

## Abhigyan Som, Ph.D.

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### EDUCATION

Ph.D. in Organic Chemistry, 2004	University of Geneva, Switzerland
M.S. in Chemistry, 1999	Indian Institute of Technology, Kanpur, India
B.S. in Chemistry, 1997	Presidency College, Kolkata, India

### HONORS AND AWARDS

- Cover picture: *Biopolymers (Peptide Science)* 2008, 90 (2).
- Cover picture: *Advanced Functional Materials* 2006, 16 (2).
- Cover picture: *Tetrahedron* 2004, 60 (31).
- Most cited paper 2003-2006 award: *Tetrahedron* 2004, 60, 6405-6435.
- Best poster award: *Swiss Chemical Society* October 17, 2002, Basel, Switzerland.
- Qualified GATE 1999 in Chemistry with 99.28 percentile (All India rank 12<sup>th</sup>).

### RESEARCH EXPERIENCES

2005-Present **Postdoctoral Researcher** with Professor Gregory N. Tew  
*Department of Polymer Science & Engineering, University of Massachusetts, Amherst, MA*

Investigated interactions of synthetic antimicrobial oligomers, polymers, and peptides with lipid membranes; illustrated the critical role of negative curvature lipids in the selective action and established a novel mechanism of action of antimicrobial oligomers/polymers.

2000-2004 **Graduate Researcher** with Professor Stefan Matile  
*Department of Organic Chemistry, University of Geneva, Switzerland*  
**Dissertation title: Rigid Rod  $\beta$ -Barrel Pores as Catalysts**

Designed, synthesized and characterized artificial rigid rod  $\beta$ -barrels where octiphenyl staves are tied together with  $\beta$ -sheets formed by peptide strands. Studied the catalytic and ion channel activity of these supramolecular assemblies and a unique cofactor mediated catalytic property of these  $\beta$ -barrel pores was achieved.

1997-2000 **Undergraduate Research Experience**

- *Indian Institute of Science, Bangalore, India in collaboration with Mitokor Inc. San Diego, CA*  
Project Supervisors: Professor Srinivasan Chandrasekaran & Professor Uday Maitra  
Designed and synthesized drugs for neurodegenerative diseases.
- *Indian Institute of Technology, Kanpur, India*  
Project supervisor: Professor Parimal K. Bharadwaj  
Functionalized cryptands and studied metal coordination.
- *Indian Association for the Cultivation of Science, Calcutta, India*  
Project Supervisor: Professor Brindaban C. Ranu  
Performed stereoselective debromination of aryl-substituted dibromides with indium metal.

### PUBLICATIONS

16. Calcium Triggered Membrane Activity in Cardiolipin Vesicles by Antimicrobial Oligomers and Antimicrobial Peptides. Som, A.; Tew, G. N. in preparation.
15. Synthetic Mimics of Antimicrobial Peptides. Som, A.; Vemparala, S.; Ivanov, I.; Tew, G. N. *Biopolymers (Pept. Sci.)* **2008**, 90, 83-93. (**cover picture**)
14. Influence of Lipid Composition on Membrane Activity of Antimicrobial Phenylene Ethynylene Oligomers. Som, A.; Tew, G. N. *J. Phys. Chem. B.* **2008**, 112, 3495-3502.

