Dr. Deepti Parashar, Scientist F

Date of Birth: 1976-11-20

Date of Joining ICMR: 14th Nov, 2006

Date of Joining Present Post: 1st Sep, 2023

Address (off): ICMR-National Institute of Virology
20-A, Dr. Ambedkar Road P.B. No.11, Pune - 411001.

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Educational Qualifications:

- Ph.D, Microbiology, National JALMA Institute for Leprosy and Other Mycobacterial Diseases, Agra (2004).

Research Experience:

- Total 26 years ICMR-National JALMA Institute of Leprosy & Other Mycobacterial Diseases, Agra (from 1998-2006); ICMR-National Institute of Virology, Pune (from 2006-till date).

Awards / Fellowship:

- Endeavour Executive Fellowship, Nano Biotechnology Research Laboratory, Centre for Advanced Materials and Industrial Chemistry, RMIT University, Melbourne, Australia (13th March – 13th July 2016).
- ICMR-International Fellowship, Uniformed Services University of the Health Sciences, F. Edward Hébert School of Medicine, Bethesda, MD (1stApril 2011 – 1st Oct 2011).

1. **Academic career and professional attainments:**

(a)

Degree	Institution	Year	including PhD supervisor name and affiliation
Ph. D	Dr. B.R. Ambedkar University, Agra	2004	Dr. V.M. Katoch, Director, ICMR-National JALMA Institute for Leprosy & Other Mycobacterial Diseases, Agra
M.Sc.	Dr. B.R. Ambedkar University, Agra	1998	-
B.Sc.	Deemed University Agra	1996	-

(b)

Positions held	Institution	From (year)	To (year)	including PDF supervisor names and affiliations
Scientist F	ICMR-National Institute of Virology, Pune	Sep 2023	Till date	-
Scientist E	ICMR-National Institute of Virology, Pune	Sep 2018	Aug 2023	-
Scientist D	ICMR-National Institute of Virology, Pune	Sep 2014	Aug 2014	-
Scientist C	ICMR-National Institute of Virology, Pune	Sep 2010	Aug 2014	-
Scientist B	ICMR-National Institute of Virology, Pune	Nov 2006	Aug 2010	-
Research Associate	Microbiology & Molecular Biology Group, ICMR-National JALMA Institute for Leprosy &Other Mycobacterial Diseases, Agra	2005	2006	Dr. V.M. Katoch, Director, ICMR-National JALMA Institute for Leprosy & Other Mycobacterial Diseases, Agra
Senior Research Fellow	Microbiology & Molecular Biology Group, ICMR-National JALMA Institute for Leprosy &Other Mycobacterial Diseases, Agra	2003	2005	Dr. V.M. Katoch, Director, ICMR-National JALMA Institute for Leprosy & Other Mycobacterial Diseases, Agra

Patent granted:

1. "Primers and method for identification of pathogenic mycobacteria", Indian Patent (No. 242073, Grant date: 09th Aug 2010).
2. "RNAi agent for inhibition of Chikungunya virus"
    - United States Patent (No. US 9574195, Grant date: 21st Feb 2017).
    - Chinese Patent (No. ZL201480037556.6, Grant date: 22nd Oct 2019).
    - European Patent (No. EP 3017046, Grant date: 11th Sep 2019).
    - Australian patent (No. 2014285701, Grant date: 15th July 2021).
    - Indian patent (No. 371495, Grant date: 08th July 2021).

