NAMDEV SHIVAJI TOGRE, PhD

Postdoctoral Scholar, Department of Biobehavioral Health

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RESEARCH SUMMARY

My current research investigates the long-term neurobehavioral consequences of perinatal exposure to microplastics and organophosphate flame retardants (OPFRs) by defining mechanisms underlying cognitive dysfunction, stress neurocircuitry, and sex-biased susceptibility. I study how perinatal exposure affects learning, memory, and stress circuits in male and female offspring. This work uses rodent exposure models, behavioral testing, brain tissue analysis, and molecular and immune readouts, with sex as a biological variable.

At Temple University, I showed that P2X7 receptor signaling contributes to blood–brain barrier injury and neuroinflammation during chronic alcohol and e-cigarette exposure. I used chronic vapor exposure models, P2X7 knockout mice, and extracellular vesicle analysis. This work led to first-author, co-corresponding papers in the Journal of Neuroinflammation, Brain, Behavior, and Immunity, and the International Journal of Molecular Sciences, and pointed to possible therapeutic targets.

Earlier in my career, I studied *Mycobacterium tuberculosis* virulence and immune evasion under BSL-3 conditions. During my PhD, I developed helminth-derived protein biotherapeutics for ulcerative colitis and showed their efficacy in mouse models.

I have about twelve years of research experience in rodent models, behavioral neuroscience, molecular biology, immunology, and animal and biosafety compliance. I am using these skills to help set up a new laboratory at Penn State.

EDUCATION

Ph.D., Biochemistry 2019

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, India

Doctoral research conducted at Mahatma Gandhi Institute of Medical Sciences, Sevagram, India

M.Sc., Biochemistry 2013

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, India

B.Sc., Biochemistry 2011

Swami Ramanand Teerth Marathwada University, Nanded, India

PROFESSIONAL APPOINTMENTS

Postdoctoral Scholar Jun 2026 – Present

Developmental Neurotoxicology and Stress Neurocircuitry

Department of Biobehavioral Health, The Pennsylvania State University, University Park, PA

Postdoctoral Fellow Dec 2022 – Jun 2026

Preclinical Neuroinflammation and Blood–Brain Barrier Studies

Department of Pathology and Laboratory Medicine, Lewis Katz School of Medicine, Temple University, Philadelphia, PA

Postdoctoral Researcher Oct 2021 – Dec 2022

Infectious Disease Research

University of Texas at El Paso, El Paso, TX

Junior Scientist Jun 2021 – Sep 2021

Molecular Biology

Pathkind Diagnostics Pvt. Ltd., Nagpur, India

Research Associate Jan 2019 – Feb 2020
Hepatitis E Virus Monoclonal Antibody Project
National Institute of Virology (ICMR), Pune, India

Doctoral Research Fellow Jul 2014 – Jun 2019
Mahatma Gandhi Institute of Medical Sciences, Sevagram, India

February 2020 – June 2021: start of a postdoctoral appointment at the University of Texas at San Antonio delayed by the COVID-19 suspension of US visa operations.

PUBLICATIONS

26 peer-reviewed publications and 2 book chapters. 301 citations, h-index 11, i10-index 12 (Google Scholar, October 2026). *First author; #Corresponding or co-corresponding author.

