Teena Mohan, PhD

Scientist V / CDC/LPRB-BAA Program Manager
Contractor, Chenega Corporation
Laboratory of Preparedness and Response Branch (LPRB)
Division of Preparedness and Emerging Infections (DPEI)
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A. Personal Statement

I have worked in biomedical sciences since 2004, primarily focusing on various infectious diseases to understand the fundamental principles regulating host's immune functions. My research has developed new biotechnologies using different adjuvants (Defensins, CpG ODNs, HPV-16 peptides, GPI-IL-12, GPI-B7-1, GPI-CCL28, host genomic DNA, and CCL27), antivirals (Lectins, CV-N, and Defensins) and vaccine delivery vehicles (PLGA microspheres, PLG nanoparticles, protein nanoparticles, virus-like particles; VLPs, microneedle patches; MNPs) for diseases such as HIV-1, malaria, influenza, cervical cancer and triple negative breast cancer as well as diagnostic kits for malaria and chikungunya infections. I have studied the coexistence of Th1/Th2 and Th17/Treg imbalances in patients with post-traumatic sepsis and the T cell profiles of HIV-1 infected Indian populations. I have investigated an HIV sequential immunization strategy with a panel of Env-enriched VLPs from HIV-1 clades A—E to generate broadly neutralizing antibody responses *(Received AIDS Vaccine Bike Ride Fellowship Award from Emory Vaccine Center)*.

I worked on various research to develop a universal influenza vaccine based on confirmation-stabilized tetrameric M2e nanoparticles, double-layered nanoparticles with HA stalk domains, and sequential immunization with various influenza HA. I have also participated in other influenza vaccine projects, including research into the use of two-layered nanoclusters, protein nanoparticles containing fusion proteins of flagellin with conserved influenza epitopes, and MNP delivery of 4M2e-tFliC fusion protein. As Research Assistant Professor, I with my amazing team developed double-layered protein nanoclusters composed of tetrameric M2e from four different viral strain cores with full-length Aic and Pr8 HA coatings to induce immune protection against divergent influenza A viruses and studied mouse genomic DNA as a novel adjuvant to enhance the potency of MNP-based influenza vaccines. I was also engaged in studying influenza skin vaccination and the adjuvanticity of CCL27 chemokine delivered *via* microneedle patches in mice.

At CDC, I worked in influenza virus surveillance and assessment of influenza virus susceptibility to FDA-approved and investigational antiviral agents. My interests were included the understanding of the molecular mechanisms of influenza virus resistance to antiviral medications and the effect of resistance mutations on viral fitness and evolution. Simultaneously, in collaboration with academic partners, I investigated the ability of the live attenuated influenza vaccines expressing hemagglutinin fused with M2 to provide protection against influenza challenge, in the ferret model.

Currently, I am working as LPRB-BAA Program Manager/ Scientist V and responsible to organize, track and report on communications and documents submitted to LPRB from multiple external research project partners and collaborators. Under the CDC-BAA program, I am involved in creating and maintaining detailed summaries, plans and organizational tools to track documents, communications, and responses from less than a dozen external partners. Additionally, I am in-charge to provide functional expertise in project coordination and expertise in laboratory data (microbiology, molecular biology, DNA/RNA sequencing).

I have a strong, consistent publication record in esteemed scientific journals such as Nature Communications, Journal of Controlled Release, Nanomedicine, and Scientific Reports *etc.* with more than 25 research/review articles with high citations. I have attended many scientific meetings, honored with number of prestigious awards worldwide, and served as reviewer and member of editorial board of various scientific journals. I have the expertise, leadership, training, experience, and motivation which are necessary to successfully carry out or mentor the research projects. I have overseen more than 30 undergraduate/graduate students, including 9 who have successfully completed their PhD program. In addition to my research training and experience, I have acquired leadership and administrative skills in the past and during my current tenure.

