

Scientist Profile

Name	Dr. K.R. Uma Devi
Designation	Scientist ‘E’ & Head – Immunology
Date of Joining	5th July 2013
Discipline	Microbiology and Immunology
Address (off.) including Contact Number*	National Institute for Research in Tuberculosis No: 1, Mayor Sathyamoorthy Road, Chetpet, Chennai – 600 031 Phone No.: 044 2836 9620
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Personal statement:

I have a research background in tuberculosis genomics, TB diagnosis, immunology, and HIV-TB vaccine development.

Currently as Head, Dept. of Immunology and Lead for the Next Generation Sequencing Facility at NIRT, I am involved in sequencing of Indian clinical isolates and characterizing their phenotypic and genotypic correlation and developing a Database for the Indian clinical isolates of TB. Based on the data developed, I want to identify new drug targets for TB and detect novel mutation to improve the sensitivity of molecular diagnosis to TB. My interest also lies in research focused towards validating new diagnostic kits and developing new vaccine candidates for TB. I have extensive experience and knowledge on the vaccine design and transgene expression in mycobacterial vaccine candidates and testing in mice models and for their immunogenicity in terms of enhanced T cell response.

As the Head of the department of Bacteriology at National Institute for Research in Tuberculosis (NIRT) from July 2013 to March 2017, I had the experience of supervising and leading a high load sample receiving SNRL/NRL, TB laboratory, that involves smear preparation from pulmonary and extra pulmonary specimens, culture of bacterial isolates from the biological specimens for drug susceptibility testing by phenotypic and genotypic methods and I am also as a trained Biosafety level 3 personnel. I have been the site principal investigator on the evaluation of the use of GenXpert for diagnosis of paediatric TB cases (multicentric study) using both pulmonary and Extra pulmonary samples and the findings of the same have been approved and mentioned in the WHO ‘s guidelines for the ‘Best practices in Child and adolescent tuberculosis care’– WHO 2018 Apart from this, I have several publications from each of the project handled and have shown productive research in the TB research. . I have been recognized as a Supervisor and Guide for PhD studies from University of Madras and have trained, supervised graduate students, rotation students and extremely knowledgeable about good laboratory practice.

Educational Qualifications (*begin with descending order*):

Degree	Institution	Field	Year
B.Sc.	Queen Mary's College, Chennai	Botany	1991
M.Sc.,	Dr ALM PGIBMS, Madras University, Chennai	Bio Medical Genetics	1993
Ph.D.	Tuberculosis Research Centre	Bio Medical Science	2002

Research/Training Experience:

Duration	Institution	Designation
24 March 2017 – till date	National Institute for Research in Tuberculosis (ICMR), Chennai, India.	Scientist E & Head, Dept, of Immunology
July 2013 – 23 March 2017	National Institute for Research in Tuberculosis (ICMR), Chennai, India.	Scientist D & Head, Dept. of Bacteriology
July 2010- May 2013	Dept. of Paediatrics (Infectious Disease), Albert Einstein College of Medicine, New York, USA.	Assistant Professor
July 2008 - July 2010	Department of Paediatrics (Infectious Disease), Albert Einstein College of Medicine, New York, USA	Instructor
Oct 2003 - July 2008	Department of Microbiology and Immunology, Albert Einstein College of Medicine, New York, USA.	Research Associate
July 2002 -July 2003	Service de Microbiology, Hospital Saint, Louis, University Paris VII, Paris, France.	Post Doctoral Fellow

Awards

- 2017: Australia Awards Fellowship, University of Sydney, Australia – DFAT Grant Agreement No. 73742.
- 2011: RO3 fellowship 1R03AI097040-01, NIAD-NIH, USA.
- 2009: Keystone Symposia scholar for Prevention of HIV/AIDS.
- 2008: Senior key personnel, NIH-1R01DE019064-01
- 2002: French Government postdoctoral Scholarship (Paris VII University Postdoctoral Fellowship Number 006)
- 1999: ICMR Senior Research Fellowship from Government of India.
- 1995: DBT Fellowship for INDO-US Vaccine Action Program
- 1991: FIRST RANK in B.Sc.