Peer-Reviewed Publications

1. **Togre NS*#**, Del Carpio-Cano F, Mekala N, Winfield M, Sriram U, Rom S, Persidsky Y. Purinergic–immune crosstalk in alcohol-induced neuroinflammation is modulated by e-cigarette co-exposure. NeuroImmune Pharmacology and Therapeutics 2026a, 5(2):249–264. doi:10.1515/nipt-2026-0013
2. **Togre NS*#**, Mekala N, Bhoj PS, Mogadala N, Winfield M, Trivedi J, Grove D, Kotnala S, Rom S, Sriram U, Persidsky Y. Neuroinflammatory responses and blood–brain barrier injury in chronic alcohol exposure: role of purinergic P2X7 receptor signaling. Journal of Neuroinflammation 2024, 21(1):244. doi:10.1186/s12974-024-03230-4
3. **Togre NS*#**, Bhoj PS, Mekala N, Hancock R, Trivedi J, Persidsky Y. Purinergic and extracellular vesicle signaling in alcohol-induced blood–brain barrier breakdown and neuroimmune activation. Brain, Behavior, and Immunity 2025, 130:106115. doi:10.1016/j.bbi.2025.106115
4. **Togre NS*#**, Bhoj PS, Mekala N, Trivedi J, Winfield MY, Hancock RE, Sriram U, Rom S, Persidsky Y. P2X7R signaling and differential regulation of neuroinflammatory and behavior responses in male and female mice during chronic ethanol exposure. International Journal of Molecular Sciences 2026b, 27(5):2332. doi:10.3390/ijms27052332
5. Mekala N, **Togre NS**, Kurian S, Rom S, Sriram U, Persidsky Y. Alcohol and e-cigarettes activate P2X7R in lung epithelial cells, stimulating release of plasminogen activator in extracellular vesicles, injuring blood–brain barrier. Cells 2026, 15(19):1750. doi:10.3390/cells15191750
6. Bhoj P, **Togre NS#**, Rojekar S, Batra L, Amdare N. Editorial: Advances in infectious disease research: tackling antimicrobial resistance, zoonoses, and more. Frontiers in Cellular and Infection Microbiology 2025, 15:1671915. doi:10.3389/fcimb.2025.1671915
7. Rojekar S, Gholap AD, **Togre NS**, Bhoj P, Haeck C, Hatvate N, Singh N, Vitore J, Dhoble S, Kashid S, et al. Current status of mannose receptor-targeted drug delivery for improved anti-HIV therapy. Journal of Controlled Release 2024, 372:494–521. doi:10.1016/j.jconrel.2024.06.002
8. Mekala N, Trivedi J, Bhoj P, **Togre NS**, Rom S, Sriram U, Persidsky Y. Alcohol and e-cigarette damage alveolar-epithelial barrier by activation of P2X7r and provoke brain endothelial injury via extracellular vesicles. Cell Communication and Signaling 2024, 22(1):39. doi:10.1186/s12964-023-01461-1
9. Bhoj PS, Nocito C, **Togre NS**, Winfield M, Lubinsky C, Khan S, Mogadala N, Seliga A, Unterwald EM, Persidsky Y, et al. Tissue kallikrein-1 suppresses type I interferon responses and reduces depressive-like behavior in the MRL/lpr lupus-prone mouse model. International Journal of Molecular Sciences 2024, 25(18):10080. doi:10.3390/ijms251810080
10. Nakhale MR, Bhoj P, **Togre NS**, Khatri V, Batra L, Padigel U, Goswami K. Dose-dependent prophylactic efficacy of filarial antigens glutathione-S-transferase and abundant larval transcript-2 against *Brugia malayi* challenge in *Mastomys*. Canadian Journal of Infectious Diseases and Medical Microbiology 2024, 2024:4543922. doi:10.1155/2024/4543922