B. Educational Credentials

2002 B.S. Biology– Chaudhary Charan Singh University, Uttar Pradesh, India
2004 M.S. Biotechnology– Jamia Millia Islamia University, New Delhi, India
2012 Ph.D. Biochemistry/Immunology– All India Institute of Medical Sciences, New Delhi, India

C. Certifications

2001 Advanced Diploma in Software Technology– IICT, Uttar Pradesh, India
2003 Advanced Diploma in Bioinformatics– Bioinformatics Institute of Indian, Uttar Pradesh, India
2016 Lab Management Course– Emory University, Atlanta, USA
2020 Simplifying CLIA– Center for Disease Control and Prevention, Atlanta, USA
2021 Introduction to Epidemiology– Tulane University School of Public Health and Tropical Medicine and the University of Alabama at Birmingham School of Public Health, USA
2021 Epidemiology of Infectious Diseases– Tulane University School of Public Health and Tropical Medicine and the University of Alabama at Birmingham School of Public Health, USA
2021 Improving Global Health: Focusing on Quality and Safety– Harvard Public School of Health, USA
2021 Advance Course in Basic & Clinical Immunology– Federation of Clinical Immunology Society, USA

D. Positions and Employment

07/2004 – 01/2006 Research Assistant, All India Institute of Medical Sciences, New Delhi, India
02/2006 – 01/2008 Junior Research Fellow, All India Institute of Medical Sciences, New Delhi, India
02/2008 – 01/2011 Senior Research Fellow, All India Institute of Medical Sciences, New Delhi, India
02/2006 – 01/2011 Teaching Assistant, All India Institute of Medical Sciences, New Delhi, India
02/2011 – 09/2012 Research Scientist, All India Institute of Medical Sciences, New Delhi, India
10/2012 – 04/2013 Scientist 'B', Indian Journal of Medical Research, New Delhi, India
05/2013 – 02/2015 Immunological Research Scientist, Metaclipse Therapeutics, Atlanta, USA
03/2015 – 07/2016 Postdoctoral Research Associate, Emory University, Atlanta, USA
08/2016 – 02/2019 Research Assistant Professor, Georgia State University, Atlanta, USA
03/2019 – 12/2020 Laboratory Specialist– Advisor, Chickasaw Nation Industries, USA
Client: Influenza Division, NCIRD, CDC, Atlanta, USA
12/2020 – 06/2021 Senior Scientist, General Dynamics of Information Technology, USA
Client: VSDB/ ID/ NCIRD, CDC, Atlanta, USA

07/2021 – Present Scientist V / LPRB-BAA Program Manager, Chenega Corporation, USA
Client: LPRB/ DPEI/ NCEZID*, CDC, Atlanta, USA*

E. Honors

2001 Best Performance Award in Software Technology, IICT, Uttar Pradesh, India
2002 Gold Medal for Best student of B.S. (Biology), Meerut University, Uttar Pradesh, India
2006 CSIR-UGC-NET Fellowship Award, Ministry of HRD, Govt. of India, India
2007 Best poster & oral presentation Award, 33rd IMMUNOCON, New Delhi, India
2008 Best poster & oral presentation Award, SFRR-2008 Satellite India Meeting, New Delhi, India
2009 K. S. Sarma Memorial Award, 2nd Indian Peptide Symposium, New Delhi, India
2009 RANBAXY Young Scientist Award, RANBAXY Research Foundation, Gurgaon, India
2009 Dr. Ranga Travel grant, All India Institute of Medical Sciences, New Delhi, India
2009 Rashtriya Gaurav Award, International Friendship Society, New Delhi, India
2010 Rajiv Gandhi Excellence Award, International Friendship Society, New Delhi, India
2010 Best oral presentation, International Conference on Opportunistic Pathogens, New Delhi, India
2010 Prof. G. P. Talwar Young Scientist Award, 37th IMMUNOCON, Jammu & Kashmir, India
2010 APCCB Young Scientific Award, Asian Pacific Conference of Clinical Biochemistry, South Korea
2011 IFCC Travel grant, IFCC Worldlab and EuroMedlab International Congress, Berlin, Germany
2011 BIOVISION.NXT Fellowship, 7th Life Science World Forum, Lyon, France
2011 Indira Gandhi Women Achiever Award, India International Friendship Society, New Delhi, India
2011 EACS 2011 Scholarship Award, European AIDS Conference, Belgrade, Serbia