COMPLETED / ONGOING RESEARCH PROJECTS:

Sl. No.	Project Title	Duration	Role as	Funding Agencies	Funding amount	Project status
	Completed:					
1.	Cambridge-Chennai Centre Partnership on Antimicrobial Resistance in Tuberculosis: Focus on Novel Diagnostics and Therapeutics.	3 Years (Dec 2015)	Co – PI	DBT	787.44 lakhs (INR)	Completed
2	Early Bactericidal activity for Tuberculosis during a short monotherapy	3 years (2016)	PI	CDC Atlanta	\$80,000	Completed
3	Impact of HIV and Diabetes Mellitus on TB Drug Resistance and Recurrence	3 years (2016)	Site-PI	CRDF	\$14,752	Completed
	Ongoing:					
1.	Protecting and improving public health globally: Building laboratory, surveillance and workforce capacity to detect, respond to, and prevent drug resistant tuberculosis in India.	5 Years (Sep 2015)	PI	CDC Atlanta	2 580,000 USD	Ongoing
2	Identification of the latent tuberculosis specific marker by the immunoproteomic analysis of the cell wall and membrane proteins of M.tuberculosis	3 years (2018)	PI	DST-SERB	Rs.23,00000/-	Ongoing
3	Accurate, Rapid, Robust and Economical diagnosis technologies for tuberculosis : ARREST TB	3 years (2019-2021)	Co-PI	DBT (NIRT) & European Union (UK)	Rs.396.19Lakhs	Ongoing

4. List of Publications:

1. Sampath P, Periyasamy K, **Ranganathan UD** and Bethunaickan R. Monocyte miRNA: Potent biomarker and target for host directed therapy for tuberculosis. *Frontiers in Immunology*. May. 2021 (Article in press). (IF:5.08)
2. Sivakumar S, Chandramohan Y, Kathamuthu GR, Sekar G, Kandhasamy D, Padmanaban V, Hissar S, Tripathy SP, **Bethunaickan R**, Dhanaraj B, Babu S, **Ranganathan UD**. The recent trend in Mycobacterial strain diversity among extra pulmonary lymph node tuberculosis and their association with drug resistance and the host immunological response in South India. *BMC Infectious Diseases*. 2020. Nov 26; 20(1):894. PMID: 33243148. (IF-2.96).
3. Periyasamy KM, **Ranganathan UD**, Tripathy SP, Bethunaickan R. Vitamin D - A host directed autophagy mediated therapy for tuberculosis. *Mol Immunol*. 2020 Nov; 127:238-244. doi: 10.1016/j.molimm.2020.08.007. Epub 2020 Oct 9. PMID: 33039674
4. Siva Kumar S, Ashok Kumar S, Sekar G, Devika K, Bhasker M, Sriram S, Dolla CK, Menon PA, Tripathy SP, Narayanan PR, **Ranganathan UD**, Narayanan S, Mondal R. Spoligotype Diversity of Mycobacterium tuberculosis over Two Decades from Tiruvallur, South India. *Int J Microbiol*. 2020 Oct 14;2020:8841512. doi: 10.1155/2020/8841512. eCollection 2020. PMID: 33110429.