11. Bhoj PS, Bahekar SP, Chowdhary S, **Togre NS**, Amdare NP, Jena L, Goswami K, Chandak HS. Michael adduct of sulfonamide chalcone targets folate metabolism in *Brugia malayi* parasite. Biomedicines 2023, 11(3):723. doi:10.3390/biomedicines11030723
12. Mallakuntla MK, **Togre NS**, Santos DB, Tiwari S. Implications of fragment-based drug discovery in tuberculosis and HIV. Pharmaceuticals 2022, 15(11):1415. doi:10.3390/ph15111415
13. **Togre NS***, Vargas AM, Bhargavi G, Mallakuntla MK, Tiwari S. Fragment-based drug discovery against mycobacteria: the success and challenges. International Journal of Molecular Sciences 2022, 23(18):10669. doi:10.3390/ijms231810669
14. Bhoj P, **Togre NS#**, Khatri V, Goswami K. Harnessing immune evasion strategy of lymphatic filariae: a therapeutic approach against inflammatory and infective pathology. Vaccines 2022, 10(8):1235. doi:10.3390/vaccines10081235 **(Selected as Cover Story, Vaccines, Volume 10, Issue 8, August 2022)**
15. **Togre NS***, Bhoj P, Goswami K, Tarnekar A, Patil M, Shende M. Human filarial proteins attenuate chronic colitis in an experimental mouse model. Parasite Immunology 2018a, 40(3):e12511. doi:10.1111/pim.12511
16. **Togre NS***, Bhoj P, Amdare N, Goswami K, Tarnekar A, Shende M. Immunomodulatory potential of recombinant filarial protein, rWbL2, and its therapeutic implication in experimental ulcerative colitis in mouse. Immunopharmacology and Immunotoxicology 2018b, 40(6):483–490. doi:10.1080/08923973.2018.1431925
17. **Togre NS***, Bhoj PS, Khatri VK, Tarnekar A, Goswami K, Shende MR, Reddy MVR. SXP–RAL family filarial protein, rWbL2, prevents development of DSS-induced acute ulcerative colitis. Indian Journal of Clinical Biochemistry 2018c, 33(3):282–289. doi:10.1007/s12291-017-0671-4
18. Hande S, Sonkar V, Bhoj P, **Togre NS**, Goswami K, Dash D. The role of oxidative and nitrosative stress of silver nanoparticles in human parasitic helminth *Brugia malayi*: a mechanistic insight. Acta Parasitologica 2021, 66(4):1212–1221. doi:10.1007/s11686-021-00394-4
19. Bhoj PS, Bahekar S, Khatri V, Singh N, **Togre NS**, Goswami K, Chandak HS, Dash D. Role of glutathione in chalcone derivative induced apoptosis of *Brugia malayi* and its possible therapeutic implication. Acta Parasitologica 2021, 66(2):406–415. doi:10.1007/s11686-020-00291-2
20. Khatri V, Amdare N, Chauhan N, **Togre NS**, Reddy MV, Hoti SL, Kalyanasundaram R. Epidemiological screening and xenomonitoring for human lymphatic filariasis infection in select districts in the states of Maharashtra and Karnataka, India. Parasitology Research 2019, 118(3):1045–1050. doi:10.1007/s00436-019-06205-0
21. Bhoj PS, Rao S, Bahekar SP, Agrawal NR, **Togre NS**, Sharma R, Goswami K, Chandak HS, Patil MB. In vitro apoptotic effect on human lymphatic filarial parasite by piperidine derivatives and thymidine reversal study. Parasitology Research 2020, 119(1):165–175. doi:10.1007/s00436-019-06492-7
22. Bhoj P, **Togre NS**, Goswami K, Madhariya V. Polyphenols-induced apoptosis by *Murraya koenigii* against lymphatic filarial parasite and its therapeutic implication. Journal of Herbs, Spices & Medicinal Plants 2019, 25(4):363–376. doi:10.1080/10496475.2019.1633454
23. Bhoj P, **Togre NS**, Bahekar S, Goswami K, Chandak HS, Patil M. Immunomodulatory activity of sulfonamide chalcone compounds in mice infected with filarial parasite, *Brugia malayi*. Indian Journal of Clinical Biochemistry 2019, 34(2):225–229. doi:10.1007/s12291-017-0727-5
24. Hande S, Goswami K, **Togre NS**, Mandvikar A, Rami Reddy MV. Antifilarial actions of green tea extract and a synthetic heterocyclic thiazolidine derivative, Im8 compound in experimental mouse model. Indian Journal of Experimental Biology 2016, 54(11):753–757.
25. **Togre NS***, Khatri V, Nakhale M, Bhoj P, Goswami K, Tarnekar A, Patil M, Kumar S. Exploration of immune modulation by combination of filarial proteins against DSS-induced colitis in mouse model. Romanian Archives of Microbiology and Immunology 2018d, 77(2):65–80.
26. Bhoj P, Daberao S, **Togre NS**, Goswami K. Antifilarial and apoptotic effect of *Cardiospermum helicacabum* leaf extract on filarial *Brugia malayi* parasite. Romanian Archives of Microbiology and Immunology 2019, 77(4):294–300.

Book Chapters

- Pardeshi S, Gholap AD, More M, **Togre NS**, Rebello N, Giram P. Dendrimers based antibacterial and antiviral materials. In: Antibacterial and Antiviral Functional Materials, Volume 1. 2023:139–169.
- Goswami K, Khatri V, Amdare N, **Togre NS**, Bhoj P. Helminth therapy: a promising biotherapeutic approach for autoimmune colitis. In: Garcia S, editor. Colitis: Causes, Diagnosis and Treatment. Nova Science Publishers; 2019.

