

**Rahul Sharma Ph.D., HCLD (ABB)**

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## **HIGHLIGHTS**

- Leading innovations and new Molecular Diagnostics development.
- Oversaw laboratory operations of a leading NGS Molecular Diagnosis company.
- Led global molecular epidemiology and translational research programs.
- Established two new laboratories, Clinical NGS, Federal reference laboratory.
- Designed and validated new Molecular Diagnosis tests, now deployed in hospital.
- CAP accreditation inspector for molecular pathology, including NGS.
- Supporting other startups Molecular and NGS product development.

## **PROFESSIONAL EXPERIENCE**

**AUG 2021 – Present**

**CHIEF INNOVATIVE OFFICER, ADVANTA ANALYTICAL LABORATORIES, TYLER TX**

- Providing technical and strategic leadership to multispecialty reference clinical lab.
- Established COVID sequencing (Illumina) and variant detection.
- Validating the precision metagenomics NGS panels for UTI, and Respiratory infections.
- Overseeing compliance and operations of Histology and Molecular laboratories.
- Expanding the Molecular Microbiology (Covid +, STI, UTI, GI, Wound, Nail)
- Expanding the genetic testing (SMA, CF, DMD, Fragile-X) including NGS (Covid-Seq, Cancer panels, metagenomics) services.
- Providing Clinical Consultation about new tests.

**SEPT 2019 – AUG 2021**

**DIRECTOR OF LABORATORY OPERATIONS, COFACTOR GENOMICS, ST LOUIS MO**

- Directed clinical NGS laboratory processing >10000 human samples/year.
- Lead laboratory operations in compliance with GCLP, CAP, and CLIA standards.
- Supervised managers leading clinical testing, NGS projects, and compliances, etc.
- Leading multi-site clinical trial for CMS reimbursement and FDA-IVD filing.
- Working with the C-suite team for long-term planning and growth opportunities.

**SEPT 2019 – AUG 2021**

**TECHNICAL DIRECTOR, COFACTOR GENOMICS, ST LOUIS MO**

- Delivery of high-quality results within pre-defined Turn Around Time (TAT).
- Maintaining CAP/CLIA compliance.
- Overseeing the competency testing and Alternate Performance Assessment.
- Led the laboratory through a successful CAP inspection
- Overseeing the CLIA, CMS, and FDA-IVD validation and QMS of new diagnostic tests.

**SEPT 2018 – SEPT 2019**

**SENIOR SCIENTIST, NUPROBE, CAMBRIDGE, MA**

- Developed *in-vitro* diagnostic devices and assays for mutation detection
- Validated point-of-care Molecular diagnosis device for infectious disease.
- Directed multiple R&D projects focusing on NGS and highly multiplex PCR assays.
- Developed RUO kits in accordance with CLIA and FDA Regulations.

**JULY 2017 – SEPT 2018**

**HEAD, DEPARTMENT OF MOLECULAR BIOLOGY, National Hansen's Disease Program (NHDP)**

**U.S. Department of Health & Human Services (DHHS), Baton Rouge, LA**

- Oversaw operations of three laboratories; 1. NGS Core 2. Research Lab 3. CLIA Lab
- Provided strategic and technical leadership to the Department.
- Oversaw the department's operations, including finance, HR, and regulatory compliance.
- Re-directed the Department's focus to translational research and assay development, which led to the Infectious disease Molecular Diagnosis Laboratory launch.

**FEB 2016 – SEPT 2018**

**TECHNICAL DIRECTOR, CLINICAL LAB, NHDP**

- Established CLIA licensed laboratory for Infectious Disease Molecular Diagnosis.
- Operated clinical lab offering Histology, Microbiology, and Molecular testing.
- Re-trained / hired the technical staff in compliance with CLIA regulation.
- Designed and validated new Laboratory Developed Test (LDT) using NGS and Q-PCR.
- Prepared and led the Laboratory through a successful JHACO inspection.

**SEPT 2013 – FEB 2016**

**DIRECTOR OF MOLECULAR MEDICINE LABORATORY, NHDP**

- Established Next Generation Sequencing facility (Illumina)
- Developed SOPs and protocols for WGS and Targeted Sequencing
- Analyzed NGS data for clinical and research applications.
- Validated new NGS assays for clinical applications.
- Secured extramural funding to improve NGS applications.
- Reduced the NGS target enrichment cost from \$700 to less than \$100.