Publications: Total- 80

List of Publications from ICMR-NIV, Pune (2006 onwards):

1. Davuluri K, Shukla S, Kakade M, Cherian S, Alagarasu K, Parashar D*. Explorations on the antiviral potential of Zinc and Magnesium salts against chikungunya virus: Implications for therapeutics. Front. Cell. Infect. Microbiol., 04 June 2024; 14
2. Shukla S, Kakade M, Cherian S, Alagarasu K, **Parashar D***. Arctigenin from *Arctium lappa* L. inhibits chikungunya virus by affecting its entry and replication, Phytomedicine (2024), doi:https://doi.org/10.1016/j.phymed.2024.155491
3. Davuluri KS, Ghanghav R, Ahire G, Kakade M, Cherian S, Alagarasu K, **Parashar D***. Repurposed drugs in combinations exert additive anti-chikungunya virus activity: an in-vitro study. Virol J. 2024;21(1):5.
4. Alagarasu K, Patil J, Jadhav S, Chowdhury D, Bote M, Punekar M, More A, Kakade M, Bachal R, Gurav Y, Cherian S, **Parashar D***. Understanding the resurgence of chikungunya virus during 2020-2021 in Pune, India, based on genomic analyses: A seven year study. J Med Virol. 2023 Nov;95(11):e29253.
5. Alagarasu K, Tomar S, Patil J, Bachal R, More R, Bote M, Kakade M, Venkatesh V, **Parashar D*,** Tandale BV* Seroprevalence of Dengue Virus Infection in Pune City in India, 2019: A Decadal change. J Infect Public Health. Available online 28 August 2023.
6. Darole RS, Bagad PK, Gonnade RG, Alagarasu K, Punekar M, Shukla S, **Parashar D***, Senthilkumar B. Synthesis of novel rhodamine type Anthrone Spiro-lactam (ASL) analogues and evaluation of antiviral activity against dengue and chikungunya viruses. Eur J Med Chem. 2023 Sep 29;261:115849.
7. Shukla S, Jadhav SM, Gurav YK, **Parashar D*,** Alagarasu K. Serum ferritin level as a prognostic biomarker for predicting dengue disease severity: A systematic review and meta-analysis [published online ahead of print, 2023 Jun 22]. Rev Med Virol. 2023;e2468.
8. Panda K, **Parashar D*,** Viswanathan R. An Update on Current Antiviral Strategies to Combat Human Cytomegalovirus Infection. Viruses. 2023; 15(6):1358.
9. Kasabe B, Ahire G, Patil P, Punekar M, Davuluri KS, Kakade M, Alagarasu K, **Parashar D*** and Cherian S (2023) Drug repurposing approach against chikungunya virus: an in vitro and in silico study. Front. Cell. Infect. Microbiol. 13:1132538.
10. Joshi, R.K.; Agarwal, S.; Patil, P.; Alagarasu, K.; Panda, K.; Cherian, S.; **Parashar, D**.; Roy, S. Anti-Dengue Activity of Lipophilic Fraction of Ocimum basilicum L. Stem. Molecules 2023, 28, 1446.
11. Alagarasu K, Punekar M, Patil P, Kasabe B, Kakade M, Davuluri KS, Cherian S, **Parashar D*.** Effect of carpaine, a major alkaloid from Carica papaya leaves, on dengue

