhary, **Saami Ahmed**, and Shrikant Kukreti. Structure specific ligand recognition of multistranded DNA structures. "*Current Topics in Medicinal Chemistry"* 2017, 17(2), 138-147.
9) Mahima Kaushik, Shikha Kaushik, Kapil Roy, Anju Singh, Swati Mahendru, Mohan Kumar, Swati Chaudhary, **Saami Ahmed**, and Shrikant Kukreti. A bouquet of DNA structures: Emerging diversity. "*Biochemistry and Biophysics Reports"* 2016, 5, 388-395.

Book Chapters

1)Dr. **Saami Ahmed**, Dr. Ishita Pundir, Dr. Gobind Ji Rai (2023). Strategies for plastic waste Management. The Climate Crisis: An Emerging Issue ISBN : 978-93-95059-50-3

2) Chaudhary, S., Kumar, M., **Ahmed, S**., & Kaushik, M. (2021). Detection and Removal of Heavy Metals from Wastewater Using Nanomaterials. *Pollutants and Water Management: Resources, Strategies and Scarcity*, 241-272.
3) Mahima Kaushik, Swati Mahendru, Mohan Kumar, Swati Chaudhary, **Saami Ahmed**, Sonia and Shrikant Kukreti. Overview of Chemo resistance in Cancerous Cells. "*Frontiers in Drug Design & Discovery"* 2018, *9(9)*35-90.
4) Khushbu G. Patel, **Saami Ahmed** "Ruthenium (Ru)based dehydrogenation reactions of saturated and unsaturated compounds" Chemistry of Dehydrogenation Reactions and its Application. (accepted)

Professional Recognition/ Award/ Prize/ Certificate, Fellowship received

1. Qualified National Eligibility Test (L.S) conducted by CSIR in JUNE 2012
2. Qualified National level Graduate Aptitude Test for Engineering (GATE) conducted by MHRD in 2012

Education:

Ph.D thesis title: Structural Diversity and Ligand-Interaction Exhibited by G-rich Oligonucleotide
Guide's Name : Prof. Shrikant Kukreti
University : Department of Chemistry, University of Delhi
Year of Award : November, 2018

Academic Qualification **(Undergraduate Onwards)**

Degree	**Year**	**Subject**	**University/Institution**	**% of marks**
Ph.D	2018	Chemistry	Delhi University	Awarded
M.Sc	2011	Chemistry	Jamia Millia Islamia	70.9%
B.Ed	2009	Sciences	Guru Gobind Singh Indraprastha University	74.2%
B.Sc	2008	Life Sciences	Zakir Hussain College, Delhi University	56.7%
Senior secondary Exam	2005	English, Maths, Chemistry, Biology, Physics	CBSE Board	63.4%
Secondary Exam	2003	English, Hindi, SST, Sciences, Maths	CBSE Board	72.4%

Posters Presented:

- "Genosensors: Plausible Solution for Monitoring Geogenic Contaminants in Groundwater" Swati Gupta*, Mohan Kumar, Swati Chaudhary, **Saami Ahmed**
  "Geogenic Contamination of Groundwater: Its Impact & Mitigation Measure" (GCG 2016) (Department of Regional Water Studies,TERI University, India) 22nd April 2016.
- "Structural polymorphism exhibited by a quasipalindrome present in Human SCAI gene"

Saami Ahmed, Swati Chaudhary and ShrikantKukreti
National Symposium on Frontiers of Biophysics, Biotechnology & Bioinformatics (IBS 2013)(University of Mumbai, VidyanagariSantacruz (E), Mumbai) 13th -16th January, 2013

- "Structural status of a quasipalindromic segment present in the Human SCAI gene"
  Saami Ahmed, Swati Chaudharyand ShrikantKukreti
  At Indian Society of Chemistry and Biologist **(ISCBC), 2016** held inUkaTarsadia University,Bardoli, Surat

Conferences:

- Participated in the International Interdisciplinary Science Conference (I-ISC, 2012) on Protein Folding and Diseases, organized by the Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia, Jamia Nagar, New Delhi-110025 during 08-10 December, 2012.

- Participated in the National Symposium on "Frontiers of Biophysics, Biotechnology and Bioinformatics" jointly organized by Department of Biophysics and Centre for Excellence in Basic Sciences, University of Mumbai during 13-16 January, 2013.

- Participated in the Workshop on Publishing Connect conducted by Elsevier in association with University of Delhi at New Delhi during 11 September, 2013.

- Participated in the Author Workshop conducted by Elsevier in association with University of Delhi at New Delhi during 22 September, 2014.

- Participated in the workshop on Information Literacy & Competency organised by Delhi University Library System, University of Delhi, Delhi-110007 during 04 December, 2014.

- Poster Presentation at the "National Symposium on Biophysics & Golden Jubilee Meeting of the Indian Biophysical Society", organized by the Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia, New Delhi during 14-17 February, 2015.

- Participated in the Antardhvani-2015 (Academic and Cultural Festival) organized by the University of Delhi during 20-22 February, 2015.

- Participated in the International Congress on "Friedreich's ataxia and DNA Structure in Health & Disease" organized by AIIMS, New Delhi, India and DNA society of India, during 11-13 April, 2015.

- Participated in the workshop Computational Chemistry and Bioinformatics organized by Department of Chemistry, Miranda House, University of Delhi in collaboration with DS BIOVIA during 26-28 August, 2015.

- Poster Presentation at the "Recent Trends in Affordable and Sustainable Drug Discovery and Developments", held at Uka Tarsadia University, Tarsadi-394-350, Bardoli, Surat, Gujrat, India, during 06-08 February, 2016.