RESEARCH FUNDING

Pending / In Preparation

- NIH/NIEHS R21 (in preparation). Role: Principal Investigator.
- Penn State Internal Postdoctoral Research Competition (in preparation). Role: Principal Investigator.

HONORS AND AWARDS

- Cover Story, *Vaccines* (MDPI), Volume 10, Issue 8, for "Harnessing immune evasion strategy of lymphatic filariae: a therapeutic approach against inflammatory and infective pathology." 2022.
- Best Oral Paper Award, 10th National Conference of the Indian Academy of Tropical Parasitology (TROPACON-2016), JIPMER, Pondicherry, India. 2016.
- Babasaheb Ambedkar National Research Fellowship for Ph.D. Research, Dr. Babasaheb Ambedkar Research & Training Institute (BARTI), Pune, India. 2015–2019.

CONFERENCE PRESENTATIONS AND INVITED TALKS

Invited Talks

- "Global Pathways for Science Students: Study, Research and Career Opportunities Abroad." Invited resource person, One-Day International Webinar, Department of Chemistry and IQAC, Ramkrishna Paramhansa Mahavidyalaya, Dharashiv, Maharashtra, India. February 27, 2026.
- "Emerging Trends and Career Opportunities in Biotechnology." Invited speaker, International Webinar Series on Recent Trends and Advancements in Multidisciplinary Research, Khaja Bandanawaz University, Kalaburagi, Karnataka, India. February 2023.
- "Is Your Career Perspective Your Reality?" Invited lecture, "Indians Speaking from Abroad" lecture series, Science College Congress Nagar, Nagpur, in association with the Microbiologists Society, India. November 13, 2022.

Oral Presentations

- **Togre NS**, Bhoj P, Mekala N, Hancock R, Trivedi J, Winfield M, Sriram U, Rom S, Persidsky Y. Sex differences in P2X7R-driven neuroinflammation and extracellular vesicle dynamics in alcohol-induced brain injury. Temple University Postdoctoral Symposium, Lewis Katz School of Medicine, Temple University, Philadelphia, PA. 2025.
- **Togre NS**, Mekala N, Bhoj PS, Sriram U, Persidsky Y. Neuroinflammatory responses and blood–brain barrier injury in chronic alcohol exposure: role of purinergic P2X7 receptor signaling. First Postdoctoral Trainee Research Symposium, Temple University, Philadelphia, PA. October 18, 2024.
- **Togre NS**. Immunomodulation by filarial proteins rWbL2 and rBmALT-2 to help in treatment of ulcerative colitis. 10th National Conference of the Indian Academy of Tropical Parasitology (TROPACON-2016), JIPMER, Pondicherry, India. November 2–6, 2016. Best Oral Paper Award.

Poster Presentations

- **Togre NS**, Bhoj P, Mekala N, Hancock R, Trivedi J, Winfield M, Sriram U, Rom S, Persidsky Y. Sex differences in P2X7R-driven neuroinflammation and extracellular vesicle dynamics in alcohol-induced brain injury. 48th Annual Scientific Meeting, Research Society on Alcohol (RSA) / ISBRA Congress, New Orleans, LA. June 21–25, 2025.

- **Togre NS**, Bhoj P, Mekala N, Hancock R, Trivedi J, Winfield M, Sriram U, Rom S, Persidsky Y. Sex differences in P2X7R-driven neuroinflammation and extracellular vesicle dynamics in alcohol-induced brain injury. First Annual Temple University Graduate Symposium for Research and Creative Works, Philadelphia, PA. April 11, 2025.
- **Togre NS**, Mekala N, Bhoj PS, Sriram U, Persidsky Y. Neuroinflammatory responses and blood–brain barrier injury in chronic alcohol exposure: role of purinergic P2X7 receptor signaling. First Postdoctoral Trainee Research Symposium, Temple University, Philadelphia, PA. October 18, 2024.
- **Togre NS**, et al. Neuroinflammatory responses and blood–brain barrier injury in chronic alcohol exposure: role of purinergic P2X7 receptor signaling. 47th Annual Scientific Meeting, Research Society on Alcohol (RSA), Minneapolis, MN. June 22–26, 2024.
- Mogadala N, **Togre NS**, Bhoj P, Sriram U, Persidsky Y. Purinergic P2X7 receptor signaling in chronic alcohol exposure causes neuroinflammation and blood–brain barrier injury in mice. CLA Neuroscience Annual Research Day, Temple University, Philadelphia, PA. 2024. **[Poster presented by N. Mogadala]**

