

CURRICULUM VITAE

Dr. Rajan Vyas

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Education:

- Ph.D. Structure Biology (2004-2010), under the supervision of Prof. R. Tewari, Panjab University and Dr. S. Karthikeyan, Institute of Microbial Technology, Chandigarh, India.
- Master of Science (M.Sc.) Biotechnology (2001-2003), Barkatullah University, Bhopal, India.
- Bachelor of Science (B.Sc.) Biology (1997-2000), Himachal Pradesh University, Shimla, India.

Research Experience:

Assistant Professor / Ramalingaswami Re-entry Fellow (March 2018 onwards) in the Department of Biochemistry and Microbiology, Central University of Punjab, Bhatinda. I am interested to study the structural and functional role of essential mycobacterial proteins using X-ray crystallography.

Postdoctoral Research Associate (Jan 2015 – Mar 2017) in Department of Physiology and Biophysics, School of Medicine, Case Western University, Cleveland, Ohio. My major project includes the elucidation of the structure and function of Ion channels using X-ray crystallography or Cryo-EM spectroscopy.

Postdoctoral Research Associate (Apr 2012 – Dec 2014) in Department of Biochemistry, Ohio State University, Columbus, Ohio. I worked on projects that includes the elucidation of molecular mechanisms of DNA lesion bypass by the Y-family DNA polymerases (*Solfolobus Solfataricus* (Dpo4). Moreover, I was also engaged in the structural basis changes for the incorporation of several L- stereochemistry based drugs in X- and Y- family human DNA polymerase, Lambda (hPol λ), Beta (β) and Dpo4, respectively using X-ray crystallography.

Postdoctoral Research Associate (Sep 2010 - Mar 2012), Protein crystallography laboratory, National Institute of Immunology, New Delhi, India. During this time, I worked on Structure-function studies on enzymes involved in Histidine biosynthesis pathway of *Mycobacterium tuberculosis* and the methionine binding protein of an ABC transporter from *Streptococcus pneumoniae*.

Ph.D research work:

Thesis title: “Biochemical and biophysical characterization of recombinant aspartate semi aldehyde dehydrogenase (ASD) of *Mycobacterium tuberculosis* H37Rv”.

Peer Reviewed Publications:

1. **Rajan Vyas**, Andrew J. Reed, Austin T. Raper, Walter J. Zahurancik, Petra C. Wallenmeyer and Zucai Suo. (2017). Structural basis for the D-stereoselectivity of human DNA polymerase β . *Nucleic Acid Research*, 45(10):6228-6237.
2. Reed, Andrew*; **Vyas, Rajan***; Raper, Austin and Suo, Zucai (2017). Structural Insights into the Post-Chemistry Steps of Nucleotide Incorporation Catalyzed by a DNA Polymerase. *J. Am. Chem. Soc.* 139 (1), 465–471 (* - equal author).
3. Xing Guo, XiaoYan Sun, Di Hu, Ya-Juan Wang, Hisashi Fujioka, **Rajan Vyas**, Sudha Chakrapani, Amit Umesh Joshi, Yu Luo, Daria Mochly-Rosen and Xin Qi. (2016). VCP recruitment to mitochondria by mutant Huntingtin causes mitophagy impairment and neurodegeneration in models of Huntington's disease. *Nature Communication*. **7:12646**.
4. Nazia Nasir, Avishek Anant, **Rajan Vyas**, Bichitra Kumar Biswal. (2016). Crystal structures of Mycobacterium tuberculosis HspAT and ArAT reveal structural basis of their distinct substrate specificities. *Sci Rep.*, 6: 18880.
5. **Vyas, R.**, Efthimiopoulos, G., Tokarsky, E.J., Malik, C.K., Basu, A.K., and Suo, Z. (2015). Mechanistic Basis for the Bypass of a Bulky DNA Adduct Catalyzed by a Y-Family DNA polymerase. *J. Am. Chem. Soc.* 137 (37), 12131-12142. **(Highlighted in F1000Prime)**
6. **Vyas, Rajan**; Reed, Andrew; Tokarsky, E. John; Suo, Zucai. (2015). Viewing Human DNA Polymerase β Faithfully and Unfaithfully Bypass an Oxidative Lesion by Time-Dependent Crystallography. *Journal of the American Chemical Society*, 137(15):5225-30. **(Highlighted in F1000Prime and Ohio State University Press release and April 26th, 2016 edition of APS Science)**
7. Gaur, vineet, **Vyas, R.**, Fowler, Jason; Efthimiopoulos, G; Feng, J, Suo, Z (2014), Structural and Kinetic Insights into Binding and Incorporation of L-Nucleotide Analogs by a Y-family DNA Polymerase. *Nucleic Acid Research*, 42(15):9984-95.
8. **Vyas, R.**, Walter J. Z., Zucai Suo (2014). Structural Basis for the Binding and Incorporation of Nucleotide Analogs with L-Stereochemistry by Human DNA Polymerase λ . *Proc Natl Acad Sci USA.*; 111(30):E3033-42.
9. Ahangar, M. S., **Vyas, R.**, Nasir, N. and Biswal, B. (2013). Crystal structures of the native, substrate-bound and inhibited forms of *Mycobacterium tuberculosis* imidazole glycerol phosphate dehydratase. *Acta Crystallogr.* D69, 2461-2467.
10. Nazia Nasir, **Rajan Vyas** and Bichitra K Biswal (2013). Sample preparation, crystallization, and structure solution of HisC from *Mycobacterium tuberculosis*. *Acta Crystallogr. F69* (4):445-448.
11. **Vyas, R.**, Rupinder Tewari, Manfred Weiss and Subramanian Karthikeyan (2012). Crystal structures of ternary complexes of aspartate semialdehyde dehydrogenase (Rv3708c) from *Mycobacterium tuberculosis* H37Rv. *Acta Crystallogr.* D68, 671-679.
12. Nazia Nasir, **Rajan Vyas**, Chetna Chugh, Mohammad Syed Ahangar and Bichitra Biswal (2012). Molecular cloning, Over-expression, Purification, Crystallization, and Preliminary X-ray Diffraction Studies of Histidinol Phosphate Aminotransferase (HisC2) from *Mycobacterium tuberculosis*, *Acta Crystallogr. F68* (1), 32-36.
13. Mohammad Syed Ahangar, Yogesh Khandokar, Nazia Nasir, **Rajan Vyas** and Bichitra Biswal (2011). HisB from *Mycobacterium tuberculosis*: Cloning, Over-expression in *Mycobacterium*