13. Synthesis of Quaternary Pyridinium Polymers Based on Norbornene Derivatives. Eren, T.; Som, A.; Rennie, J.; Nelson, C. F.; Urgina, Y.; Tew, G. N.; Coughlin, B. E. *Macromol. Chem. Phys.* **2008**, *209*, 516-524.
12. Synthetic Antimicrobial Oligomers Induce Composition Dependent Topological Transition in Membranes. Yang, L.; Gordon, V. D.; Mishra, A.; Som, A.; Purdy, K.; Davis, M. A.; Tew, G. N.; Wong, G. C. L. *J. Am. Chem. Soc.* **2007**, *129*, 12141-12147.
11. Infectious Disease: Connecting Innate Immunity to Biocidal Polymers. Gabriel, G.; Som, A.; Madkour, A.; Eren, T.; Tew, G. N. *Mater. Sci. Eng. R.* **2007**, *57*, 28-64.
10. Molecular Recognition by Synthetic Multifunctional Pores in Practice: Are Structural Studies Really Helpful? Baudry, Y.; Bollot, G.; Gorteau, V.; Litvinchuk, S.; Mareda, J.; Nishihara, M.; Pasini, D.; Perret, F.; Ronan, D.; Shah, R. M.; Sakai, N.; Som, A.; Sordé, N.; Talukdar, P.; Tran, D. H.; Matile, S. *Adv. Funct. Mater.* **2006**, *16*, 169-179. **(cover picture)**
9. Contribution of Lipid Bilayer Hosts to Structure and Activity of Multifunctional Supramolecular Guests. Som, A.; Matile, S. *Chem. Biodiv.* **2005**, *2*, 717-729.
8. On Thermodynamic and Kinetic Stability of Synthetic Multifunctional Rigid Rod  $\beta$ -Barrel Pores: Evidence for Supramolecular Catalysis. Litvinchuk, S.; Bollot, G.; Mareda, J.; Som, A.; Ronan, D.; Shah, R. M.; Perrotet, P.; Sakai, N.; Matile, S. *J. Am. Chem. Soc.* **2004**, *126*, 10067-10075.
7. Recent Synthetic Ion Channels and Pores. Matile, S.; Som, A.; Sordé, N. *Tetrahedron* **2004**, *60*, 6405-6435. **(cover picture) recipient of the most cited paper 2003-2006 award.**
6. Catalytic Rigid-Rod  $\beta$ -Barrels with Hydrazide Cofactors to Convert Poor Substrates as Hydrazone Conjugates. Som, A.; Talukdar, P.; Baumeister, B.; Matile, S. *Chimia* **2003**, *57*, 208-209.
5. Complementary Characteristics of Homologous *p*-Octiphenyl  $\beta$ -Barrels with Ion Channel and Esterase Activity. Som, A.; Sakai, N.; Matile, S. *Bioorg. Med. Chem.* **2003**, *11*, 1363-1369.
4. Rigid-Rod  $\beta$ -Barrel Ion Channels with Internal "Cascade Blue" Cofactors – Catalysis of Amide, Carbonate, and Ester Hydrolysis. Som, A.; Matile, S. *Eur. J. Org. Chem.* **2002**, 3874-3883.
3. On the Importance of Intermediate Internal Charge Repulsion for the Synthesis of Multifunctional Pores. Baumeister, B.; Som, A.; Das, G.; Vilbois, F.; Gerard, D.; Shahi, S. P.; Matile, S. *Helv. Chim. Acta* **2002**, *85*, 2740-2753.
2. Bioorganic Chemistry of Rigid-Rod Molecules: Adventures with *p*-Oligophenyls. Baudry, Y.; Baumeister, B.; Das, G.; Gerard, D.; Matile, S.; Sakai, N.; Som, A.; Sordé, N.; Talukdar, P. *Chimia* **2002**, *56*, 667-671.
1. Functionalization of a Heteroditopic Cryptand: Exocyclic Coordination with Iron(III). Tripathi, P.; Som, A.; Bharadwaj, P. K. *Proc. Indian Acad. Sci. (Chem. Sci.)* **2000**, *112*, 385.

## POSTERS AND PRESENTATIONS

8. Influence of Lipid composition on Membrane Activity of Synthetic Antimicrobial Oligomers. American Chemical Society 234<sup>th</sup> National Meeting August 19-23, 2007, Boston, USA.
7. Interactions of Antimicrobial Oligomers with Liposomal Membranes. PSE Annual Poster Symposium October 3-5, 2006, University of Massachusetts, Amherst, USA.
6. Interactions of Homologous Amphiphilic Antibiotics with Liposomal Membranes. PSE Annual Poster Symposium October 11-13, 2005, University of Massachusetts, Amherst, USA.
5. Synthetic Multifunctional Pores as Hosts, as Sensors and as Catalysts. National Research Program "Supramolecular Functional Materials" July 4, 2003, Bern, Switzerland.
4. Rigid-Rod  $\beta$ -Barrel Ion Channels with Internal "Cascade Blue" Cofactors to Catalyze Ester, Amide, and Carbonate Hydrolysis. Swiss Chemical Society October 17, 2002, Basel, Switzerland. **(recipient of the best poster award)**
3. Rigid-Rod  $\beta$ -Barrel Ion Channels with Internal "Cascade Blue" Cofactors to Catalyze Ester, Amide, and Carbonate Hydrolysis. "Lipids and Biomembranes: New Technologies" October 2-5, 2002, Davos, Switzerland.
2. Internal Cofactors for *p*-Oligophenyl  $\beta$ -Barrels with Ion Channel and Esterase Activity. Opolzer Lectures October 5, 2001, Geneva, Switzerland.
1. A Barrel-Stave Supramolecule with Ion Channel, Hydrolase, and Fibrillogenic Activity. National Research Program "Supramolecular Functional Materials" First Progress Report Meeting October 23, 2001, Bern, Switzerland.