2012 Microbicides Scholarship Award, International Conference on Microbicides, Sydney, Australia
2013 MSM Institute Scholarship, Annual African American MSM Institute, USA
2013 Young Scientist Award, International Congress on AIDS in Asia and Pacific, Bangkok, Thailand
2014 ISCB Best Thesis Award, Indian Society of Chemists and Biologist (ISCB), India
2015 AIDS Vaccine 200 Bike Ride Fellowship Award, Emory Vaccine Center, Atlanta, USA
2016 Oral Presentation Award, 14th Southeastern Regional Virology Conference, Atlanta, USA
2017 Marquis Who's Who, Marquis Who's Who in America LLC, USA
2018 Vaccine Renaissance Award, ISV Annual Congress, Atlanta, USA
2021 Women Researcher Award, International Scientist Awards on Engineering, Science and Medicine, Pondicherry, India

F. Other Research Contributions

2012 – 2014 Executive Member, Indian Immunology Society Committee, New Delhi, India
2009 – 2010 Member, Editorial Board, Journal of HIV for Clinical and Scientific Research
2013 – Present Member, Editorial Board, International Journal of Immunology Research
2014 – Present Member, Editorial Board, Journal of HIV for Clinical and Scientific Research
2015 – Present Member, Editorial Board, International Journal of Pharmaceutical Sciences
2016 – Present Member, Editorial Board, Austin Immunology
2016 – Present Member, Editorial Board, Austin Neurology
2016 – Present Member, Editorial Board, ARC Journal of AIDS

Reviewer, Current Immunology Review
Reviewer, Journal of Immunobiology
Reviewer, Scientific Pages of Immunology
Reviewer, Journal of Infectious Diseases and Diagnosis
Reviewer, International Journal of STDs and AIDS
Reviewer, Indian Journal of Clinical Biochemistry
Reviewer, World Journal of Gastroenterology
Reviewer, Journal of Enzymology and Biotechnology
Reviewer, International Immunology Journal
Reviewer, Journal of Antivirals & Antiretrovirals
Reviewer, International Journal of Plant and Animal Sciences
Reviewer, Indian Journal of Medical Research
Reviewer, Current HIV Research
Reviewer, Canadian Journal of Physiology and Pharmacology
Reviewer, Immunology
Reviewer, Viral Immunology
Reviewer, Scientific Reports
Reviewer, Virology
Reviewer, Journal of AIDS
Reviewer, Immunology Research
Reviewer, Vaccine
Reviewer, Viral Immunology
Reviewer, Viruses
Reviewer, Emerging Infectious Diseases
Reviewer, Influenza and Other Respiratory Viruses
Reviewer, Antimicrobial Agents and Chemotherapy
Reviewer, Journal of Infectious Diseases

G. Memberships of Scientific Organizations

2009 – Present Member, Indian Peptide Society (IPS)
2009 – Present Member, Indian Immunology Society (IIS)
2009 – 2010 Member, Society of Biological Chemists of India (SBC India)
2010 – Present Member, Association of Clinical Biochemists of India (ACBI)
2012 – Present Member, Indian Society of Chemists and Biologists (ISCB)

2012 – 2014 Executive Member, Committee of Indian Immunology Society (IIS)
2014 – 2015 Member in Training, American Society of Clinical Oncology (ASCO)
2015 – 2016 Member, Committee on the Environment– Emory University (COE)
2015 – Present American Association for Clinical Chemistry (AACC)
2016 – Present Member, American Association of Immunologists (AAI)
2021 – Present Federation of Clinical Immunology Society (FOCIS)
2021 – Present American Society for Virology (ASV)
2021 – Present International Society for Influenza and other Respiratory Virus Diseases (ISIRV)

H. Organization of Conferences

2002 Asian Pacific Conference of Clinical Biochemistry held at New Delhi, India
2007 33rd Annual conferences of the Indian Immunology Society held at New Delhi, India
2010 37th Annual conferences of the Indian Immunology Society held at Jammu and Kashmir, India