**MARCH 2008 – SEPT 2013**

**POSTDOCTORAL RESEARCHER, LOUISIANA STATE UNIVERSITY & NHDP**

- Designed and performed Molecular Biology experiments
- Discovered zoonotic leprosy in the United States.
- Performed DNA/RNA extraction, Library Preparation, Target Enrichment, and Sequencing.
- Performed fundamental NGS data analysis for SNPs, Gene Expression and Microbiome

**JAN 2003 – JAN 2008**

**RESEARCH SCHOLAR, INDIAN COUNCIL OF MEDICAL RESEARCH (CMR), AGRA INDIA**

- Designed and developed microarray and identified new drug targets.
- Contributed to the consortium for monitoring the TB drug resistance in north India.
- Authored 10 papers
- Developed Molecular Diagnosis assay for drug resistance in Tuberculosis.

**EDUCATION:**

- **Doctoral of Philosophy (Biotechnology) 2008:**  
Indian Council of Medical Research, New Delhi and Dr. B.R. Ambedkar University, AGRA;  
**Title:** Analysis of genes involved in important metabolic pathways in *Mycobacterium leprae* using structural and functional genomic approaches (**Supervisor: Dr. VM Katoch, Ex-Secretary,** Department of Health Research, Govt. of India).
- **Master of Science in Microbiology (2002);** Dr. B.R. Ambedkar University, AGRA
- **Bachelor of Science (1999);** University of Rajasthan, Jaipur- Raj, India  
Major: Chemistry, Zoology, Botany

**PATENTS:**

1. Probes and primers for identification of mycobacterial proteins useful as potential drug targets. (*patent number: 280840*)
2. Expression of virulence factors of *M.leprae* in host during infection by functional genomic approaches. (*Indian Patent Application No- 2012/DEL/2006*)
3. Novel probes, primers and DNA Chip. (*Indian Patent Application No-2071/DEL/2007*)  
<http://icmr.nic.in/ipr/2011/njil.pdf>,  
<http://www.bcil.nic.in/files%5CM.%20leprae%20DNA%20chip-Technology%20brief.pdf>

**AWARDS / FELLOWSHIPS:**

- Best talk by student / Post Doc in 11<sup>th</sup> MEEGID conference October 30 – November 2, 2012, New Orleans, USA
- Disease Model and Mechanism Travel Award to visit University of Edinburgh UK, Nov 2011
- American Society of Microbiologist (ASM), Outstanding Minority Mentor
- UNESCO-ASM Visiting Resource Person award Nov April 2013.
- UNESCO-ASM Visiting Resource Person award Nov 2011
- UNESCO-ASM Visiting Resource Person award March 2011
- Awarded College/University level teaching eligibility with PhD program sponsorship by Council for Scientific & Industrial Research (CSIR) of India: 2002
- College/University level teaching eligibility award by University Grand Commission (UGC) of India.2001
- Junior Research Fellowship by University Grant Commission: Jan 2002-Dec2004.
- Senior Research Fellowship by University Grant Commission: Jan 2005-Dec2007.

**REVIEWER / EDITOR:**

- Member, Editorial Board: *Asian Journal of Medical Sciences*.
- Member, Editorial Board: *International Research Journal of Bacteriology*
- Member, Editorial Board: *Journal of Dairy and Veterinary Sciences (JDVS)*.
- Member, Editorial Board: CPQ Microbiology

- Reviewer: Ecotoxicology
- Reviewer: abstracts for International Leprosy Congress -2013
- Chaired: Session on Molecular Biology during International Leprosy Congress -2013

#### **MEDIA COVERAGE OF RESEARCH:**

- [Prime time expert panel NEWS18 Rajasthan India](#)
- [It's time to recruit research labs in the COVID-19 fight](#) By Rahul Sharma, PhD, LabPulse.com
- **The New York Times:** “*Armadillos Can Transmit Leprosy to Humans, Federal Researchers Confirm*”
- **The Wall Street Journal:** “*Leprosy Linked to Armadillos*”
- **Los Angeles Times:** “*Armadillos pass leprosy to humans, study finds*”
- **Cnn.com:** “*Armadillos linked to leprosy in humans*”
- **NPRnews:** “*Mysterious Leprosy Cases Linked To Armadillos*”
- **Dailymail.co.uk:** “*How thousands of Americans are still getting leprosy... and why you should stay away from ARMADILLOS if you want to avoid it*”
- **Health & Medicine Week:** “*Research from Louisiana State University Has Provided New Data on Disease Mechanisms, Diagnostics and Treatment*”.
- **USAToday:** “*DNA tests link Southern leprosy cases to armadillo*”
- **The Telegraph, UK:** “*Armadillos blamed for leprosy*”
- **The Independent, UK:** “*Armadillos linked to Louisiana leprosy*”
- **The Guardian, UK:** “*DNA tests link Southern leprosy cases to armadillo*”
- <http://www.christiantoday.com>: “*U.S. faces new health threat: Leprosy transmitted to humans by armadillos*”