virus-2 infection and replication-an in-vitro and in-silico study. Phytother Res. 2023 Jan 1. doi: 10.1002/ptr.7715.
12. Joshi RK, Agarwal S, Patil P, Alagarasu K, Panda K, Parashar C, Kakade M, Sai DK, Cherian S, **Parashar D***, Pandey KC, Roy S. Effect of Sauropus androgynus L. Merr. on dengue virus-2: An in vitro and in silico study. J Ethnopharmacol . 2022; 1106044.
13. N Shrivastava, K Alagarasu, S Cherian*, **Parashar D***. Antiviral and platelet-protective properties of Carica papaya in dengue: a brief survey. Indian J Med Res September 2022 156(3):459-463.
14. Tagore R, Alagarasu K, Patil P, Pyreddy S, Polash SA, Kakade M, Shukla R, **Parashar D***. Targeted *in vitro* gene silencing of E2 and nsP1 genes of chikungunya virus by biocompatible zeolitic imidazolate framework. Front. Bioeng. Biotechnol. 10:1003448.
15. Patil P, Alagarasu K, Chowdhury D, Kakade M, Cherian S, Kaushik S, Yadav JP, Kaushik S, **Parashar D***. *In-vitro* antiviral activity of **Carica papaya** formulations against dengue virus type 2 and chikungunya viruses. Heliyon. 2022;8: e11879.
16. Punekar M, Kasabe B, Patil P, Kakade M, **Parashar D**, Alagarasu K, Cherian S. transcriptomics-based bioinformatics approach for identifi-cation and in-vitro screening of FDA-approved drugs for re-purposing against dengue virus-2. Viruses. 2022; 14, 2150.
17. Thomas N, Patil P, Sharma A, Kumar S, Singh VK, Alagarasu K, **Parashar D** and Tapryal S. Studies on the antiviral activity of chebulinic acid against dengue and chikungunya viruses and in silico investigation of its mechanism of inhibition. Sci Rep 12, 10397 (2022).
18. Tomar SJ, Alagarasu K, More A, Nadkarni M, Bachal R, Bote M, Patil J, Venkatesh V, **Parashar D*,** Tandale BV. Decadal Change in Seroprevalence of Chikungunya Virus Infection in Pune City, India. Viruses. 2022 May 7;14(5):998.
19. Alagarasu K, Patil P, Kaushik M, Chowdhury D, Joshi RK, Hegde HV, Kakade MB, Hoti SL, Cherian S, **Parashar D***. In Vitro Antiviral Activity of Potential Medicinal Plant Extracts Against Dengue and Chikungunya Viruses. Front Cell Infect Microbiol. 2022 Apr 7;12:866452.
20. Gurav YK, Alagarasu K, Yadav PD, Sapkal G, Gokhale M, **Parashar D**, Jadhav U, Bote M, Kakade M, Nyayanit D, Kumar A, Deshpande GR, Cherian S, Awate PS, Abraham P. First case of Zika virus infection during an outbreak of chikungunya in a rural region of Maharashtra state, India. Trans R Soc Trop Med Hyg. 2022 Apr 12:022.
21. Jeengar MK, Kurakula M, Patil P, More A, Sistla R, **Parashar D***. Effect of Cationic Lipid Nanoparticle Loaded siRNA with Stearylamine against Chikungunya Virus. Molecules. 2022 Feb 9;27(4):1170.
22. Panda K, Alagarasu K, Patil P, Agrawal M, More A, Kumar NV, Mainkar PS, **Parashar D*,** Cherian S. In Vitro Antiviral Activity of α-Mangostin against Dengue Virus Serotype-2 (DENV-2). Molecules. 2021 May 19;26(10):3016.
23. Patil P, Agrawal M, Almelkar S, Jeengar MK, More A, Alagarasu K, Kumar NV, Mainkar PS, **Parashar D***, Cherian S. In vitro and in vivo studies reveal α-Mangostin, a xanthonoid from Garcinia mangostana, as a promising natural antiviral compound against chikungunya virus. Virol J. 2021 Feb 28;18(1):47.
24. Panda K, Alagarasu K, **Parashar D**. Oligonucleotide-Based Approaches to Inhibit Dengue Virus Replication. Molecules. 2021 Feb 11;26(4):956.
25. Jeengar MK, Kurakula M, Patil P, More A, Sistla R, **Parashar D***. Antiviral activity of stearylamine against chikungunya virus. Chem Phys Lipids. 2021 Mar;235:105049.