I. Scientific Conferences/Meetings Attended

2005 Symposium on Quality Control, New Delhi, India
2007 Recent Advances and challenges in Reproductive Health Research, New Delhi, India
2007 33rd Annual conferences of the Indian Immunology Society held at New Delhi, India
2007 National Hematology Updates –VI, New Delhi, India
2007 Association of Clinical Biochemists of India Conference, New Delhi, India
2007 Interdisciplinary Sciences Conference, New Delhi, India
2007 National Symposium on New Frontier in Cell Biology, New Delhi, India
2007 National Symposium on Immunity to Infection, New Delhi, India
2007 National Symposium on Nanotechnology, New Delhi, India
2008 Society of Free Radical Research Satellite Meeting, New Delhi, India
2008 National Hematology Updates-VII, New Delhi, India
2008 Conference on Human Viruses Translational Medicine, New Delhi, India
2009 2nd Indian Peptide Conference, New Delhi, India
2010 37th Annual conferences of the Indian Immunology Society held at Jammu and Kashmir, India
2010 2nd International Conference on the Natural Polymers and Biomaterials, Kerala, India
2010 International Conference on Opportunistic Pathogens, New Delhi, India
2010 Asian Pacific Conference of Clinical Biochemistry, Seoul, South Korea
2011 7th Life Sciences World Forum, Lyon, France
2011 IFCC World Lab and Euromed Laboratory International Congress, Berlin, Germany
2011 European AIDS Conference, Belgrade, Serbia
2012 International Conference on Microbicides, Sydney, Australia
2013 5th Annual African American MSM conference, West Columbia, USA
2013 34th Federation of Immunological Societies of Asia-oceania, New Delhi, India
2013 International Congress on AIDS in Asia and Pacific, Bangkok, Thailand
2015 14th Southeastern Regional Virology Symposium, Emory University, Atlanta, USA
2015 Annual Postdoctoral Symposium, Emory University, Atlanta, USA
2015 The Microbiome Symposium, Emory University, Atlanta, USA
2016 Emory Antibiotic Resistance Center Symposium, Emory University, Atlanta, USA
2016 HIV Cure symposium, Emory University, Atlanta, USA
2018 IBMS Biomedical Symposium, Georgia State University, Atlanta, USA
2018 International Society for Vaccines Annual Congress, Atlanta, USA
2021 Keystone Symposia's eSymposia on "COVID-19: One Year Later", USA
2021 Advance Course in Basic & Clinical Immunology, FOCIS, USA

J. Oversight of Graduates/Undergraduates

2008 – 2009 Kuldeep Gupta, Lab Technician, All India Institute of Medical Sciences, New Delhi, India
2008 – 2009 Subbiah Balaji, Trainee, All India Institute of Medical Sciences, New Delhi, India
2009 – 2010 Aditya Singh, Trainee, All India Institute of Medical Sciences, New Delhi, India
2009 – 2010 Rashi Gupta, Trainee, All India Institute of Medical Sciences, New Delhi, India
2010 – 2011 Aparajita Anvita, Trainee, All India Institute of Medical Sciences, New Delhi, India

2012 – 2013 Hina Rashid, Research Associate, Indian Council of Medical Research, New Delhi, India
2012 – 2013 Maria Habib, Research Associate, Indian Council of Medical Research, New Delhi, India
2014 – 2015 Kalpanadevi Venkadesan, Lab Technician, Metaclipse Therapeutics Corporation, Atlanta, USA
2014 – 2015 Punya Mardhanan, Graduate student, Metaclipse Therapeutics Corporation, Atlanta, USA
2014 – 2015 Roheila Seyedtabaei, Volunteer, Emory University, Atlanta, USA
2014 – 2015 Lihua Shu, Graduate student and Volunteer, Emory University, Atlanta, USA
2015 – 2016 Scott Schaffer, Graduate student and Volunteer, Emory University, Atlanta, USA
2015 – 2016 Zachary Berman, Research Assistant, Emory University, Atlanta, USA
2016 – 2017 Zachary Berman, Research Technician III, Georgia State University, Atlanta, USA
2016 – 2017 Apexa Patel, Graduate Research Assistant, Georgia State University, Atlanta, USA
2016 – 2017 Jazmine Noel Jones, Graduate Research Assistant, Georgia State University, Atlanta, USA
2017 – 2018 Pooney Tavakoley Gheinani, Graduate student, Georgia State University, Atlanta, USA
2018 – 2018 Kandace Hadley, Graduate student, Georgia State University, Atlanta, USA
2017 – 2019 Ye Wang, Ph.D. student, Georgia State University, Atlanta, USA
2017 – 2019 Latika Luthra, Ph.D. student, Georgia State University, Atlanta, USA
2018 – 2019 Sijia Tang, Ph.D. student, Georgia State University, Atlanta, USA
2019 – 2020 Lori Fralick, Centers for Disease Control and Prevention, Atlanta, USA
2019 – 2021 Juan De La Cruz, Centers for Disease Control and Prevention, Atlanta, USA
2019 – 2021 Daniel Flanigan, Centers for Disease Control and Prevention, Atlanta, USA

