CURRICULUM VITAE

Dr. Rajeshwar Narlawar

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Industrial Research Experience:

- Currently working as a Senior Staff Scientist at Neuroscience−Medicinal Chemistry, Janssesn Research and Development, Janssen Pharmaceutica, Beerse Belgium on a project in collaboration with VIB Leuven since **September 2014**. Leading the chemistry efforts towards the development of γ-secretase inhibitors devoid of notch-related side effect and improved efficacy. Specific aims of the current projects:
- Worked as a **Senior Medicinal Chemist (Nov. 2000 – Sep. 2002)** in Reddy's Research Laboratories, Discovery Research Group, Hyderabad, India. **Dr. Reddys Discovery Research** (www.drreddys.com) is a leading new drug discovery pharmaceutical R&D organization in India with several New Chemical Entities (NCE's) in clinical development and promising candidates in the pipeline. The Metabolic Disorder Research group, which I belonged to, was engaged in development of agonist for PPAR gamma. The specific jobs and responsibilities were:
    - Synthesis, purification, spectroscopic characterization and structure of elucidation of complex organic compounds.
    - Literature search, method and synthetic route development.
    - Synthesis of small libraries of target compounds, SAR analysis.
    - Scaling of final compound for pre-clinical studies.
    - Preparing scientific reports and presentations for meetings.

Academic Research Experience:

- As a Postdoctoral Research Associate with **Prof. Michael Kassiou** at **Brain and Mind Research Institute (BMRI) / School of Chemistry**, **University of Sydney, Australia** from **December 2011** to **Septmeber 2014**. Research was focused towards the design and synthesis of novel carborane based ligands for Translocator Protein (TSPO). The specific aims were:
    - Design and synthesis of novel ligands for TSPO, radio-labelling studies with the most potent ones for their application as biomarkers in Alzheimer's disease: Successfully

designed and synthesized several libraries of TSPO ligands with <10 nM potency. Radio-labelling experiments are being performed.

- Design and Synthesis of carborane containing TSPO ligands and their application for boron neutron capture therapy (BNCT): The most active ligands were decorated with carborane moiety, co-incubated with the cells and then quantified the boron content in the cells. These born containing ligands bound the TSPO in tumor cells and this novel approach could be used for target specific drug delivery for brain tumors.

- As a Postdoctoral Research Associate with Prof. Paul Groundwater at **Faculty of Pharmacy**, **University of Sydney**, **Australia**, from **December 2009** to **September 2011**. The research was focused towards the synthesis of novel inhibitors of FtsZ as a novel target for anti-bacterial in particular TB. Curcumin was used as the starting point and the non-natural analogs were synthesized. The most active compound shows low micromolar activity with significant inhibition of FtsZ in bacteria.
- As Postdoctoral Research Associate with Prof. Ad. P. IJzerman, at **Leiden/ Amstrerdam Centre for Drug Research (LACDR)**, Leiden, **The Netherlands**, from **January 2008** to **September 2009**. The research was focused towards synthesis of bitopic ligands (where an allosteric ligand is linked with an orthosteric ligand with linker) for Adenosine A_1 receptor. This unique strategy allowed us to locate the allosteric site on the Adenosine A1 receptor. Designed and synthesized allsoteric inhibitors for Luteinizing Hormone with potential as contraceptive agents.
- At National Chung Cheng University, **Taiwan** as a research assistant from **September-2002** to **May-2003**. I was working there on the solid phase synthesis of tri- and tetra-peptides and preparation solid phase supported reagents such as reagent for Yamaguchi lactonisation.

Doctoral Research:

- At Department of Chemistry and Biochemistry, **Darmstadt University of Technology**, Darmstadt, **Germany** from **June 2003- January 2008** under the supervision of Prof. Boris Schmidt. Specific aims of the doctoral research were:

  - Synthesis of γ-secretase inhibitors and modulators using Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) as scaffolds: Synthesized NSAIDs inspired modulators with low µM potency and no effect on NICD generation.
  - Design and synthesis of γ-secretase modulators and inhibitors based photoaffinity labels to identify binding site on active γ-secretase complex: Successfully designed and synthesized several photoaffinity labels. The most interesting being the flurbiprofen based photoaffinity label targeted the substrate APP. Results are published in Nature journal.
  - Design and Synthesis of substrate specific (Notch sparing) peptidic and nonpeptidic gamma secretase modulators.
  - Synthesis of curcumin-derived inhibitors for Tau and Aβ aggregation.