26. Panda K, Alagarasu K, Cherian SS, **Parashar D***. Prediction of potential small interfering RNA molecules for silencing of the spike gene of SARS-CoV-2. Indian J Med Res. 2021 Jan & Feb;153(1 & 2):182-189.
27. Alagarasu K, Patil JA, Kakade MB, More AM, Yogesh B, Newase P, Jadhav SM, **Parashar D**, Kaur H, Gupta N, Vijay N, Narayan J, Shah PS; VRDL Team. Serotype and genotype diversity of dengue viruses circulating in India: a multi-centre retrospective study involving the Virus Research Diagnostic Laboratory Network in 2018. Int J Infect Dis. 2021 Oct;111:242-252.
28. Alagarasu K, Kakade MB, Bachal RV, Bote M, **Parashar D**, Shah PS. Use of whole blood over plasma enhances the detection of dengue virus RNA: possible utility in dengue vaccine trials. Arch Virol. 2021 Feb;166(2):587-591.
29. Kumar S, Singh VK, Vasam M, Patil P, Dhaked RK, Lohia NK, Ansaric AS, **Parashar D**, Tapryal S. An in vitro refolding method to produce oligomers of anti-CHIKV, E2-IgM Fc fusion subunit vaccine candidates expressed in E. coli. J Immunol Methods. Available online 21 September 2020, 112869.
30. Kakade MB, Shrivastava N, Patil JA, **Parashar D**, Shah PS, ·Alagarasu K. Clinical evaluation of an in-house-developed real-time RT-PCR assay for serotyping of dengue virus. Arch Virol 2020; https://doi.org/10.1007/s00705-020-04725-0.
31. Newase P, More A, Patil J, Patil P, Jadhav S, Alagarasu K, Shah P, **Parashar D***, Cherian S. Chikungunya phylogeography reveals persistent global transmissions of the Indian Ocean Lineage from India in association with mutational fitness. Inf Gen Evol 2020; 82: 1042892
32. **Parashar D**, Rajendran V, Ramakrishna S, Shukla R. Lipid-based nanocarriers for delivery of small interfering RNA for therapeutic use. Eur J Pharm Sci 2020; 142:105159.
33. Sudeep AB, Vyas PB, **Parashar D** and Shil P. Differential susceptibility and replication potential of certain cell lines and one mosquito species to three lineages of chikungunya virus. Indian J Med Res. 2019; 149: 771-7.
34. Alagarasu K, Patil JA, Kakade, More AM, Bote M, Chowdhury D, Seervi M, Rajesh NT, Ashok M, Anukumar B, Abrahame AM, **Parashar D**, Shah PS. Spatio-temporal distribution analysis of circulating genotypes of dengue virus type 1 in western and southern states of India by a one-step real-time RT-PCR assay Inf Gen Evol. 2019; 75: 103989.
35. Alagarasu K, Jadhav SM, Bachal RV, Bote M, Kakade MB, Ashwini M, Singh A **Parashar D**. Scenario of dengue and chikungunya in Pune district, Maharashtra during 2016: A retrospective study based on data from samples referred to an Apex referral laboratory. Dengue Bulletin 2018; 40:33-43.
36. Abraham PR, **Parashar D**, Kasetty S, Sharma VD, Shivannavar CT. Characterization of nontuberculous mycobacteria isolated from environmental samples in Kalaburagi district of South India. JSM Mirobiol 2018; 6: 1051.
37. Patil JA, Alagarasu K, Kakade MB, More AM, Gadekar KA, Jadhav SM, **Parashar D**, Shah PS. Emergence of dengue virus type 1 and type 3 as dominant serotypes during 2017 in Pune and Nashik regions of Maharashtra, Western India. Inf Gen Evol 2018; 66: 272-83.
38. Chauhan DS, Sharma R, **Parashar D**, Das R, Sharma P, Singh AV, Singh PK, Katoch K and Katoch VM. Rapid detection of Ethambutol Resistant *Mycobacterium*