K. Research Involvements

1. CpG ODNs as strong immunostimulators with HIV and malaria peptide antigens. I studied the role of CpG 1826 and CpG 2006 (Class B) as strong immunostimulators to induce host immune responses when co-encapsulated in PLGA microparticles with peptide antigens of HIV-1 such as envelope glycoproteins gp41 leucine zipper, gp41 fusion domain, gp120-C2, regulatory protein (nef) and peptide antigens of *P. vivax*.

a. Pun PB, Bhat AA, **Mohan T**, Kulkarni S, Paranjape R, Rao DN. Intranasal administration of peptide antigens of HIV with mucosal adjuvant CpG ODN coentrapped in microparticles enhances the mucosal and systemic immune responses. *Int Immunopharmacol. 2009*; 9(4): 468-77. PMID: 19291836.

b. **Mohan T**, Bhat AA, Rao DN. Immunomodulation & Vaccine adjuvant. *The book series of Compendium of Bioactive Natural Products M/s Studium Press, LLC, USA. 2009. Vol. 5.*

c. Bhat AA, Seth RK, Kumar S, Ali R, **Mohan T**, Biswas S, Rao DN. Induction of cell-mediated immune responses to peptide antigens of *P. vivax* in microparticles using intranasal immunization. *Immunol Invest. 2010*; 39(4-5): 483-99. PMID: 20450288.

2. Investigation of synthetic defensins as mucosal adjuvants with HIV-1 antigens. During my doctorate, I studied defensin peptide and their corresponding analogues with various peptide antigens of HIV-1 and demonstrated the effectiveness of synthetic defensins to induce strong and long-lasting humoral and cellular immune responses at different mucosal sites, when administered through intranasal route with HIV-1 peptide antigens using PLG nanosphere as a delivery vehicle.

a. **Mohan T**, Sharma C, Bhat AA, Rao DN. Modulation of HIV peptide antigen specific cellular immune response by synthetic α- and β-defensin peptides. *Vaccine. 2013; 31(13): 1707-16.* PMID: 23384751.

b. **Mohan T**, Mitra D, Rao DN. Comparative in-vitro functional analysis of synthetic defensins and their corresponding peptide variants against HIV-1NL4.3, E. coli, S. aureus and P. aeruginosa. *Int J Pept Res Ther. 2013; 19: 245–255.* Not on Pubmed.

c. **Mohan T**, Mitra D, Rao DN. Nasal delivery of PLG microparticle encapsulated defensin peptides adjuvanted gp41 antigen confers strong and long-lasting immunoprotective response against HIV-1. *Immunol Res. 2014; 58(1): 139-53.* PMID: 23666811.

d. **Mohan T**, Verma P, Rao DN. Comparative mucosal immunogenicity of HIV gp41 membrane-proximal external region (MPER) containing single and multiple repeats of ELDKWA sequence with defensin peptides. *Immunobiology. 2014; 219(4): 292-301.* PMID: 24290973.