5. Murhekar MV, Bhatnagar T, Selvaraju S, Rade K, Saravanakumar V, Vivian Thangaraj JW, Kumar MS, Shah N, Sabarinathan R, Turuk A, Anand PK, Asthana S, Balachandar R, Bangar SD, Bansal AK, Bhat J, Chakraborty D, Rangaraju C, Chopra V, Das D, Deb AK, Devi KR, Dwivedi GR, Salim Khan SM, Haq I, Kumar MS, Laxmaiah A, Madhuka, Mahapatra A, Mitra A, Nirmala AR, Pagdhune A, Qurieshi MA, Ramarao T, Sahay S, Sharma YK, Shrinivasa MB, Shukla VK, Singh PK, Viramgami A, Wilson VC, Yadav R, Girish Kumar CP, Luke HE, **Ranganathan UD**, Babu S, Sekar K, Yadav PD, Sapkal GN, Das A, Das P, Dutta S, Hemalatha R, Kumar A, Narain K, Narasimhaiah S, Panda S, Pati S, Patil S, Sarkar K, Singh S, Kant R, Tripathy S, Toteja GS, Babu GR, Kant S, Muliyl JP, Pandey RM, Sarkar S, Singh SK, Zodpey S, Gangakhedkar RR, S Reddy DC, Bhargava B. Prevalence of SARS-CoV-2 infection in India: Findings from the national serosurvey, May-June 2020. *Indian J Med Res*. 2020 Jul & Aug;152(1 & 2):48-60. doi: 10.4103/ijmr.IJMR_3290_20. PMID: 32952144.
6. Kalra A, Parija D, Raizada N, Sachdeva KS, Raghuram Rao, Swaminathan S, Khanna A, Chopra KK, M. Hanif M, Varinder Singh, **Umadevi KR**, Sheladia KN, Rama Rao, Vasundhara N, Anil S, Nirmala AR, Azeem A, Chhajlani V, Khurana J, Das NJ, Bandana Choudhury, Nair SA, Shalini Mall, Rajashree Sen, Chadha SS, Denkinger CM, Boehme C, Sarin S. Upfront Xpert MTB/RIF or diagnosis of pediatric TB — Does it work? Experience from India. *PLoS One*, 2020;15(8):e0236057 Anamika G, Pallavi S, Sunita R, Sivakumar S, **Uma Devi KR**, Shampa A, Vijay N. Genotype analysis of ofloxacin-resistant multidrug-resistant *Mycobacterium tuberculosis* isolates in a multicentered study from India. *Indian Journal of Medical Research*, 2020;151:361-370.
7. Banurekha V, Jawahar MS, Nair D, Pooranagangadevi N, Ponnuraja C, Chandrasekaran K, Gomathi NS, Mahesh Kumar M, Kumaran PP, Ramesh Kumar S, Baskaran D, Devaleenal DB, Devarajulu RS, Vasantha M, Paramasivan P, Ramachandran G, **Uma Devi KR**, Hannah LE, Sekar G, Radhakrishnan A, Kalaiselvi D, Dhanalakshmi A, Thiruvalluvan E, Raja Sakthivel M, Mahilmaran A, Sridhar R, Lavanya J, Prabhakaran R, Angamuthu P, Ponnusamy KS, Venkatesan P, Natrajan M, Tripathy SP, Swaminathan S. 4-month moxifloxacin containing regimens in the treatment of patients with sputum positive pulmonary tuberculosis in south India - a randomized clinical trial. *Tropical Medicine and International Health*, 2020;25(4):483-495.