ACADEMIC RECORD

Ph. D.	Department of Chemistry, Clemens Schöpf-Institute for Organic chemistry and Biochemistry, Darmstadt university of Technology, Darmstadt, **GERMANY**. Period: June 2003 –January 2008. Grade: ***Magna Cum Laude*** PhD Thesis: Modulation and Characterization of Alzheimer's Disease Associated gamma-Secretase.
Master of Science **M.Sc. (Org. Chem.)**	Department of Chemistry, Dr. B. A. Marathwada University, Aurangabad, INDIA. Course Period: Jun. 1998-Apr. 2000. First year: **75.00%** (Distinction) Second year: **75.80%** (Distinction)
Bachelor of Science **(B.Sc.)**	Dr. B. A. Marathwada University, Aurangabad, INDIA. Course Period: Jun. 1995- Apr. 1998. Marks obtained: Final year: **76.75%** Second year: **72.50%** First year: **75.40%**

SCHOLASTIC ACHIEVEMENTS

- Awarded **Gold Medal** for standing first at M.Sc. Chemistry examination for year 2000 in the Dr. B. A. M. University, Aurangabad, India.
- Received **Dr. D. S. Deshpande Award** and **Vishwas Patki Smruti Award** for securing highest marks at the MSc Chemistry Exams for the year 2000.
- Received **Dr. K. A. Thakar Award** for the scholastic achievement and securing highest marks in organic chemistry at the Dr. B. A. M. University MSc Exams for year 2000.
- Received the '**Eklavya Scholarship**' for year 1998-2000 from the State Government of Maharashtra, India.
- Qualified Graduate Aptitude Test in Engineering (GATE-2002) conducted by Indian Institute of Science (IISc), India, with 90.34 percentile.

Scientific Affiliation

- Editorial board member: *International Journals of Advanced Chemistry*.
- Editorial board member: *Journal of Advanced Pharmaceutical Science and Technology*.
- Editorail board member: *Journal of New Developents in Chemistry*.
- Editorail board member: *American Research Journal of Chemistry*.

Skills and Expertise

- Familiar with modern methods of organic synthesis and capable of doing multi step synthesis. Hands on experience in doing dry reactions, low temperature reactions and catalytic hydrogenations, cross coupling reaction, metal catalyzed reactions, oxidations, and reductions. Capable of handling reactions from milligram to multi-gram scale.
- Expertise in heterocyclic chemistry, multi component reactions (MCRs), solid phase synthesis, parallel synthesis, microwave assisted organic synthesis and protecting group chemistry.
- Expertise in peptide synthesis, synthesis of photo-affinity and affinity probes used in the identification of binding site, bivalent ligands and linker chemistry.
- Familiar with purification techniques such as Flash Chromatography, Column Chromatography, Preparative and Thin Layer Chromatography.
- Well versed with data interpretation of complex Organic molecules using ^{1}H NMR, ^{13}C NMR, COSY, NOESY, HMBC, HMQC, HSQC, DEPT, APT, GC-MS, LC-MS, UV, IR, GC, and HPLC.

INSTRUMENTAL EXPOSURE

NMR spectrometer (Bruker Advance and Varian, 300MHz,400 MHz, 600 MHz); LCMS (Finnigan Mat LCO spectrometer); GCMS (QP-5000 Simadzu); IR spectrometer (nicolet spectrometer); Elemental Analyser (Elementor, Vario E); Spectrophometer (Beckman HU 7400); HPLC (Bruker); Microwave by Biotage, CEM; Automated flash column chromatography systems by Grace Davisson's Reveleris and Combiflash by Teledyne ISCO.