3. T cell functionality in Indian HIV-1 patients. I conducted T cell phenotypic and functional analysis in Indian HIV-1 patients by a flowcytometric analysis of different surface markers of exhaustion, functionality, and depletion on CD4+ and CD8+ T cells.

a. Vajpayee M, **Mohan T**. Current practices in laboratory monitoring of HIV infection. *Indian J Med Res. 2011; 134(6): 801-22.* PMID: 22310815.
b. **Mohan T**, Verma P, Rao DN. Novel adjuvants & delivery vehicles for vaccines development: a road ahead. *Indian J Med Res. 2013; 138(5): 779-95.* PMID: 24434331.
c. **Mohan T**, Bhatnagar S, Gupta DL, Rao DN. Current understanding of HIV-1 and T cell adaptive immunity: progress to date. *Microb Pathog. 2014; 73: 60-9.* PMID: 24930593.

4. Evaluation of cytokine profile in post-traumatic sepsis patients and chimeric peptide adjuvant for cervical cancer. As side projects, I worked on a chimeric T cell peptide to test its adjuvanticity and therapeutic importance for cervical cancer vaccine development. Simultaneously, I studied the cytokine profiles of traumatized haemorrhage patients.
a. Sharma C, Khan MA, **Mohan T**, Shrinet J, Latha N, Singh N. A synthetic chimeric peptide harboring human papilloma virus 16 cytotoxic T lymphocyte epitopes shows therapeutic potential in a murine model of cervical cancer. *Immunol Res. 2014; 58(1): 132-8.* PMID: 24174302.
b. Gupta DL, Bhoi SK, **Mohan T**, Galwnkar S, Rao DN. Coexistence of Th1/Th2 and Th17/Treg imbalances in patients with post traumatic sepsis. *Cytokine. 2016; 88: 214-221.* PMID: 27676155.

5. Development of diagnostic kits for malaria and chikungunya infections. I developed reagents using sandwich ELISA for simultaneous detection of PfHRP2 (*P. falciparum* histidine rich protein) and PfLDH (*P. falciparum* lactate dehydrogenase) antigens in the proven malaria cases and a highly sensitive immunodiagnostic assay for chikungunya virus, based on a multiple antigenic peptide approach using selective epitopes of the E2 protein of chikungunya virus.
a. Verma P, Biswas S, **Mohan T**, Ali S, Rao DN. Detection of histidine rich protein & lactate dehydrogenase of *P. falciparum* in malaria patients by sandwich ELISA using in-house reagents. *Indian J Med Res. 2013; 138(6): 977-87.* PMID: 24521645.
b. Bhatnagar S, Kumar P, **Mohan T**, Verma P, Parida MM, Hoti SL, Rao DN. Evaluation of multiple antigenic peptides based on the Chikungunya E2 protein for improved serological diagnosis of infection. *Viral Immunol. 2015; 28(2): 107-12.* PMID: 25412351.

6. Personalized therapeutic breast cancer vaccine. I studied GPI-anchored human IL-12 and B7-1 tumor membrane vesicles using 'Protein Transfer Technology' as the cure of triple negative breast cancer. This is a simple but versatile technique that can be used to display GPI-IL-12 or GPI-B7-1 on membrane vesicles. After establishing a murine metastatic model, I investigated whether the membrane-based immunotherapy can prevent or reducing the metastasis or not.

7. GPI-anchored CCL28 in influenza VLPs acts as potent immunostimulatory. I developed a chimeric VLP containing influenza HA as antigen and GPI-CCL28 as an adjuvant. I found GPI-CCL28 acted as a strong immunostimulator at both systemic and mucosal sites and it promoted long-lasting antigen-specific immune recall responses and protective immunity against homologous or drifted H3N2 viruses. I also evaluated the role of chimeric VLPs in enhancement of T cell immunity and dendritic cells activation and maturation.
a. **Mohan T**, Kim J, Berman Z, Wang S, Compans RW, Wang BZ. Co-delivery of GPI-anchored CCL28 and influenza HA in chimeric virus-like particles induce cross-protective immunity against H3N2 viruses. *J Control Release. 2016; 233: 208-19.* PMID: 27178810.
b. **Mohan T**, Berman Z, Luo Y, Wang C, Wang S, Compans RW, Wang BZ. Chimeric virus-like particle containing influenza antigen and GPI-CCL28 induces long-lasting antibody immunity against H3N2 viruses. *Sci Rep. 2017; 7: 40226.* PMID: 28067290.
c. **Mohan T**, Deng L, Wang BZ. CCL28 chemokine: An anchoring point bridging innate and adaptive immunity. *Int Immunopharmacol. 2017; 51: 165-170.* PMID: 28843907.
d. **Mohan T**, Zhu W, Wang Y, Wang BZ. Application of chemokines as adjuvants for vaccine immunotherapy. *Immunobiology. 2018; 223(6-7): 477-485.* PMID: 29246401.