Published Abstracts

- **Togre NS**, Bhoj P, Mekala N, Hancock R, Trivedi J, Winfield M, Sriram U, Rom S, Persidsky Y. Sex differences in P2X7R-driven neuroinflammation and extracellular vesicle dynamics in alcohol-induced brain injury. Alcohol, Clinical and Experimental Research 2025;49(S1). Supplement: 48th Annual RSA Scientific Meeting / ISBRA Congress, New Orleans, LA, June 21–25, 2025.
- **Togre NS**, Mekala N, Bhoj PS, Mogadala N, Winfield M, Trivedi J, Grove D, Kotnala S, Rom S, Sriram U, Persidsky Y. Neuroinflammatory responses and blood–brain barrier injury in chronic alcohol exposure: role of purinergic P2X7 receptor signaling. Alcohol, Clinical and Experimental Research 2024;48(S1). Supplement: Speaker and Poster Abstracts of the Research Society on Alcohol, 47th Annual Scientific Meeting, Minneapolis, MN, June 2024.
- **Togre NS**, Bhoj P, Khatri V, Tarnekar A, Reddy MVR, Goswami K. Therapeutic potential of recombinant Wuchereria bancrofti L2 (rWbL2) in the treatment of DSS-induced chronic ulcerative colitis. Abstract supplement, 17th Annual Meeting of the Federation of Clinical Immunology Societies (FOCIS 2017), Chicago, IL. June 14–17, 2017.
- Chowdhary S, Bhoj P, Bahekar S, **Togre NS**, Goswami K, Chandak H. Targeting folate metabolism in *Brugia malayi* parasitic model using synthetic chalcone derivatives as probe. Journal of Mahatma Gandhi Institute of Medical Sciences 2017;22(2):128.

Co-authored Abstracts and Presentations

- Sriram U, Bhoj P, Mekala N, **Togre NS**, Persidsky Y. Purinergic receptor P2X7R regulates neuropsychiatric lupus. The Journal of Immunology 2026, 215(Supplement_1):vkag141.712. doi:10.1093/jimmun/vkag141.712
- Mekala NK, **Togre NS**, Rom S, Sriram U, Persidsky Y. Electronic cigarettes and alcohol induce alveolar epithelial and blood–brain barrier injury via P2X7 receptor signaling. 30th Scientific Conference of the Society on NeuroImmune Pharmacology (SNIP), Annapolis, MD. May 3–6, 2026.
- Mekala N, **Togre NS**, Rom S, Sriram U, Persidsky Y. Alcohol and e-cigarette exposure induce release of extracellular vesicles and their plasminogen urokinase content promoting blood–brain barrier injury. 29th Scientific Conference of SNIP, Omaha, NE. June 8–11, 2025.
- Mekala N, Trivedi J, Bhoj P, **Togre NS**, Rom S, Persidsky Y. E-cigarette and alcohol cause alveolar epithelial and blood–brain barrier injury via extracellular vesicles release and purinergic receptor signaling. 28th Scientific Conference of SNIP, Charleston, SC. March 10–13, 2024. Supported by NIAAA AA030841.

TEACHING AND MENTORING

Mentoring

Mentored twelve trainees across four institutions in experimental design, laboratory technique, data interpretation, and scientific writing.

- Penn State (2026): Sydney Newman, Julia Kay Schmouder, Emmalee Faith Johnston, Chunbaixue Yang, Skye Petrie-Cameron — environmental toxicant exposure, behavioral and molecular neuroscience.
- Temple University (2023–2026): Nikhita Mogadala, Deborah Grove — P2X7 receptor signaling and blood–brain barrier injury.
- University of Texas at El Paso (2021–2022): Anna Verghese, Destiny B. Santos — mycobacterial pathogenesis under BSL-3 conditions.
- MGIMS Sevagram (2015–2019): Suman Kumar Singh, Arun Rathore, Jayesh Unekar — filarial immunology and recombinant protein biotherapeutics.

