Dr. SEEMA P MENGSHETTI (BAGMARE)

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Summary:

- Doctorate in Bio-organic chemistry with a total 9+ years of experience which includes the design and synthesis of Nucleic acid analogs/mimics for therapeutics and diagnostics, as well as the synthesis of novel nucleosides and their prodrugs for the treatment of HIV, HCV, HBV, and other newly emerging viruses.

Research Experience:

- **Post-doctoral Research Fellow** **From March 2014 to Present**

  Emory University School of Medicine- Atlanta, Georgia, USA

  As a Post-doctoral Research Fellow working in Dr. Raymond Schinazi's multidisciplinary research group, our research group focuses on discovering agents that could be used for the treatment of HIV, Hepatitis infections, other viral infections and on modalities aimed at preventing the development of drug-resistant viruses.

  I am responsible for the synthesis of novel antivirus nucleosides for the treatment of HIV, HBV, HCV, West Nile Virus, RSV, Influenza and other class of antiviral agents. My work also involves the synthesis of nucleoside triphosphates for enzyme studies.

- **Research Associate** **March 2013 to January 2014**

  National Chemical Laboratory- Pune, Maharashtra, INDIA

  As a Research Associate worked under the supervision of Dr. V. A. Kumar at Division of Organic Chemistry, I was responsible for the synthesis of modified nucleosides and their incorporation into short DNA sequences.

- **Ph.D. Research Scholar** **From January 2007 to January 2013**

  National Chemical Laboratory- Pune, Maharashtra, INDIA

  Research Supervisor: Dr. Vaijyanti Kumar, Division of Organic Chemistry

  Research work for my thesis entitled "*Synthesis and biophysical properties of Nucleic acid analogues bearing 5-atom achiral amide- and chiral D/L-amino acid-derived linkages*" deals with the synthesis TT dimer blocks having α-amino acids as an internucleoside linker. The interesting part of this work is that the chirality of the α-amino acid as the internucleoside linker in the dimers was found to exert a profound effect on the CD signal. This part of my work is published in ***Chem. Comm.*** **2009.** Chiral amide linked dimers were incorporated into the DNA backbone by partial replacement of selected phosphodiester linkages. The UV-*T*m data shows that the dimer block having the D-proline as a internucleoside linker are compatible in the DNA backbone to stabilize the ON: DNA and ON:RNA complexes whereas L-proline is not. In recognition for this work, I received the **Best Poster Award** in **XIX International Round Table on Nucleosides, Nucleotides and Nucleic Acids - 2010, Lyon, France** and my complete work is published in **Tetrahedron 2015.**
  I have developed the synthetic protocol for all four appropriately protected natural nucleoside-based β-amino acids and standardized the methodology for solid phase synthesis using different solid support. This work is published in **Tetrahedron 2013** and in **Bioconjugate Chemistry 2015**. Another part of my thesis comprises 4'-substituted α-L-nucleotide analog which has a compact

backbone like RNA but shows S-type sugar pucker. It is an important attribute that helps to elicit RNase H activity since current literature lacks efforts to this end. The structure of the modified nucleoside was analyzed using X-ray studies that confirmed S-type sugar pucker. Although incorporation of this modified unit slightly destabilized duplexes with RNA, it allowed retention of RNase H activity. This work will also be published within the next few months.

- **Project Assistant** **From January 2005 - December 2005**

  National Chemical Laboratory, Pune INDIA

  Project Leader: Dr. M. N. Deshmukh, Division of Organic Chemistry
  I have worked on the following Projects-
  1) "Latent M .Tuberculosis: New targets drugs, delivery system and bioenhancer (NMITLI)"
  2) " Oral penam antibacterial agents for community acquired infections"

Educational Qualification:

- **Doctor Of Philosophy (Ph. D) Chemistry 2013-** University of Pune- National Chemical Laboratory (NCL), Pune India
- **M.S.** (Chemistry) **2004**- Dr. Babasaheb Ambedkar Marathawada University, Aurangabad, India with first class honors (similar to *magna cum laude*).