Key Skills:

- *Techniques used in research*
  - Gel Electrophoresis

- UV-Vis Spectroscopy
- Circular Dichroism Spectroscopy
- UV-Thermal Denaturation studies
- Fluorescence Spectroscopy
- Bioinformatics Techniques

❖ *Oral and written proficiencies in Hindi and English*

❖ *Multi-task Management*

Computer Literacy

- Computer Softwares :
  - Microsoft Origin
  - ChemDraw, Chemsketch

❖ *Membership of National Bodies:*

- Life Member of the "DNA Society of India" (DSI)
- Life Member of the "Indian Biophysical Society" (IBS)

References:

1) Prof. Shrikant Kukreti (Supervisor)
Department of Chemistry
University of Delhi,
New Delhi-110007, INDIA
Email: Shrikant.kukreti6@gmail.com

2) Prof. Mahima Kaushik
Professor, Cluster Innovation Centre,
University of Delhi, Delhi
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Dr. Saami Ahmed

Abstract of Ph.D Thesis

DNA (Deoxyribonucleic Acid) acts as a carrier of genetic information in all living organisms. The double helical structure of DNA was discovered by J. Watson and F. Crick in 1953 for which they got Nobel Prize in 1962. After the discovery of DNA double helical structure, numerous efforts have been made to understand the process of storing information in DNA. Structural polymorphism is regarded as the most prevalent characteristic of DNA which depends on various factors and solution condition such as sequence context, hydration, solution pH, ions, proteins, drugs and spherical stress etc. The Gene regulation and gene expression are highly affected by structural polymorphism and dynamism. Most of the drugs and protein specifically bind to particular DNA sequence, which can be conceived to cause separation of the strands either transiently during replication, transcription or permanently in specific regions and this separation led the strands to arrange themselves in different conformations. The sequences rich in guanine have shown its existence in several regions of the *Human* genome such as at telomeric ends, immunoglobulin switch regions and promoter region of many proto-oncogenes. This draws our interest to explore more on G-quadruplex as well as i-motif (C-tetraplex) DNA structures and to investigate other structures adopted by G-rich sequences. The study also focuses on recognition aspect of the DNA structures by a drug called Methylene Blue.

At first, the bioinformatics approaches were utilized to understand the biological importance of the sequences under study. The transcription factor binding sites (TFBS) was determined using various Bioinformatics tool. The multiple sequence alignment and phylogenetic analysis were carried out to investigate the evolutionary relationship of the DNA sequences with other organisms. In this work, the structural status of an intronic 24-mer DNA sequence [SG24T] of *Human SCAI* (Suppressor of Cancer Cell Invasion) gene was studied. Quite recently, the biological significance of introns is being debated, and they are no longer considered as junk. *SCAI* is a highly conserved protein that regulates invasive cell migration. Reports reveal that decreased levels of *SCAI* are significantly correlated with increased invasive cell migration. Further, *SCAI* gene is known to inhibit the MAL/SRF transcriptional activator complex which results in diminished β1-integrins expression and thereby reduces the invasive potential of the cancerous cell. With the help of several biochemical and biophysical studies, we demonstrated that the 24-mer quasi-palindromic sequence [SG24T] and

its point mutated version [SG24G] both exhibit a hairpin-duplex equilibrium. The point mutation causes the predominance of one structural form of DNA in solution over the other. It is proposed that

the formation of stable hairpins by a quasi-palindrome in the intronic region might play a role in *SCAI* gene regulation by affecting the binding of transcription factors.

In the G-rich oligonucleotide and ligand interaction studies, the interaction between SG24T and SG24G with a drug Methylene Blue (MB) has been carried out. By using various biophysical techniques, the thermodynamic parameters such as enthalpy, entropy and their contributions to ΔG° and binding mode of DNA-MB complex has been investigated. It was found that MB dye possibly binds to DNA both via electrostatic and intercalation modes. Beside this, it was also observed that on the addition of MB the hairpin structure of DNA gets stabilize at the expense of duplex conformation. This structure-specific binding property of MB can be employed to explore its potential application in biomedicine.

An exceptional property of self-association and folding into a range of intra as well as intermolecular quadruplexes by guanine-rich oligomers (GROs) of genomic locations is still one of the most attractive area of research at present times. The structural status of another 20-nt long G-rich sequence with two G5 stretches (SG20) is investigated using various biophysical and biochemical techniques. Bioinformatics analysis of this sequence suggested the presence of a 17-nt stretch of this SG20 sequence in the intronic region of *Human SYTX* (Synaptotagmin 10) gene. The *SYTX* gene helps in sensing out the Ca^{2+} ion, causing its intake in the pre-synaptic neuron. A range of various topologies like bimolecular, tetramolecular and guanine-wires (nano-wires) was exhibited by the studied sequence, as a function of cations (Na^{+}/K^{+}) concentration. A cation-dependent structural switch exhibited by G rich sequence SG20 may further be explored for its possible relevance in nano-biotechnological applications.

Further, the complementary C-rich stretch of SG20 i.e. SG20c has been investigated using biophysical and biochemical techniques. This study has been designed for exploring the conformational switching ability of cytosine-rich DNA oligonucleotides as a function of pH for their potential use as biosensors. The SG20c sequence is shown to adopt i-motif structure at low pH and remain unstructured at pH 7.4. This pH-dependent transition of SG20c from unstructured single strand to i-motif structures of varied molecularity can further be exploited for its utilization as switching on/ off pH-based biosensors.

Overall, this work provides an insight of alternative DNA structures adopted by the G-rich sequences (and their C-rich counterpart) of *Human SCAI* and *SYTX* genes. It might also provide a platform for the development of new and effective ligands having greater therapeutic properties and greater binding affinity for G-rich DNA structure.