Trainees have gone on to PhD programs at Penn State and UT El Paso, an MD in Biochemistry at Darbhanga Medical College, and research positions in industry.

Teaching

- Resource person, DBT (Government of India)-sponsored National Training Course, "Molecular techniques as applied for infectious disease research," Department of Biochemistry and JBTDRC, MGIMS, Sevagram, India. 2015, 2016, and 2017. Delivered lectures and led hands-on practical sessions in molecular biology for approximately 20 participants each year.

TRAINING AND PROFESSIONAL DEVELOPMENT

- Global Initiative of Academic Networks (GIAN) workshop, "Transgenic animal technology" (14 days), Department of Animal Biology, University of Hyderabad, India. July 19 – August 1, 2018.
- DBT-sponsored short-term training course, "Hands-on training programme on nanobiotechnology and use of *Drosophila* as a genetics research model" (14 days), Department of Biotechnology, MIET, Meerut, India. December 4–17, 2017.

EDITORIAL AND PEER REVIEW SERVICE

Journal Editorial Roles

- Associate Editor, *Virulence* (Taylor & Francis). Handled over 100 manuscripts through peer review.
- Topic Editor, *Frontiers in Cellular and Infection Microbiology*.
- Review Editor, *Frontiers in Molecular Biosciences* and *Frontiers in Immunology* (Vaccines and Molecular Therapeutics section). Editorial profile

Special Issues and Topical Collections

- Topic Editor, Frontiers in Molecular Biosciences — "Advances in Host–Pathogen Molecular Interactions: New Tools, Targets, and Therapeutic Strategies with a Focus on Neuroinfectious Mechanisms." Open for submissions, 2026.
- Topic Editor, Frontiers in Cellular and Infection Microbiology — "Advances in Infectious Disease Research: Tackling Antimicrobial Resistance, Zoonoses, and More." 2025. Corresponding author on the collection editorial.
- Guest Editor, *Cells* (MDPI) — "Alcohol-Related Neurologic Disease: Molecular Mechanisms and Therapy."
- Guest Editor, *JoVE* — "Experimental Models for Alcohol-Induced Neurovascular Dysfunction."
- Guest Editor, *Life* (MDPI).

Advisory Panels and Peer Review

- Topical Advisory Panel Member, *International Journal of Molecular Sciences* and *Life* (MDPI).
- Reviewed over 70 manuscripts across 14 journals, including PLOS One, International Journal of Molecular Sciences, Frontiers in Immunology, Gut Microbes, Cells, Human Vaccines & Immunotherapeutics, and Virulence.

RESEARCH EXPERIENCE

Environmental Toxicants and the Brain: Neurobehavioral Outcomes, Neuroinflammation, and Blood–Brain Barrier Dysfunction Jun 2026 – Present

Department of Biobehavioral Health, The Pennsylvania State University, PA

- Investigating how perinatal exposure to microplastics and organophosphate flame retardants (OPFRs) disrupts cognitive processing in adult male and female offspring
- Examining long-lasting deficits in learning, memory, and stress neurocircuitry induced by developmental exposure, using behavioral testing
- Identifying sex-biased vulnerability at the intersection of endocrine disruption and chronic stress-induced maladaptive states
- Helping establish the laboratory's cell culture and blood–brain barrier model capability and a breeding colony

Molecular Mechanisms Regulating Blood–Brain Barrier Function During Alcohol Abuse Dec 2022 – Jun 2026