Academic Achievements/Awards/Scholarship:

- **Doctor of Philosophy (Ph.D., January 2013) -** Awarded by University of Pune, Maharashtra state in the field of chemical science.
- **Senior Research Fellowship (Jan 2009- Jan 2012):** Awarded by University Grants Commission, New Delhi, India in the field of chemical science.
- **Junior Research Fellowship (Jan 2007- Jan 2009):** Awarded by University Grants Commission, New Delhi, India in the field of chemical science.
- **Qualified State Eligibility Test for Lectureship-(SET) examination (Aug 2006)** Awarded by University of Pune, Maharashtra state in the field of chemical science.
- **Qualified National Eligibility Test for Lectureship-(NET) examination (June 2006)** Awarded by University Grants Commission, New Delhi, India in the field of chemical science.
- **Best Research Paper with Highest Impact factor, (Seema Bagmare**, Moneesha D'Costa and Vaijayanti A. Kumar., **Chem. Commun., 2009, 6646–6648)** Dr. Rajappa Award - 2009, National Chemical Laboratory, Pune, India.
- **Best Poster Award** in XIX International Round Table on Nucleosides, Nucleotides and Nucleic Acids - 2010, Lyon, France.

List of Research Publications:

1. "Investigation of the effect of amino acid chirality in the internucleoside linker on DNA:DNA and DNA:RNA duplex stability" **Seema Bagmare**, Anita D. Gunjal and Vaijayanti A. Kumar. **Tetrahedron**, **2015**, Volume 71, Issue 16, 2442-2449.
2. "Glycine-linked nucleoside-β-amino acids: Polyamide analogues of nucleic acids." Anjan Banerjee, **Seema Bagmare**, Manoj Kumar Varada, Vaijayanti Kumar. **Bioconjugate Chemistry, 2015**, 26(8), 1737-1742

3. "Synthesis of all four nucleoside based *β*-amino acids" **Seema Bagmare**, Anjan Banerjee, Manojkumar varada and Vaijayanti A. Kumar., **Tetrahedron, 2013**, Volume 69, Issue 3, 1210–1216
4. "Effect of chirality of L/D-proline and prochiral glycine as the linker amino acid in five-atom linked thymidinyl-(α-amino acid)-thymidine dimers" **Seema Bagmare**, Moneesha D'Costa and Vaijayanti A. Kumar., **Chem. Commun., 2009,** 6646–6648.
5. 4"-Epi-DNA: A DNA Mimic Containing-4"hydroxymethyl-α-L-Xylo-Thymidine with Compact Backbone like RNA, **Seema Bagmare**, Vedavati G. Puranik, Moneesha Fernandes, and Vaijayanti A. Kumar., Nucleosides, Nucleotides and Nucleic Acids (Accepted for Publication)

Patents:

1. Nucleoside Analogs for Treatment of the Flaviviridae Family of Viruses and Cancer (Provisionally filed with United States Patent Application)

Professional Membership:

1. Member, "The International Society of Nucleosides, Nucleotides and Nucleic acid (IS3NA)"
2. Member, "International Society For Antiviral Research (ISAR)"
3. Life Member, "Indian Society of Chemist and Biologist (ISCB)"
4. Life Member, "Chemical Research Society of India (CRSI)"

Editorial Service:

1. Assistant Editor, De Gruyter Open Chemistry.
2. Editor, Open Science Journal (OJS)

Reviewer of Scientific Journals:

1. European Journal of Medicinal Chemistry (ELSEVIER, Impact Factor- 3.90)
2. Bio-organic and Medicinal Chemistry (ELSEVIER, Impact Factor- 2.90)
3. Bio-organic and Medicinal Chemistry Letters (ELSEVIER, Impact Factor- 2.48)
4. Chinese Chemical Letter (ELSEVIER, Impact Factor- 1.90)
5. Medicinal and Pharmaceutical Chemistry (Frontiers)