8. Yuvaraj C, Venkatesan P, Ramalingam B, Tripathy SP, Swaminathan S, **Uma Devi R**. *In vitro* interaction profiles of the new antitubercular drugs bedaquiline and delamanid with moxifloxacin against clinical *Mycobacterium tuberculosis* isolates. *Journal of Global Antimicrobial Resistance*, 2019;19:348-353.
9. Munir A, Kumar N, Ramalingam SB, Tamilzhalagan S, Shanmugam SK, Palaniappan AN, Nair D, Padmapriyadarshini C, Natarajan M, Tripathy S, **Ranganathan UD**, Peacock SJ, Parkhill J, Blundell TL, Malhotra S. Identification and characterization of genetic determinants of isoniazid and rifampicin resistance in *Mycobacterium tuberculosis* in southern India. *Scientific Reports*, 2019;9(1):10283:1-13.
10. Adams KN, Verma AK, Gopaldaswamy R, Adikesavalu H, Singhal DK, Tripathy S, **Ranganathan UD**, Sherman DR, Urdahl KB, Ramakrishnan L, Hernandez RE. Diverse clinical isolates of *Mycobacterium tuberculosis* develop macrophage-induced rifampin tolerance. *Journal of Infectious Diseases*, 2019;219(10):1554-1558.
11. Sivakumar S, Narender K, Dina N, Mohan N, Tripathy SP, Peacock SJ, Swaminathan S, **Uma Devi R**. Genome sequencing of polydrug-, multidrug-, and extensively drug-resistant *Mycobacterium tuberculosis* strains from south India. *Microbiology Research Announcements*, 2019;8(12).
12. Soundarya JSV, **Uma Devi KR**, Tripathy SP. Current trends in tuberculosis vaccine. *Medical Journal Armed Forces India*, 2019;75:18-24.
13. Pavithra S, Kadar M, **Uma Devi R**, Ramalingam B. Monocyte subsets: Phenotypes and Function in tuberculosis infection. *Frontiers in Immunology*. 2018;9:1726-1-8.
14. Raizada N, Khaparde SD, Rao R, Kalra A, Sarin S, Salhotra VS, Swaminathan S, Khanna A, Chopra KK, Hanif M, Singh V, **Umadevi KR**, Nair SA, Huddart S, Tripathi R, Surya Prakash CH, Saha BK, Denkinger CM, Boehme C. Upfront Xpert MTB/RIF testing on various specimen types for presumptive infant TB cases for early and appropriate treatment initiation. *PLoS One*, 2018;13(8):e0202085.
15. Radhakrishnan R, Prabuseenivasan S, Balaji S, Sangamithirai D, Nagarajan P, Ponnuraja C, **Uma Devi KR**, Kumar V, Selvakumar N. Assessment of Training on Culture and Drug Sensitivity Testing of *Mycobacterium tuberculosis* at a National Reference Laboratory. *Mycobacterial Diseases*.2018;2018;8(3):1-4.
16. Kumarasingam K, Vincent M, Shivshankar R. Mane SR, Shunmugam R, Sivakumar S, **Uma Devi KR**. Enhancing Antimycobacterial Activity of Isoniazid and Rifampicin Incorporated Norbornene Nanoparticles. *Int J Mycobacteriol*.2018;7(1):84-88.
17. Raizada N, Khaparde SD, Swaminathan S, Sarin S, Salhotra VS, Kalra A, Khanna A, Chopra KK, Hanif M, **Uma Devi KR**, Hissar S, Nair SA, Surya Prakash CH, Saha BK, Rao R, Denkinger C, Boehme C. Catalysing progressive uptake of newer diagnostics by health care providers through outreach and education in four major cities of India. *PLoS One*.2018;13(3):e0193341.
18. Raizada N, Khaparde SD, Salhotra VS, Rao R, Kalra A, Swaminathan S, Khanna A, Chopra AK, Hanif M, Singh V, **Uma Devi KR**, Nair SA, Huddart S, Surya Prakash CH, Mall S, Singh P, Saha BK, Denkinger CM, Boehme C, Sarin S. Accelerating access to quality TB care for pediatric TB cases through better diagnostic strategy in four major cities of India. *PLoS One*.2018;13(2):e0193194.
19. Miotto P, Tessema B, Tagliani E, Chindelevitch L, Starks AM, Emerson C, Hanna D, Kim PS, Liwski R, Zignol M, Gilpin C, Niemann S, Denkinger CM, Fleming J, Warren RM, Crook D, Posey J, Gagneux S, Hoffner S, Rodrigues C, Comas I, Engelthaler DM, Murray M, Alland D, Rigouts L, Lange C, Dheda K, Hasan R, **Uma Devi KR**, McNerney R, Ezewudo M, Cirillo DM, Schito M, Köser CU, Rodwell TC. A standardised method for interpreting the association between mutations and phenotypic drug resistance in *Mycobacterium tuberculosis*. *Eur Respir J*.2017;50(6):1701354.