COMPUTER PROFICIENCY

Conversant with windows, macintosh environment. Well versed with softwares such as CHEMOFFICE, ISIS draw, CHEMSKETCH, ENSEMBLE, Belstein´s Crossfire commander, Sci-finder and the structure interpretation softwares provided by ACD. Molecular modeling softwares such as viewer pro, Spartan, YASARA, MOE and Chem draw 3D.

COLLABORATIONS during PhD

Dr. Christian Haass, **Dr. Harald Steiner**. Adolf-Butenandt-Institute, Department of Biochemistry, Laboratory for Alzheimer's and Parkinson's Disease Research, Ludwig-Maximilian-University, Schillerstr. 44, D-80336 Munich, Germany	For AICD assay to probe the substrate specificity of modulators and inhibitors. Photoaffinity and affinity labeling experiments.
Dr. Karlheinz Baumann, F. Hoffmann-La Roche Ltd. Pharmaceuticals Division, Preclinical Research CNS, Bldg. 70/345, CH-4070 Basel, Switzerland.	To probe the potency of modulators and inhibitors using Aβ-electrochemiluminescence assay.
Dr. Eckhard Mandelkow, **Dr. Marcus Pickhardt**, Max-Planck-Unit for Structural Molecular Biology, DESY, Notkestrasse 85, D22607 Hamburg, Germany	To test the compounds for their ability to depolymerize preformed paired helical filaments (PHFs), polymerized tau.
Dr Sabine Krause, Dr Thomas Dyrks Bayer Schering Pharma AG, Molecular Imaging Research, S109, 06, 614A, Müllerstrasse 178, 13353 Berlin, Germany	To probe the affinity of compounds to bind tau and $A\beta_{42}$ aggregates

PUBLICATIONS

Research Articles

1. Paul W. Groundwater*, **Rajeshwar Narlawar**, Vivian Wan Yu Liao, Anusri Bhattacharya, Shalini Srivastava, Munikumar Reddy Doddareddy, Pratik M. Oza, Ramesh Mamidi, Emma C. L. Marrs, John D. Perry, David E. Hibbs, Dulal Panda, A carbocyclic curcumin inhibits proliferation of Gram positive bacteria by targets FtsZ assembly, **2017**, Biochemistry, 56, 514-524. (**IF 2.938**)
2. Linnet Ramos, Callum Hicks, Alex Caminer, Kalliu Couto, **Rajeshwar Narlawar**, Michael Kassiou, Ian Mcgregor, MDMA (ecstacy), oxytocin and vasopressin modulate social preference in rats: A role for handling oxytocin receptors, , Pharmacology, Biochemistry and Behaviour, **2016**, 150-51, 115-123. (**IF 2.781**)

3. **Rajeshwar Narlawar**, Eryn L. Werry, Alana M. Scarf, Raphy Hanani, Sook Wern Chua, Victoria A. King, Melissa L. Barron, Ralph N. Martins, Lars M. Ittner, Louis M. Rendina, and Michael Kassiou, First Demonstration of Positive Allosteric-like Modulation at the Human Wild Type Translocator Protein, **2015**, Journal of Medicinal Chemistry, 58 (21), 8743-8749. (**IF 6.259**)

4. Callum Hicks, Linnet Ramos, Tristan A. Reekie, **Rajeshwar Narlawar**, Michael Kassiou,, Iain S. McGregor, WAY 267,464, a non-peptide oxytocin receptor agonist, impairs social recognition memory in rats through a vasopressin 1A receptor antagonist action Psychopharmacology, **2015**, 232, 15, 2659-2667. (**IF 3.308**)

5. Callum Hicks, Linnet Ramos, Tristan Reekie, Giti Misgah, **Rajeshwar Narlawar**, Michael Kassiou and Ian Mcgregor, Body temperature and cardiac changes induced by peripherally administered oxytocin, vasopressin and the non-peptide oxytocin receptor agonist WAY 267,464: A biotelemetry study in rats, British Journal of Pharmacology, **2014**, 171, 11, 2868-2887. (**IF 5.491**)