#### **PUBLIC HEALTH IMPACT:**

- Center for Disease Control and Prevention (CDC), Atlanta, USA has listed two of my publications in the resources section for leprosy and recommends. <http://www.cdc.gov/leprosy/exposure/armadillos.html>
- Referring to my publication, US Department of Health and Human Services (HHS) displays a message on their website <http://www.hrsa.gov/hansensdisease/>

#### **EXTRAMURAL SUPPORT RECEIVED:**

1. **NIH: Small Business Innovation Research** (1 R44 AG061957-01) 09/30/2018 – 02/28/2021  
Rapid, Simple and Cost-Effective Detection of Human Cell Line Contamination.  
Role: Principle Investigator
2. **R2STOP effect: hope The Leprosy Mission Canada 2016:** 01/01/2016 to 01/01/2019  
Genomic markers for pathological variants and transmission of leprosy bacilli.  
Role: Principle Investigator
3. **Leprosy Research Initiative (LRI) 2016:** 01/01/2016 to 01/01/2018  
Biomarkers for early detection of leprosy using comparative transcriptomics.  
Role: Principle Investigator
4. **R2STOP effect:hope The Leprosy Mission Canada 2016:** 01/01/2016 to 01/01/2018  
Biomarkers for early detection of leprosy using comparative transcriptomics

Role: Principle Investigator

5. **R2STOP effect:hope The Leprosy Mission Canada 2016:** 01/01/2016 to 01/01/2018  
Role of arthropods in transmission of leprosy  
Role: Co- Investigator
6. **American Leprosy Mission 2015:** 01/01/2015 to 01/01/2017  
Molecular strain typing to monitor transmission and drug resistance in Philippines:  
Role: Co- Investigator

## **PUBLICATIONS:**

**Total 30 peer-reviewed publications, 3 book chapters, 3 patents, and several invited seminars**

1. Prenilla Naidu, **Rahul Sharma**, Jamil N. Kanji, Vilma Marks, and Arienne King. Autochthonous North American Leprosy: a second case in Canada. *Infect. Dis. Rep.* **2021**, *13*,
2. **Rahul Sharma**. [NGS versus Sanger Sequencing for Clinical Decisions.](https://www.clinicallabmanager.com)  
<https://www.clinicallabmanager.com>
3. **Rahul Sharma**. [It's time to recruit research labs in the COVID-19 fight.](https://www.labpulse.com/)  
<https://www.labpulse.com/>
4. **Rahul Sharma\***, Pushpendra Singh, Rajiv C McCoy, Shannon M Lenz, Kelly Donovan, Maria T Ochoa, Iris Estrada-Garcia, Mayra Silva-Miranda, Fermin Jurado-Santa Cruz, Marivic F Balagon, Barbara Stryjewska, David M Scollard, Maria T Pena, Ramanuj Lahiri, Diana L Williams, Richard W Truman, Linda B Adams. Isolation of *Mycobacterium lepromatosis* and Development of Molecular Diagnostic Assays to Distinguish *M. leprae* and *M. lepromatosis*. *Clinical Infectious Diseases*, ciz1121, <https://doi.org/10.1093/cid/ciz1121>
5. Tengyu Ko, **Rahul Sharma** and Shisheng Li. Genome-wide screening identifies novel genes implicated in cellular sensitivity to BRAFV600E expression: *Oncogene* 2019.
6. Kathiresan Selvam, Baojin Ding, **Rahul Sharma** and Shisheng Li. Evidence that Moderate Eviction of Spt5 and Promotion of Error-Free Transcriptional Bypass by Rad26 Facilitates Transcription Coupled Nucleotide Excision Repair. *J Mol Biol* 2019; 431: 7; 1322-1338.
7. Christina Dai, Ahmed Ansari, Vilma Marks, **Rahul Sharma** and Jeffrey Greenwald. Molecular epidemiology of locally acquired Hansen's Disease in Florida. *J Am Acad Dermatol.* 2019 ;80(6):1789-1791.
8. Devendra S Chauhan, **Rahul Sharma**, Dipti Parashar, Ram Das, Pragya Sharma, Ajay V Singh, et al. Rapid detection of ethambutol-resistant Mycobacterium tuberculosis in clinical specimens by real-time polymerase chain reaction hybridisation probe method. *Indian J Med Microbiol* 2018; *Indian J Med Microbiol* :36(2):211-216.
9. Malcolm S. Duthie, Maria T. Pena, Gigi Ebenezer, Thomas P. Gillis, **Rahul Sharma**, Kelly Cunningham, Michael Polydefkis, and Richard W. Truman, and Steven G. Reed. LepVax, A

Defined Subunit Vaccine That Provides Effective Post-Exposure Prophylaxis In *M. leprae*-infected Armadillos. *npj Vaccines*: 3: 12 (2018).