20. Nakatani Y, Opel-Reading HK, Merker M, Machado D, Andres S, Kumar SS, Moradigaravand D, Coll F, Perdigão J, Portugal I, Schön T, Nair D, **Uma Devi KR**, Kohl TA, Beckert P, Clark TG, Maphalala G, Khumalo D, Diel R, Klaos K, Aung HL, Cook GM, Parkhill J, Peacock SJ, Swaminathan S, Viveiros M, Niemann S, Krause KL, Köser CU. Role of Alanine Racemase mutations in *Mycobacterium tuberculosis* D-cycloserine resistance. *Antimicrob Agents Chemother*.2017;61(12).
21. Gupta A, Pal SK, Pandey D, Fakir NA, Rathod S, Sinha D, Siva Kumar S, Sinha P, Periera M, Balgam S, Sekar G, Uma Devi KR, Anupurba S, Nema V. PknB remains an essential and a conserved target for drug development in susceptible and MDR strains of *M. Tuberculosis*. *Ann Clin Microbiol Antimicrob*.2017;16(1):56.
22. Suzana S , Sivakumar S, **Uma Devi KR**, Swarnalatha PN, Michael JS. Spoligotyping of *Mycobacterium tuberculosis* isolates at a tertiary care hospital in India. *Trop Med Int Health*.2017;22(6):703-707.
23. Shainaba SA, Sameer H, Hanna LE, **Uma Devi R**, Vanaja K. Homology modeling, substrate docking, and molecular simulation studies of mycobacteriophage Che12 lysin A. *J Mol Model*.2016;22(8):180.
24. Raizada N, Sachdeva KS, Swaminathan S, Kulsange S, Khaparde SD, Nair SA, Khanna A, Chopra KK, Hanif M, Sethi GR, **Umadevi KR**, Keshav Chander G, Saha B, Shah A, Parmar M, Ghediya M, Jaju J, Boehme C, Paramasivan CN. Piloting Upfront Xpert MTB/RIF Testing on Various Specimens under Programmatic Conditions for Diagnosis of TB & DR-TB in Paediatric Population. *PLoS One*.2015;10(10):e0140375.
25. Narender M, Jaswanth SB, Umasankar K, Malathi J, Raghuram Reddy A, **Umadevi KR**, Azger D, Venkat Rao K, Raghuram RA. Synthesis, *in vitro* antimycobacterial evaluation and docking studies of some new 5,6,7,8-tetrahydropyrido[4',3':4,5] thieno[2,3-d]pyrimidin-4(3H)-one schiff bases. *Bioorg Med Chem Lett*.2016;26(3):836-840. PMID: 26755393.
26. Balaji S, **Uma Devi KR**, Laboratory Investigation for the Detection of Tuberculosis from Clinical Specimens. *Indian J Practical Pediatr*.2014;16(4):337-344.
27. Jensen K, Pena MD, Wilson R, **Uma Devi KR**, Jacobs WR Jr, Fennelly G, Larsen MH, Rompay V, Kozlowski P and Abel K. A neonatal oral Mycobacterium tuberculosis-SIV prime / intramuscular MVA-SIV boost combination vaccine induces both SIV and Mtb-specific immune responses in infant macaques. *Trials in Vaccinology*.2013;2:53-63. PMID: 24454591
28. **Umadevi KR**, Larsen M, Abel K, Jacobs Jr WR, Fennelly G. Recombinant attenuated *M. tuberculosis*-SIVgag (rAMtb-gag) vaccination primes for SIV-specific CD8 T cell response that are boosted by Ad5-SIVgag in mice. *Retrovirology* 2012;9 (2):P263.
29. Jensen K, **Uma Devi KR**, Van Rompay KK, Canfield DR, Khan I, Ravindran R, Luciw PA, Jacobs WR Jr, Fennelly G, Larsen MH, Abel K. A recombinant attenuated Mycobacterium tuberculosis vaccine strain is safe in immunosuppressed simian immunodeficiency virus-infected infant macaques. *Clin Vaccine Immunol*.2012;19 (8):1170-81.PMID: 22695156.
30. **Ranganathan, U. D.** and Raja, A. (2013). Purification of Antigen 85 Complex of Mycobacterium tuberculosis. *Bio-protocol* 3(3): e324. DOI: 10.21769/BioProtoc.324.
31. **Ranganathan, U. D.** (2012). Purification of 38kDa Antigen of Mycobacterium tuberculosis by Two Dimensional Preparative Electrophoresis. *Bio-protocol* 2(24): e312. DOI: 10.21769/BioProtoc.312.
32. **Ranganathan, U. D.**, Bethunaickan, R. and Raja, A. (2012). Isolation of Circulating Immune Complexes from TB Patient Serum for Serodiagnosis. *Bio-protocol* 2(11): e188. DOI: 10.21769/BioProtoc.188.