Lewis Katz School of Medicine, Temple University, Philadelphia, PA

- Led preclinical rodent studies investigating neuroinflammation and blood–brain barrier dysfunction during chronic intermittent ethanol (CIE) exposure and nicotine e-cigarette co-exposure, integrating behavioral, biochemical, and molecular endpoints
- Designed and implemented chronic vapor exposure paradigms including 16-h CIE exposure and automated e-cigarette inhalation models to study substance-induced neuroimmune and vascular injury
- Contributed to cannabinoid vapor exposure studies (THC and CBD), including animal exposure procedures, physiological monitoring, and post-exposure tissue harvesting for immunological and molecular analyses
- Conducted survival procedures, tissue collection, and brain tissue microdissection to assess neuroinflammatory and neurotoxic effects
- Contributed to extracellular vesicle isolation and nanoparticle tracking analysis, and measured cytokines (MSD ELISA) and gene expression (qRT-PCR, PCR arrays) in brain microvessels, serum, and plasma
- Assessed behavior and spatial memory in male and female mice during chronic ethanol exposure
- Developed IACUC-compliant animal protocols and SOPs for chronic vapor exposure studies, welfare monitoring, and endpoint assessment
- Established and maintained a P2X7 receptor knockout mouse colony enabling mechanistic studies of neuroinflammation and BBB dysfunction
- Oversaw animal welfare assessments including temperature monitoring, body weight tracking, and humane endpoint evaluation during repeated exposure studies
- Performed endpoint monitoring and analyzed molecular and behavioral datasets to generate preclinical study reports
- Mentored graduate students in experimental design, compliance, and study documentation
- Publications: Mekala et al., 2026; Togre et al., 2026a–b; Togre et al., 2025; Togre et al., 2024

Crosstalk Between the Kallikrein–Kinin System (KKS) and Type I Interferons in SLE and Neuropsychiatric Lupus Dec 2022 – Jun 2026

Lewis Katz School of Medicine, Temple University, Philadelphia, PA

- Contributed to in vivo mouse studies, including behavioral assays to evaluate depressive-like phenotypes in lupus models. Publication: Bhoj et al., 2024

Pathogenesis of Mycobacterium tuberculosis: Mechanisms of Virulence and Host Immune Evasion Oct 2021 – Dec 2022

University of Texas at El Paso, El Paso, TX

- Executed preclinical infection studies to assess bacterial virulence and host immune responses, including tissue dissemination and survival analysis

- Managed animal study execution under BSL-2, BSL-3, and ABSL-3 conditions, ensuring compliance with biosafety standards
- Performed molecular and imaging assays including qPCR, confocal microscopy, and IVIS to evaluate pathogen dissemination
- Performed bacterial culture, growth kinetics, and drug inhibition assays with *Mycobacterium* species
- Developed and standardized SOPs for infection studies, animal handling, and sample collection
- Trained junior researchers in study execution, documentation, and biosafety compliance
- Publications: Togre et al., 2022; Mallakuntla et al., 2022

Identification and Characterization of Neutralizing Monoclonal Antibodies Against Hepatitis E Virus Jan 2019 – Feb 2020

National Institute of Virology (ICMR), Department of Hepatitis, Pune, India

- Isolated PBMCs and extracted RNA from clinical samples
- Amplified IgG heavy chain genes from donor cDNA by PCR and cloned them into the pCR2.1-TOPO vector (lysate PCR, EcoRI digestion) for antibody characterization
- Analyzed heavy chain sequences against human germline genes using V-BASE and NCBI IgBLAST

Doctoral Research

Development of Biotherapeutics for Autoimmune and Inflammatory Disorders 2014 – 2019

Mahatma Gandhi Institute of Medical Sciences, Sevagram, India

Helminth-derived biotherapeutics for autoimmune colitis

- Conducted preclinical studies of recombinant filarial proteins in mouse models, including dose–response and survival assays to evaluate therapeutic safety and efficacy
- Cloned, expressed, and purified recombinant filarial proteins (affinity chromatography, FPLC)
- Used DSS-induced colitis models in mice
- Performed IP, IV, SC, intradermal, and intra-articular injections, ensuring precise dosing, tolerability assessment, and reliable pharmacological outcomes in preclinical studies
- Collected tissues and analyzed biochemical, cytokine, and histological endpoints to evaluate inflammation and immunomodulatory effects
- Publications: Togre et al., 2018a–d