10. **Rahul Sharma\***, Pushpendra Singh, Maria Pena, Ramesh Subramanian, Vladmir Chouljenko, Joohyun Kim, Nayong Kim, John Caskey and Richard W Truman. Differential growth of *Mycobacterium leprae* strains (SNP genotypes) in Armadillos. *Infect Genet Evol.* 2018; 14;62:20-26 . \*Corresponding author
11. **Rahul Sharma**. Bringing the Genomics Revolution to Develop Early Diagnosis for Leprosy, and Decoding the Transmission Dynamics. *The Leprosy Mission Research & Training Newsletter*. 2017: XIV.
12. Paul E. Bonnar, Natalie P. Cunningham, Andrea K. Boggild, Noreen M. Walsh, **Rahul Sharma** and Ian R.C. Davis. Hansen's disease in a nonimmigrant Canadian without travel outside of North America: *Emerging Infectious Diseases: Emerg Infect Dis.* 2018;24(1):165-166.
13. Brandon W Lewis, Razia Sultana, **Rahul Sharma**, Alexandra Noel, Ingeborg Langohr, Sonika Patial, Arthur L. Penn and Yogesh Saini. Early Postnatal Secondhand Smoke Exposure Disrupts Bacterial Clearance and Abolishes Immune Responses in Muco-Obstructive Lung Disease. *J Immunol.* 2017, 199 (3) 1170-1183
14. Devendra Singh Chauhan, **Rahul Sharma**, Deepti Parasharb, Pragma Sharma, Ram Dasc, Madhvi Chahar, Ajay Vir Singh, Pravin Kumar Singh, Kiran Katoch & Vishwa Mohan Katoch. Early detection of multidrug resistant (MDR) *Mycobacterium tuberculosis* in a single tube with in-house designed fluorescence resonance energy transfer (FRET) probes using real-time PCR. *Indian Journal of Experimental Biology*: 2016: 54: 229-236
15. **Rahul Sharma**, Pushpendra Singh, W. J. Loughry, J. Mitchell Lockhart, W. Barry Inman, Malcolm S. Duthie, Maria T. Pena, Luis A. Marcos, David M. Scollard, Stewart T. Cole, Richard W. Truman. Emerging zoonotic leprosy in the southern United States. *Emerging Infectious Diseases*: 2015: 21:12; 2127-2134.
16. Gayathriy Balamayooran, Maria Pena, **Rahul Sharma**, Richard W Truman. The armadillo as an animal model and reservoir host for *M. leprae*. *Clinics in Dermatology*: 2015: 33:1;108–115
17. Richard Truman, Gigi J. Ebenezer, Maria Pena, **Rahul Sharma**, Gayathriy Balamayooran, Thomas H. Gillingwater, David Scollard, Justin McArthur, Anura Rambukkana. The armadillo as a model for peripheral neuropathy in leprosy. *ILAR J.* 2014; 54(3): 304–314.
18. **Rahul Sharma**, Ramanuj Lahiri, David M Scollard, Maria Pena, Diana L Williams, Linda B Adams, John Figarola and Richard W Truman. The Armadillo: Animal Model for Neuropathy of Leprosy and other Neurodegenerative Diseases. *Dis Model and Mech* 2013;6(1);19-24.
19. Diana L. Williams, Timothy Hagino, **Rahul Sharma** and David M. Scollard. Primary Multidrug-Resistant Leprosy in the US. *Emerg Infec Dis* 2013: 19:1; 179-181