Symposia Attended/Poster/Oral Presentations/Judging Experience:

1. Attended CFAR (Center for AIDS Research) Science symposium, Emory University, Atlanta, GA, USA. March 2015
2. Attended the full agenda of ACS on campus events at National Chemical Laboratory, Pune, October 2012.
3. Attended Indo-French Conference On Organic Synthesis, National Chemical Laboratory, Pune, December 8-9, 2011.
4. National Science Day, NCL Research Foundation, National Chemical Laboratory, Pune. February 24-25, 2011; Poster Presentation on "Synthesis of nucleoside β- amino acids" **Seema Bagmare,** Anjan Banarjee and Vaijayanti A. Kumar.
5. XIX International Round Table on Nucleosides, Nucleotides and Nucleic Acids held in Lyon, France. August 31st to September 03rd, 2010; Poster presentation on "Investigation of the effect of amino acid

chirality in the internucleoside linker on DNA:DNA and DNA:RNA duplex stability" **Seema Bagmare**, Moneesha D'Costa, Anita Gunjal and Vaijayanti A. Kumar.

6. National Science Day, NCL Research Foundation, National chemical Laboratory, Pune. February 28, 2010; Poster Presentation on "Linker Chirality: Directs Base stacking in T-(α-amino acid)-T dimer" **Seema Bagmare,** Moneesha D'Costa and Vaijayanti A. Kumar.
7. 5th J-NOST Conference, Indian Institute of Technology, Kanpur, India, December 4 -7, 2009 : Oral Presentation on "Effect of chirality of L/D-proline and prochiral glycine as the linker amino acid in five atom linked thymidinyl-(α-amino acid)-thymidine dimers" **Seema Bagmare.**
8. Attended National Seminar on Biocatalysis and Biomimetic Catalysis in Organic Chemistry. Dr. Babasaheb Ambedkar Marathwada University, Aurangabad India, March 20-21, 2009.
9. Attended 11th CRSI National Symposium in Chemistry. National Chemical Laboratory, Pune India, February 5-8, 2009.
10. Attended 4th INSA-KOSEF Symposium in Organic Chemistry. Contemporary Organic Chemistry and its future directions. National Chemical Laboratory, Pune India, January 12-13, 2009.
11. Served as a Judge for STEM Research & Career Symposium at Emory University- Laney Graduate School, Atlanta, USA, September 18-20, 2016.

Scientific and experimental Skills:

- **Synthetic organic chemistry-** Experienced in multistep synthesis of organic compounds using novel material and methods, product identification and purification methods such as TLC, flash chromatography and HPLC; product characterization using various spectroscopic techniques such as NMR, Mass and IR spectroscopy. Knowledge of various organic reactions and ability to design synthetic methods.
- **Nucleoside chemistry-** Experienced in the synthesis of modified deoxyribo nucleosides in solution and the extension to solid phase synthesis of oligomers involving knowledge of nucleosides and phosphoramidite chemistry. Design and synthesis of nucleosides and their corresponding phosphoramidates, triphosphate synthesis.
- **DNA and RNA synthesis & analysis-** Experienced in the synthesis of modified and unmodified oligonucleotides on DNA synthesizers such ABI 3900 DNA and MerMade 4 DNA synthesizers. Good knowledge of DNA/ RNA handling and purification using HPLC followed by characterization by UV spectrophotometer and Circular dichroism.
- **Biophysical and spectroscopic methods-** Extensively used UV-Visible, CD spectroscopic methods in evaluation of DNA:DNA, DNA:RNA, DNA: mod DNA, RNA: mod DNA. Experienced in characterization of modified and unmodified oligonucleotides using MALDI-TOF on Voyager De-STR (Applied Biosystems). Polyacrylamide gel electrophoresis (**PAGE**) technique to confirm duplex binding and RNase H activity.
- **Computers** Computer literate with MS-Office, Excel, Origin, Isis Draw, ChemDraw, ACD Specview, search engines such as SciFinder, Scopus and Web of Science

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