tuberculosis in clinical specimens by real time polymerase chain hybridization probe methods. Indian J Med Mirobiol 2018; 36: 211-6.
39. **Parashar D***, Paingankar M, More A, Patil P. Altered microRNA expression signature in Chikungunya-infected mammalian fibroblast cells. Virus Genes 2018 https://doi.org/10.1007/s11262-018-1578-8.
40. **Parashar D***, Sudeep AB, More A, Patil P, Walimbe A, Mavale M, Amdekar S. Persistence of chikungunya virus in serum samples and infected mosquitoes stored at different temperatures. Current Science 2018; 115: 25-27.
41. Patil J, More A, Patil P, Jadhav S, Newase P, Agarwal M, Amdekar S, Raut CG, **Parashar D***, Cherian S. Genetic characterization of chikungunya viruses based on the E1 and E2 genes during the 2015-2017 outbreaks in different States of India. Arch Virol 2018; 163:3135-3140.
42. Amdekar S, **Parashar D**, Alagarasu K. Chikungunya virus induced arthritis: Role of host and viral factors in the pathogenesis Viral immunology 2017 30: 691-702.
43. Deoshatwar AR, **Parashar D***, Gokhale MD, More A. Low intensity Chikungunya outbreak in rural Western India indicates potential for similar outbreaks in other regions. Asian Pac J Trop Dis 2017; 7: 401-4.
44. Penumarthi A, **Parashar D**, Abraham AN, Dekiwadia C, Macreadie I, Shukla R and Smooker PM. Solid lipid nanoparticles mediated non-viral delivery of plasmid DNA to dendritic cells. J Nanoparticles Res. 2017; 19: 210**.** DOI 10.1007/s11051-017-3902-y.
45. **Parashar D*** and Cherian S. RNA interference agents as Chikungunya virus therapeutics. Future Virol 2016; 11: 321-9.
46. Damle RG, Jayaram N, Kulkarni SM, Nigade K, Khutwad K, Gosavi S and **Parashar D.** Diagnostic potential of monoclonal antibodies against the capsid protein of chikungunya virus for detection of recent infection. Arch Virol 2016.
47. Chauhan DS, Sharma R, **Parashar D**, Sharma P, Das R, Chahar M, Singh A, Singh PK, Katoch K and Katoch VM. 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 J Exp Biol 2016; 54: 229-36.
48. Penumarthi A, **Parashar D**, Shukla R, Macreadie I and Smooker PM. Utilizing novel nanoparticles for DNA vaccine delivery. J Vaccines & Vaccination 12th Asia Pacific Global Summit and Expo on Vaccines & Vaccination. November 24-25, 2016 Melbourne, Australia J Vaccines Vaccin DOI: 10.4172/2157-7560.C1.045.
49. **Parashar D***, Amdekar S, More A, More R, Patil P and Ravindra Babu V. Chikungunya fever outbreak in Guntur, Andhra Pradesh, India (2013) Indian J Med Res (Supplement) 2015; 142: 62-6.
50. Gokhale MD, Paingankar MS, Sudeep AB and **Parashar D**. Chikungunya virus susceptibility and variation in populations of Aedes aegypti (Diptera: Culicidae) mosquito from India. Indian J Med Res (Supplement) 2015; 142: 33-43.
51. Dayaraj C, Kakade M; Alagarasu K, Patil J, Salunke A, **Parashar D** and Shah PS. Development of a quantitative multiplex reverse transcriptase polymerase chain reaction for detecting dengue virus and Chikungunya virus. Archives Virol 2015;160: 323-27.