20. Linda B. Adams, Maria T. Pena, **Rahul Sharma**, Deanna A. Hagge, Erwin Schurr and Richard W. Truman. Insights from Animal Models on the Immunogenetics of Leprosy: *Memórias do Instituto Oswaldo Cruz*: 2012:107(1):197-208
21. Maria Pena, Annemieke Geluk, Jolien van der Ploeg, Kees Franken, **Rahul Sharma** and Richard Truman. Cytokine responses to *M. leprae* recombinant proteins differentiate between *M. leprae* infected and naïve armadillos. *Lepr Rev*: 2011 Dec;82(4):422-31
22. Richard W. Truman\*, Pushpendra Singh\*, **Rahul Sharma\***, Philippe Busso, Jacques Rougemont, Alberto Paniz-Mondolfi, Adamandia Kapopoulou, Sylvain Brisse, David M. Scollard, Thomas P. Gillis, and Stewart T. Cole. Probable Zoonotic Leprosy in the Southern United States. *New Eng J Med* 2011:364(17):32-39. \* **co-first authors**
23. Mallika Lavania, Kiran Katoch, **Rahul Sharma**, Pragya Sharma, Ram Das, Anuj Kumar Gupta, Devendra Singh Chauhan. Analysis of potential short tandem repeats for molecular typing of *Mycobacterium leprae* strains from Northern India: *Indian J Med Res* 201: 133:1 618-626
24. Manoj Kumar, Farrah G. Khan, Sandeep Sharma, Rajinder Kumar, Jaya Faujdar, **Rahul Sharma**, Devendra S. Chauhan, Rajinder Singh, Shyam K. Magotra, Inshad A. Khan. A identification of *Mycobacterium tuberculosis* genes preferentially expressed during human infection. *Microb Pathog* 2011: **50**: 31-38.
25. Anuj Kumar Gupta, VM Katoch, DS Chauhan, **Rahul Sharma**, M Singh, K Venkatesan and VD Sharma. Microarray analysis of efflux pump genes in multidrug resistant *M. tuberculosis* during stress induced by common anti-TB drugs. *Microbial Drug Resistance* 2010:**16(1)**:21-8.
26. DS Chauhan, M Chahar, **Rahul Sharma**, K Katoch and VM Katoch. Detection of mutations associated with isoniazid resistance in *M. tuberculosis* isolates by hybridization probe assay of real-time PCR. *Indian J Lepr* 2009: **81**: 215-217
27. **Rahul Sharma**, Mallika Lavania, DS Chauhan, Kiran Katoch, Amresh, Pramod, Rakhi, Richa and VM Katoch. A metabolic gene (*accA3*) of *M. leprae* as potential marker for leprosy reactions. *Indian J Lepr* 2009:81(3): 141-148.
28. Mallika Lavania, Kiran Katoch, Vishwa Mohan Katoch, Anuj Kumar Gupta, Devendra Singh Chauhan, **Rahul Sharma**, Rashi Gandhi, Varsha Chauhan, Gurpreet Bansal, Pawan Sachan, Shailendra Sachan, V.S. Yadav, Rupendra Jadhav (2008). Detection of viable *Mycobacterium leprae* in soil samples: Insights into possible sources of transmission of leprosy. *Infect Genet Evol.* 2008 **8(5)**:627-631
29. **Rahul Sharma**, M Lavania, K Katoch, DS Chauhan, AK Gupta, UD Gupta, VS Yadav and VM Katoch. Development and Evaluation of Real-Time RT-PCR Assay for Quantitative Estimation of Viable *Mycobacterium leprae* in Clinical Samples: *Indian J Lepr* 2008, **80**: 315-321.
30. Mallika Lavania, Kiran Katoch, HB Singh, Ram Das, Anuj Kumar Gupta, **Rahul Sharma**, DS Chauhan, VD Sharma, P Sachan, S Sachan and VM Katoch (2007). Predominance of three copies of tandem repeats in *rpoT* gene of *Mycobacterium leprae* from Northern India. *Infect Genet and Evol* – **7(5)**: 627-631.

31. V.M. Katoch, Mallika Lavania, DS Chauhan, **Rahul Sharma** and Hirawati (2007). Advances in molecular biology of leprosy. *Ind J Lepr* **79**: 151-166.
32. **Rahul Sharma** and VM Katoch. Designing of oligonucleotides: Probes and Primers for diseases diagnosis, epidemiology and research in medicine. *Journal of communicable Diseases* 2006: **38**: 305-316.

#### **BOOK CHAPTER:**

1. Maria T. Pena, **Rahul Sharma**, Richard W Truman. 18 September 2016, posting date. The armadillo model for leprosy. In Scollard DM, Gillis TP (ed), International textbook of leprosy. [www.internationaltextbookofleprosy.org](http://www.internationaltextbookofleprosy.org).
2. Linda B. Adams, Maria T. Pena, **Rahul Sharma**, Ramanuj Lahiri and Richard W. Truman, "Animal Models for Leprosy Research". In Many Hosts of Mycobacteria, CABI, ed C. R. Waters, M.M. Larsen, 2015: 491-511.
3. Linda B. Adams, Maria T. Pena, **Rahul Sharma**, Ramanuj Lahiri and Richard W. Truman. "Experimental leprosy: Contributions of animal models to leprosy research". In Leprosy: Indian Association of Leprologists, JAYPEE, ed B. Kumar and H.K. Kar, 2015: 186-204.