6. Linnet Ramos, Callum Hicks, Richard Kevin, Alex Caminer, **Rajeshwar Narlawar**, Michael Kassiou and Iain S. McGregor, Acute Prosocial Effects of Oxytocin and Vasopressin when Given Alone or in Combination with 3,4-Methylenedioxymethamphetamine (MDMA, 'Ecstasy') in Rats: involvement of the $V1_A$ receptor, Neuropsychopharmacology, **2013**, 38, 2249-2259 (**IF 6.403**)

7. Zhaowei Yan, Jinping Liu, Dan Lu, **Rajeshwar Narlawar**, Paul Groundwater and Pingya Li, Two new ceramides from the fruit pulp of Acanthopanax senticosus (Rupr. et Maxim) Harms, Natural Product Research, **2014**, 28 (3), 144-149. (**IF 1.828**)

8. Yiliand Zhao, Paul W Groundwater, David E Hibbs, Paul K. Nguyen, **Rajeshwar Narlawar, (**1E,4Z,6E)-5-Hy-droxy-1,7-bis-(2-meth-oxy-phen-yl)-1,4,6-hepta-trien-3-one**,** Acta Crystallogr Sect E, **2011**, E67(8), o1885.

9. **Rajeshwar Narlawar**, J. Robert Lane, Munikumar R. Doddareddy, Judy Lin, Johannes Brussee, Adrian P. IJzerman, Hybrid Ortho/allosteric ligands for Adenosine A_1 Receptor, Journal of Medicinal Chemistry, **2010**, *53* (8), 3028–3037. (**IF 6.259**)

10. Karen Bernard, Wei Wang, **Rajeshwar Narlawar**, Boris Schmidt and Kevin L. Kirk, Curcumin cross-links CFTR polypeptides and potentiates channel activity by distinct mechanisms, Journal of Biological Chemistry, **2009**, *284,* 30754-30765. (**IF 4.125**)

11. Laura H. Heitman*, **Rajeshwar Narlawar**, Henk de Vries, Milou W. Willemsen, Dieter Wolfram, Johannes Brussee, Adriaan P. IJzerman, Substituted Terphenyl Compounds as the First Class of Low Molecular Weight Allosteric Inhibitors of the Luteinizing Hormone Receptor, Journal of Medicinal Chemistry, **2009**, *52* (7), 2036-2042. (**IF 6.259**)

12. Boris Schmidt, Stefanie Baumann, Nicole Hoettecke, **Rajeshwar Narlawar**, Thomas Kukar, Todd E. Golde, Karlheinz Baumann, Mapping the binding site of gamma-secretase modulators by small (and not so small) organic molecules, Alzheimer's & Dementia, **2008**, *4*, (4), T91. (**IF 9.478**)

13. Thomas L. Kukar, Thomas B. Ladd, Maralyssa A. Bann, Patrick C. Fraering, **Rajeshwar Narlawar**, Ghulam M. Maharvi, Brent Healy, Robert Chapman, Alfred T. Welzel, Robert W. Price, Brenda Moore, Vijayaraghavan Rangachari, Bernadette Cusack, Jason Eriksen, Karen Jansen West, Christophe Verbeeck, Debra Yager, Christopher Eckman, Wenjuan Ye, Sarah Sagi, Barbara A. Cottrell, Justin Torpey, Terrone L. Rosenberry, Abdul Fauq, Michael S. Wolfe, Boris Schmidt, Dominic M. Walsh, Edward H. Koo & Todd E. Golde, Substrate Targeting γ-Secretase Modulators, **Nature**, **2008**, *453*, 925-929. (**IF 40.137**) *453*, 925-929

