

Editorial Board Focus: Prof. Vibha Tandon (Jawaharlal Nehru University, India)

Background and Purpose. From time to time, SYNFORM portraits Thieme Chemistry Editorial Board or Editorial Advisory Board members who answer several questions regarding their research interests and revealing their impressions and views on the developments in organic chemistry as a general research field. This Editorial Board Focus presents Prof. Vibha Tandon (Jawaharlal Nehru University, India) who joined the Associate Board of *SynOpen* with effect of March 2023.

Biographical Sketch



Prof. V. Tandon

Vibha Tandon obtained her Ph.D. in 1991 in chemistry on the sequential synthesis of oligonucleotides using special protecting groups from Allahabad University (India). She carried out postdoctoral studies at the Department of Chemistry, IIT Kanpur (India) to develop synthetic methodology for oxidation of alkenes and sulfides using cobalt complexes as organometallic catalyst. Thereafter, in 2009, she joined Delhi University (DU, India) as an assistant professor at Dr. B.R. Ambedkar Centre for Biomedical Research, and later the same year moved to the Department of Chemistry, DU as an associate professor. Presently, she is a professor at the Special Centre for Molecular Medicine (SCMM), Jawaharlal Nehru University (JNU, India). She was Chairperson of the Research Coordination Committee of JNU, creating a number of Special Interest Groups at JNU and started a networking project. She served as Chairperson of SCMM from 2015 to 2017 and Chief proctor from 2016 to 2017. She was Chairperson of

the Women Scientists Program, Chemical Sciences Stream, of the Department of Science and Technology, Government of India from 2016 to 2021. Presently, she is Chairperson of the Biotechnology Career Advancement and Re-Orientation Programme (BioCARE) for women launched by the Department of Biotechnology, Ministry of Science and Technology, Government of India.

She has published 93 papers in international journals, and has to her credit four international and four Indian patents. Prof. Tandon has mentored 25 Ph.D. students and around 70 students for six-month projects. She has been teaching Masters and Ph.D. students for the last 25 years.

She was awarded a Royal Society Fellowship (2007-08) to work at Prof. Michael J. Gait's laboratory, MRC Cambridge, UK. She has been on a DAAD fellowship (2010–2011) and an INSA visiting fellowship (2011–12) to work in the Radiation Biology laboratory of Prof. George Iliakis at the Institute of Medical Radiation Biology at Essen (Germany); and a Fulbright Senior Research fellowship (2012–2013) to visit the Department of Cell Biology, Georgia State University (Atlanta, USA).

INTERVIEW

SYNFORM What is the focus of your current research activities?

Prof. V. Tandon My group's research interest over the last five years include: designing novel approaches to synthesize biologically active heterocyclic molecules for use in the treatment of cancer, bacterial infection, and neurodegenerative disease; development of operationally simple organocatalyzed stereoselective catalytic strategies for asymmetric synthe-

sis under mild conditions; investigation of metal-catalyzed cross-coupling and highly atom-economic C–C and C–N bond-forming domino reactions.

My group has carried out Brønsted acid/chiral phosphoric acid catalysed regioselective synthesis of carboxamidation of indolyl alcohols using isocyanooesters. In addition, my lab established a Pd-catalyzed synthesis of multi-aryl 7-azaindoles using sequential arylation of 5-bromo-6-chloro-3-iodo-1-methyl-1*H*-pyrrolo[2,3-*b*]pyridine. Four diverse aryl groups are installed in a chemoselective fashion providing a general method to synthesize sterically encumbered compounds and

extended 7-azaindoles. Three selective sequential arylations at C-3, C-5, and C-6 via Suzuki–Miyaura cross-coupling followed by direct C-2 arylation using a Pd catalyst and AgOTf as an additive are highlights of that work. Interestingly, the tetraaryl 7-azaindoles showed aggregate-induced emission (AIE) making them potentially useful as fluorophores in OLEDs, sensors, and bio-imaging tools.

Other than heterocyclic chemistry, my group is largely involved in translational research. We have two strong leads (novel molecules) in the pipeline to be developed as drugs: PPEF, an antibacterial agent against MDR bacterial strains, and DMA, a radioprotector against radiation therapy in cancer patients. We have shown that DMA, a benzimidazole, exerts radioprotection to normal cells during radiotherapy of tumor in patients. I deciphered that the Akt/PKB/GSK3 β /NF κ B pathway is selectively activated in normal cells in tumor-bearing mice, but not in tumor cells. The ICMR has approved DMA for product development as a radioprotector. DMA confers protection against Xerostomia, reduces radioresistance and causes increased survival in HNSCC. GMP synthesis and GLP grade safety pharmacology & toxicology IND enabling studies have been done on DMA by Intox Pvt. Ltd., Pune, and Eurofins–Advinus Pvt. Ltd., Bangalore, which was funded by ICMR. I am working closely with head and neck patients of Medanta Hospital, Gurgaon and GTB Hospital, Delhi.

My group has also developed an antibiotic candidate, PPEF, a small molecule targeting topoisomerase IA and III protein selectively in bacteria, but which does not act on gyrase. PPEF efficiently kills 640 multi-drug-resistant pathogenic strains of eleven Gram negative and Gram positive bacterial strains identified by the WHO as “Priority Pathogens”. PPEF covers PRIORITY 1. CRITICAL: 1. *Pseudomonas aeruginosa*, carbapenem-resistant; 2. Enterobacteriaceae, carbapenem-resistant, ESBL-producing; PRIORITY 2: HIGH 1. *Enterococcus faecium*, vancomycin-resistant; 2. *Staphylococcus aureus*, methicillin-resistant, vancomycin-intermediate and resistant; 3. *Salmonella*, fluoroquinolone-resistant; PRIORITY 3: MEDIUM 1. *Streptococcus pneumoniae*, penicillin-non-susceptible; 2. *Shigella* spp., fluoroquinolone-resistant. Preclinical evaluation showed high efficacy of PPEF against MRSA in septicaemia mice model.

SYNFORM Please comment on your role as an Associate Editor of SynOpen.

Prof. V. Tandon My role will be to establish SynOpen as a journal which publishes original high-quality research in medicinal chemistry and to involve the scientific community with SynOpen so as to create faith in SynOpen. I will try to make SynOpen a journal of high repute in next few years.

SYNFORM Could you tell us something about yourself outside the lab, such as your hobbies or extra-work interests?

Prof. V. Tandon I am interested in gardening and landscaping, as well as counselling and working for girls and women to bring them back into mainstream society to earn enough to live with dignity.