8. Exploration of various aspects in the development of the universal influenza vaccine. I also researched: two-layered influenza nanoclusters; protein nanoparticles containing fusion proteins of flagellin and influenza conserved epitopes; and MNP delivery of 4M2e-tFliC fusion protein.

a. Wang L, Chang TZ, He Y, Kim JR, Wang S, **Mohan T**, Berman Z, Tompkins MS, Tripp RA, Compans RW, Champion JA, Wang BZ. Coated protein nanoclusters from influenza H7N9 HA are highly immunogenic and induce robust protective immunity. *Nanomedicine. 2017; 13 (1): 253-262.* PMID: 27622321.
b. Deng L, Kim JR, Chang TZ, Zhang H, **Mohan T**, Champion JA, Wang BZ. Protein nanoparticle vaccine based on flagellin carrier fused to influenza conserved epitopes confers full protection against influenza A virus challenge. *Virology. 2017; 509: 82-89.* PMID: 28622575.
c. Zhu W, Pewin W, Wang C, Luo Y, Gonzalez GX, **Mohan T**, Prausnitz MR, Wang BZ. A boosting skin vaccination with dissolving microneedle patch encapsulating M2e vaccine broadens the protective efficacy of conventional influenza vaccines. *J Control Release. 2017; 261: 1-9.* PMID: 28642154.

9. Sequential immunization with a panel of VLPs generate broader protection in HIV and influenza. I demonstrated that the intramuscular sequential immunization of confirmation-stabilized trimeric chimeric Env that closely mimic the natural structure of the HIV-1 Env glycoprotein, embedded VLPs, from various HIV-1 subclades generate broadly neutralizing antibody responses with high breadth and potency of neutralization in rabbits. As well, I employed intranasal sequential administration of a panel of these Env-enriched VLPs to elicit potent and robust mucosal and T cell immunity in rabbits. In influenza project, I have sequentially vaccinated mice with heterosubtypic influenza HA VLPs to elicit cross protection against divergent influenza A viruses.
a. **Mohan T**, Berman Z, Kang SM, Wang BZ. Sequential immunizations with a panel of HIV-1 Env virus-like particles coach immune system to make broadly neutralizing antibodies. *Sci Rep. 2018; 8(1): 7807.* PMID: 29773829.
b. Luo Y, **Mohan T**, Zhu W, Wang C, Deng L, Wang BZ. Sequential Immunizations with heterosubtypic virus-like particles elicit cross protection against divergent influenza A viruses in mice. *Sci Rep. 2018; 8: 4577.* PMID: 29545521.

10. Tetrameric M2e cores and crosslinked full-length or stalk HA nanoparticle confer broad immune protection. I designed double-layered nanoparticles, fabricated by tetrameric M2e into protein nanoparticle cores and coated with headless HA from two phylogenetic groups. The vaccination of M2e-headless HA nanoparticles in mice induced robust long-lasting immunity and fully protected the mice against challenges by different influenza A viruses. I also tested whether the dual protein nanoclusters composed of tetrameric M2e from four different viral strain cores with full-length Aic and Pr8 HA coatings could induce immune protection against divergent influenza A virus challenges of the same group or both groups. Study demonstrated that the dual protein nanoclusters conferred mice with divergent cross-protection mediated.
a. Deng L, **Mohan T**, Chang TZ, Gonzalez GX, Wang Y, Kwon YM, Kang SM, Compans RW, Champion JA, Wang BZ. Double-layered protein nanoparticles induce broad protection against divergent influenza A viruses. *Nature Communications. 2018; 9 (1): 359.* PMID: 29367723.