Therapeutic and preventive strategies against lymphatic filariasis

- Used filarial challenge models in *Mastomys coucha* and jirds, and propagated *Brugia malayi* parasites
- Performed animal surgeries, in situ micropore chamber experiments, and vaccine challenge studies to assess systemic and tissue-specific effects
- Performed in vivo prophylactic studies in *Mastomys* to test the dose-dependent efficacy of recombinant filarial antigens (glutathione-S-transferase and abundant larval transcript-2) against *Brugia malayi* challenge
- Performed in vitro drug screening and inhibition assays on *Brugia malayi* microfilariae to evaluate plant extracts (*Murraya koenigii*) and sulfonamide chalcone compounds
- Used MTT assay, cytochrome c ELISA, and fluorescence microscopy (EB/AO staining) to assess apoptosis, and homology modeling, molecular docking, and a DHFR enzyme inhibition assay to study the mechanism of action
- Publications: Nakhale et al., 2024; Bhoj et al., 2023; Bhoj et al., 2019

Shared across both areas

- Collaborated cross-functionally with pathologists and microbiologists to evaluate the pathological changes in response to the treatments
- Developed IACUC-compliant study protocols, dosing schedules, and SOPs to standardize preclinical workflows
- Mentored post-graduate students

Industry Experience

Junior Scientist, Pathkind Diagnostics Pvt. Ltd., Nagpur, India Jun 2021 – Sep 2021

- Oversaw high-throughput qRT-PCR and immunodiagnostic assays under NABL/QA regulations
- Ensured accuracy of data reporting and supported audit-ready documentation

PROFESSIONAL SERVICE AND MEMBERSHIPS

Service

- Vice President, Temple University Postdoctoral Association, Temple University, Philadelphia. 2025–2026
- Community Leader, ASM Connect, American Society for Microbiology. 2022–2023
- Organizing Committee Member, National Symposium on "Healthy Yoga Lifestyle for Prevention of Lifestyle Diseases," JBTDRC, Sevagram, India. September 2015.

Memberships

- National Postdoctoral Association (NPA)
- American Society for Microbiology (ASM)
- Research Society on Alcohol (RSA)
- Federation of Clinical Immunology Societies (FOCIS)
- Life Member, Society of Biological Chemists, India

TECHNICAL SKILLS

Animal Models and Colony Management

- Breeding, colony management, and experimental handling of murine and rodent models including BALB/c, Rag-/-, C57BL/6J, NZBW/F1, MRL/lpr, SLE 123, *Meriones unguiculatus*, and *Mastomys coucha*
- Autoimmune and inflammatory disease models (colitis, diabetes, arthritis, lupus)
- Small animal surgery, survival studies, cervical lymph node isolation, brain microdissection, dorsal root ganglia collection, perfusion, brain microvessel isolation, and in situ micropore chamber experiments
- Behavioral assays: forced swim, tail suspension, elevated plus maze, open field, Barnes maze, Y-maze, novel object recognition, object placement, and social recognition tests
- Multiple administration routes (retro-orbital, intraperitoneal, intravenous, subcutaneous, intra-articular) and blood collection techniques (cheek punch, tail tip, retro-orbital, cardiac puncture)

Molecular Biology and Protein Analysis

- qRT-PCR, digital PCR, gene expression arrays, RNA isolation, cloning and expression of recombinant proteins
- SDS-PAGE, agarose gel electrophoresis, affinity chromatography, FPLC, and 2D gel electrophoresis

Immunology, Microbiology, and Cell Culture

- MSD ELISA, conventional ELISA, Western blotting, MTT assays, cell culture and proliferation assays
- Antibody-dependent cell-mediated cytotoxicity (ADCC) and lateral-flow chromatography-based diagnostic assay development
- Bacterial culture, growth kinetics, transformation, transfection, drug screening, inhibition assays, and PBMC isolation
- Human cell culture systems and laboratory propagation of filarial parasites

Imaging and Extracellular Vesicle Analysis

- Immunohistochemistry, immunostaining, immunofluorescence, cytospin preparation, light and confocal microscopy, and IVIS

- Extracellular vesicle isolation and nanoparticle tracking analysis

Computational and Structural Methods

- Molecular docking (AutoDock), homology modeling, and peptide prediction applied to mechanism-of-action studies, including DHFR inhibition analysis in *Brugia malayi*

Biosafety and Data Analysis

- Extensive hands-on experience with *Mycobacterium* species in BSL-2, BSL-3, and ABSL-3 environments
- GraphPad Prism, IBM SPSS, ImageJ, and Microsoft Office