smegmatis, Purification, Crystallization, and Preliminary X-ray Crystallographic Analysis, *Acta Crystallogr. F67* (11), 1451-1456.

14. Bhushan. J., **Vyas. R.**, Sharma. T, Sehgal. D. and Biswal. B.K. (2011). "Cloning, Over-expression, Purification, Crystallization, and Preliminary X-ray Studies of SP_0149, the Substrate Binding Protein of an ABC Transporter from *Streptococcus pneumoniae*. *Acta Crystallogr. F67* (7), 797-799.
15. Gautam, A., **Vyas, R.**, Tewari. R. (2011). Peptidoglycan Biosynthesis Machinery: A Rich Source of Drug Targets. *Critical Reviews in Biotechnology*. 31(4):295-336.
16. **Vyas, R.**, Kumar, V., Panjekar, S., Karthikeyan, S., Kishan, K. V. R., Tewari, R., & Weiss, M. S. (2008). Purification, crystallization and preliminary X-ray diffraction analysis of aspartate semialdehyde dehydrogenase (Rv3708c) from *Mycobacterium tuberculosis*. *Acta Crystallogr. F64* (3), 167–170.

Fellowships and Awards

- Selected as **Ramalingaswami Re-entry Fellow** (2016-2017) by Department of Biotechnology, India.
- June 2008- May 2010, **Senior Research Fellow** (funded by Department of Biotechnology, Govt. of India) **concurrent with the Ph.D program.**
- June 1 - November 30, **2007** Availed "**Deutscher Akademischer Austausch Dienst**" (**DAAD**) fellowship **concurrent with the Ph.D. sponsored by German Academic Exchange Service** to work in European Molecular Biology Laboratory (EMBL-Hamburg), Germany, under the supervision of Dr. M. S. Weiss.
- July 2006 - February 2007, **Junior Research Fellow** (funded by Department of Biotechnology, Govt. of India) **concurrent with Ph.D program.**

Presentations

- Invited speaker, "DNA lesion bypass by X- and Y-family DNA polymerases" on 8th May 2015 at Central University of Himachal Pradesh, India.
- Presented Ph.D work "Crystal structure of recombinant aspartate semialdehyde dehydrogenase (ASD) from *Mycobacterium tuberculosis* (H37Rv)" at EMBL Hamburg in Nov. 2007.

Major International/National Conferences

- Poster titled "**Molecular mechanism of anaesthetic inhibition in voltage gated sodium channels**" in Departmental Retreat (23 Sep, 2016) held at Department of Physiology and Biophysics, Case Western Reserve University, 109000 Euclid Avenue, Cleveland, Ohio United States 44106.
- Poster titled "**Expression and purification of serotonin 5-HT₃ receptor in *Saccharomyces cerevisiae***" in Departmental Retreat (25 Sep, 2015) held at Department of Physiology and Biophysics, Case Western Reserve University, 109000 Euclid Avenue, Cleveland, Ohio United States 44106.
- Poster titled "**Structural and Kinetic Insights into Binding and Incorporation of Nucleotide Analogs with L-Stereochemistry Catalyzed by a DNA Polymerase**" at Gordon Research Conference on Nucleosides, Nucleotides & Oligonucleotides held (06/30/2013 - 07/05/2013) at Salve Regina University in Newport, RI, United States.

- International Conference on microbial biotechnology. *MICROCON 2009*: “**Microbes for the sustainability of mankind**” organized by Department of Microbial Biotechnology, Panjab University, Chandigarh, India, 2009.
- Poster titled “**Crystal structure analysis of recombinant aspartate semialdehyde dehydrogenase (ASD) from *Mycobacterium tuberculosis* H37Rv**” at European Molecular Biology Organization (EMBO) International conference “Recent Developments in Macromolecular Crystallography” at the National Chemical Laboratory, Pune, India (Nov, 2008).
- Poster titled “**Crystal structure of recombinant aspartate semialdehyde dehydrogenase (ASD) from *Mycobacterium tuberculosis* (H37Rv)**” in Chandigarh Science Congress (CHESCON) (March, 2008).
- “**Xth Heart of Europe Bio-Crystallography Meeting,**” Poland, 2007.
- “**National Workshop on Genetic Engineering**” organized by the Department of Biotechnology, Panjab University, Chandigarh, India, 2006.
- “**Workshop on Basics of Bioinformatics**” organized by Panjab University, Chandigarh, India, 2005.