33. Larsen MH, Jacobs WR, Porcelli SA, Kim J, **Uma Devi R**, Fennelly GJ. Balancing safety and immunogenicity in live-attenuated mycobacterial vaccines for use in humans at risk for HIV: response to misleading comments in Rangathan et al., “recombinant pro-apoptotic *Mycobacterium tuberculosis* generates CD8+ T cell responses against human immunodeficiency virus type 1 ENV and M. tuberculosis in neonatal mice”. *Vaccine*. 2010;28(21):3633-3634.PMID:20347058.
34. **Uma Devi R**, Larsen MH, Kim J, Porcelli SA, Jacobs WR Jr, Fennelly GJ. Recombinant pro-apoptotic *Mycobacterium tuberculosis* generates CD8+ T cell responses against human immunodeficiency virus type 1 Env and M. tuberculosis in neonatal mice. *Vaccine*. 2009;28(1):152-61.PMID: 19808028
35. Raja A, **Uma Devi R**, Bethunaickan R. Improved diagnosis of pulmonary tuberculosis by detection of antibodies against multiple *Mycobacterium tuberculosis* antigens. *Diagn Microbiol Infect Dis*. 2008;60(4):361-368. . PMID:18206332
36. Mo Y, Quanquin NM, Vecino WH, **Uma Devi R**, Tesfa L, Bourn W, Derbyshire KM, Letvin NL, Jacobs WR Jr, Fennelly GJ. Genetic Alteration of *Mycobacterium smegmatis* to Improve Mycobacterial Bactofection and DNA Immunization. *Infect Immun*. 2007;75(10):4804-16. PMID:17664267
37. Raja A, **Uma Devi KR**, Ramalingam B. Clinical value of specific detection of immune complex-bound antibodies in pulmonary tuberculosis. *Diagn Microbiol Infect Dis*.2006; 56(3):281-287. PMID:16876372
38. Raja A, **Uma Devi KR**, Ramalingam B, Brennan PJ. Improved diagnosis of pulmonary tuberculosis by detection of free and immune complex bound anti – 30kDa antibodies. *Diagn Microbiol Infect Dis*.2004;50(4):253-259. PMID:15582298.
39. Selvaraj P, Raja A, Kurian SM, **Uma Devi KR**, Narayanan PR. HLADR phenotypes and IgG, IgA and IgM antibody responses to *Mycobacterium tuberculosis* culture filtrate and 30 kDa antigens in pulmonary tuberculosis. *Curr Sci*.2004;87(6):771-775.
40. **Uma Devi KR**, Ramalingam B, Raja A. Antibody response to Mycobacterium tuberculosis 30 and 16kDa antigens in pulmonary tuberculosis with human immunodeficiency virus coinfection. *Diagn. Microbiol Infect Dis*.2003;46(3):205- 209.PMID:12867096.
41. Ramalingam B, **Uma Devi KR**, Raja A. Isotype-specific anti-38 and 27 kDa (mpt 51) response in pulmonary tuberculosis with human immunodeficiency virus coinfection. *Scand J Infect Dis*.2003;35(4):234-239.PMID: 12839150.
42. Mahadevan R, Porkodi R, Rajendran CP, Chandrasekeran AN, **Uma Devi, KR**, Raja A. IgM, IgG, and IgA, response to enterobacteria in ankylosing spondylitis patients of south India. *Ann N Y Acad Sci*.2002;958:408-411.
43. K.S. Senthil Kumar, **K.R. Uma Devi**, Raja A. Isolation and evaluation of diagnostic value of two major secreted proteins of *Mycobacterium tuberculosis*. *Indian J Chest Dis Allied Sci*.2002;44:5-12. PMID:12437234.
44. **Uma Devi KR.**, Ramalingam B, Raja A. Qualitative and quantitative analysis of antibody response in childhood tuberculosis against antigens of *Mycobacterium tuberculosis*. *Indian J Med Microbiol*.2002;20(3):145-149.PMID: 11874868.
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50. Senthil kumar KS, Raja A, **Uma Devi KR**, Pranjape R. Production & characterization of monoclonal antibodies to *Mycobacterium tuberculosis*. ***Indian J Med Res***.2000:12: 37-46. PMID:11037676.