14. **Rajeshwar Narlawar**, Marcus Pickhardt, Stefanie Leuchtenberger, Sascha Weggen, Karlheinz Baumann, E. Mendelkow, Boris Schmidt, Curcumin Derived Isooxazoles and Pyrazoles: Blunt Tools or Swiss knives Against Alzheimer´s Disease ?, ChemMedChem. **2008**, *3*, 165-172. (**IF 3.225**)
15. **Rajeshwar Narlawar**, Karlheinz Baumann, Christian Czech, Boris Schmidt, LXR-agonist TO-901307 can be Tuned From Inverse to Normal Modulation of γ-Secretase by Addition of a Carboxylic Acid and a Lipophilic Anchor, Bioorganic and Medicinal Chemistry Letters, **2007**, *17 (19)*, 5428-5431. (**IF 2.454**)
16. **Rajeshwar Narlawar**, Karlheinz Baumann, Robert Schubenel, Boris Schmidt, Curcumin Derivatives Inhibit or Modulate β-Amyloid Precursor Protein Metabolism, Neuro-degenerative Diseases, **2007**, *04 (02)*, 88-93. (**IF 2.842**)
17. **Rajeshwar Narlawar**, Blanca I. Pérez Revaulta, Karlheinz Baumann, Robert Schubenel, Christian Haass, Harald Steiner, Boris Schmidt, *N*-Substituted Carbazolyloxyacetic Acids Modulate Alzheimer Associated γ-Secretase, Bioorganic and Medicinal Chemistry Letters, **2007**, *17*, 176-182. (**IF 2.454**)
18. **Rajeshwar Narlawar**, Blanca I. Pérez Revauelta, Christian Haass, Harald Steiner, Boris Schmidt, Karlheinz Baumann, The Scaffold of the COX-2 Inhibitor Carprofen Provides Alzheimer γ-Secretase Modulators, Journal of Medicinal Chemistry, **2006**, *49 (26)*, 7588-7591. (**IF 6.239**)
19. Boris Schmidt, Stefanie Baumann, **Rajeshwar Narlawar**, Hannes A. Braun, Gregor Larbig, Modulators and Inhibitors of β- and γ-Secretase. Neuro-degenerative Diseases, **2006**, *03 (4-5)*, 290-297. (**IF 2.842**)

Review Articles

20. Anthony Rowe, **Rajeshwar Narlawar**, Paul W. Groundwater, Iqbal Ramdan, Kavalactones Pharmacophores for Major Cellular Drug Targets, Mini-Reviews in Medicinal Chemistry, **2011**, *11*,79-83. (**IF 2.66**)
21. Boris Schmidt, Hannes A. Braun, **Rajeshwar Narlawar**, Drug Development and PET-diagnostics for Alzheimer's Disease, Current Medicinal Chemistry, **2005**, *12*, 1677-1695. (**IF 3.249**)

Book Chapters

22. Stefanie Baumann, Nicole Höttecke**, Rajeshwar Narlawar** and Boris Schmidt, gamma-secretase as a target for AD, *in* Medicinal Chemistry of Alzheimer's Disease, Ed. A. Martinez, Research Signpost, **2008**, ISBN 978-81-7895-342-7.

23. Vivian Wan Yu Liao, **Rajeshwar Narlawar**, David E. Hibbs and Paul groundwater, Phytotherapies as New Drug Sources: Gossypol and Curcumin, Ed Iqbal Ramzan, Wiley VCH, **2015,** ISBN 978-1-118-26806-3

Patent

24. Agnieszka Felczykowska, Beata Guzow-Krzeminska, Anna Herman-Antosiewicz, Michael Kassiou, **Rajeshwar Narlawar**, The new usnic acid derivatives, processes for their preparation, pharmaceutical composition and their application, Polish Patent Application no. P.413596 filed date **15.10.15**

Abstracts

1. Eryn Werry, Melinda Barron, **Rajeshwar Narlawar**, Michael Kassiou, Allosteric interactions at the human translocator protien, Journal of Neurochemistry, **2015**, 134 (S1), 174.
2. Frederic Dolle, Isaac Freelander, Fabien Caille, **Rajeshwar Narlawar**, Annelaure Damont, Bertrand Kuhnast, Geraldine Pottier, Raphael Boisgard, Michael Kassiou, Carbon-11-labelling of two novel indole-2-carboxamides targeting the translocator protein, Journal of Labelled Compounds and Radiopharmaceuticals, **2015**, 58, S289. (**IF: 1.745**)
3. Vivian Liao, **Rajeshwar Narlawar**, David Hibbs, Paul Groundwater, The synthesis and Biological Study of Curcumin Analogs as Anti-cancer Agents, Asia-Pacific Journal of Clinical Oncology, **2014**; 10(Suppl. 7): 35 (**IF 1.959**