52. **Parashar D***, Paingankar MS, Sudeep AB, More A, Shinde S and VA Arankalle. Assessment of qPCR, nested RT-PCR and ELISA techniques in diagnosis of Chikungunya. Current Science 2014; 107:2011-13.
53. Desikan P, Panwalkar N, **Parashar D**, Trivedi SK and Chauhan DS. Massive pericardial effusion caused by Mycobacterium simiae: First case report. J Med Microbiol Case Reports. 2014. http://jmmcr.sgmjournals.org/content/1/3/e001040.full.pdf.
54. **Parashar D*** and Cherian S. Antiviral Perspectives for Chikungunya Virus. Biomed Res Int 2014; 2014: 631642.
55. **Parashar D**, Paingankar MS, Kumar S, Gokhale MD, Sudeep AB, Shinde SB and Arankalle VA. Administration of E2 and NS1 siRNAs inhibit Chikungunya virus replication in vitro and protects mice infected with the virus. PLoS Negl Trop Dis 2013. 7: e2405.
56. **Parashar D** and Patil D. Chikungunya: A disease re-emerged in India after 32 years. A review in Diamond jubilee publication of NIV Commemorative compendium 2012.
57. Mavale M, Sudeep AB, Gokhale MD, Hundekar SL, **Parashar D**, Ghodke YS, Arankalle VA and Mishra AC. Persistence of viral RNA in Chikungunya virus infected Aedes aegypti (Diptera: Culicidae) mosquitoes after prolonged storage at 28^0C Am J Trop Med Hyg. 2012; 86:178-80.
58. **Parashar D**, Khalkar P and Arankalle VA. Survival of Hepatitis A and E Viruses in Soil Samples. Clin Micro Infect. 2011; 17: E1-E4.
59. Mavale M, **Parashar D**, Sudeep AB. Gokhale MD, Ghodke Y, Geevarghese G, Arankalle VA and Mishra AC. Venereal transmission of Chikungunya virus. Am J Trop Med Hyg 2010; 83:1242-4.
60. Sudeep AB, **Parashar D**, Jadi RS, Basu A, Mokashi C, Arankalle VA and Mishra AC. Establishment and characterization of a new Aedes aegypti (L.) (Diptera: Culicidae) cell line with special emphasis on virus susceptibility. In Vitro Cell Dev Biol Anim. 2009; 45: 491-5.
61. Sudeep AB and **Parashar D**. Chikungunya: an overview. J Biosci 2008; 33:443-9.

Extramural projects handled:
Completed:

1) Studies on CHIKV - vector virus interactions, development of diagnostics, vaccine and prophylactics (PI; 2009-13, Funding agency: ICMR; Budget: Rs. 76, 50, 369).
2) Study based on miRNA and host immune response to CHIK infection (Mentor; 2014-16, Funding agency: DST; Budget: Rs. 21,00,000).
3) Training program in the area of Modern Biology – under support to Indian Institutes (DHR): Molecular Virological Techniques for dengue and chikungunya (Coworker, Funding agency: DHR, Budget: Rs. 1000000/ year).
4) Structure-based design and evaluation of the antiviral activity of potential lead compounds against the CHIKV (Co-Investigator; 2017-2020; Funding agency: ICMR, Budget: 43.7 lakh)
5) Use of lipid nanoparticles for effective delivery of siRNA against CHIKV (as PI; 2017-2020; Funding agency: DST Nano Mission; Budget: Rs. 65,43,168).
6) Monitoring of dengue and chikungunya viruses circulating in India for changes in the serotypes, genotype and lineages utilizing Viral Research & Diagnostic Laboratories Network (Co-Coordinators, 2018-2020; Funding agency: DHR-ICMR, Budget: Rs.7624000).

7) Repurposing of drugs towards anti-Dengue and Chikungunya viruses using the systems biology approach (Co-PI; 2019-2022; Funding agency: ICMR; Budget: Rs. 2962400).

Ongoing:

1) Complete genome sequencing and molecular characterization of circulating dengue viruses circulating in India using a next generation-based sequencing approach (Co-PI; 2020-2023; Funding agency: DHR; Budget: Rs. 7831320).
2) An observational analytical prospective study on host and virus related variations associated with arthritis in chikungunya patients in North East India (PI; 2023-2026; Funding agency: ICMR; Budget: Rs. 6432000).
3) Transcriptome profiling of dengue and chikungunya infected patients for repurposing of drugs (PI; 2023-2026; Funding agency: ICMR; Budget: Rs. 16,952,992).
4) Development of mRNA based candidate vaccine for the prevention of chikungunya virus infection (Co-PI; 2023-2026; Funding agency: DHR; Budget: Rs. 30,00,000).
5) Development and pre-clinical evaluation of immunogenicity and protective efficacy of a peptide based vaccine candidate against dengue (Co-PI; 2023-2026; Funding agency: ICMR; Budget: Rs. 14679488).
6) Apex referral laboratory activity for National Vector Borne Disease Control Programme (Coworker, Funding agency: NVBDCP, Budget: 300000 / year).
7) Scaling up facilities for production of Diagnostic kits/ Reagents for detection of JE, DEN & CHIK viruses kits (PI; Funding agency: NCVBDC)