11. Mouse genomic DNA in influenza Pr8 MNP act as the potent immunostimulators. In this project, I studied mouse genomic DNA as novel adjuvant to enhance the potency of MNP-based influenza vaccines. The Pr8 MNPs co-formulated with mouse genomic DNA showed the greatest enhancement in the antigen-specific antibody and cellular immune with greatest protection against A/PuertoRico/8/1934 or A/California/7/2009 viruses.
a. **Mohan T**, Song L, Gonzalez GX, Mark Prausnitz, Wang BZ. Genomic DNA in a dissolvable microneedle patch act as strong immunostimulator. *Clinica Chimica Acta, 2019.*

12. Influenza virus surveillance and susceptibility assessment. Under the influenza virus surveillance, our team monitors influenza drug resistance among community isolates/ specimens, offers antiviral testing for clinical care use in the USA. Recently, we identified a cluster of four oseltamivir-resistant influenza A(H1N1)pdm09 viruses, carrying NA-H275Y at a border detention center. These viruses shared HA-N156K and NA-N222K substitutions that may facilitate their spread by enabling escape from pre-existing immunity and increasing neuraminidase activity.
a. Gubareva L, **Mohan T**, Antivirals Targeting the Neuraminidase. *Cold Spring Harb Perspect Med. 2020 Mar 9:a038455. doi: 10.1101/cshperspect.a038455.* PMID: 32152244
b. **Mohan T**, Nguyen HT, Mishin VP, De La Cruz, Kondor R, Wentworth DE, Gubareva L. A cluster of oseltamivir-resistant antigenically drifted influenza A(H1N1)pdm09 viruses, Texas, January 2020. *Emerging Infectious Diseases. 2021; 27 (7): 1953-1957.* PMID: 34152954.

Complete list of publications: https://www.ncbi.nlm.nih.gov/pubmed/?term=teena+mohan

L. Management Expertise

Currently, at CDC, I am working as LPRB-BAA Program Manager/ Scientist V and responsible to organize, track and report on communications and documents submitted to LPRB from multiple external research project partners and collaborators. I am involved in reviewing and organizing communication and related materials submitted to LPRB by external collaborators as related to on-going research project collaborations and in preparing written summaries of scientific reports submitted to LPRB at CDC by external collaborators who study topics including microbiology, DNA/RNA sequencing, and molecular biology. I am also assisting in facilitating project team status, schedule development, risk/issue reviews and corrective action meetings and maintain program level issues/action logs, scope change requests/logs, work plans. My other responsibilities are to plan, create and organize accurate detailed project schedules with some follow-up and to create and organize portfolio summaries of each research project collaboration and update according to actions taken by the project team to resolve schedule problems. I am also responsible to conduct regular meetings with CDC stakeholders to plan and organize efforts, as needed, and streamline and improve processes for any of the above task.

M. IP Disclosures Submitted

a. Membrane bound CCL28 through GPI-anchoring as an adjuvant. Wang BZ, Compans RW, **Mohan T**.
b. Sequential immunization of HIV-1 chimeric Env VLPs to generate bnAbs. Wang BZ, **Mohan T**.
c. Induction of influenza broad cross protective immunity through sequential immunizations with divergent hemagglutinin antigens. Wang BZ, Luo Y, **Mohan T**.

N. Research Support and/or Scholastic Performance

Department of Biotechnology-JRF Fellowship **PI: Mohan T** Start/End date: 02/01/2006 to 01-31-2011
Title: Alpha and beta defensins as microbicides/mucosal adjuvants with the peptide antigens of HIV-1.
The goal of the project is to investigation of synthetic defensins as vaginal microbicides or mucosal adjuvants with the peptide antigens of HIV-1.
Role: PI and DBT-JRF fellow.

AIDS Vaccine 200 Bike Ride Fellowship **PI: Mohan T** Start/End date: 06/01/2015 to 05-31-2016
Title: Sequential immunization with HIV VLPs containing conformation stabilized trimeric Env.
The goal of the project is to sequentially immunized animals with conformation-stabilized trimeric HIV Env for the generation of broadly neutralizing antibody responses.
Role: PI and AIDS vaccine 200 bike ride fellow.