- **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.

1. **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.

2. Gubareva L, **Mohan T**, Antivirals Targeting the Neuraminidase. *Cold Spring Harb Perspect Med. 2020 Mar 9:a038455. doi: 10.1101/cshperspect.a038455.* PMID: 32152244.

- **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.

3. 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.

- **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.

4. **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. *Journal of Control Release. 2016; 233: 208-19.* PMID: 27178810.

5. **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. *Scientific Reports. 2017; 7: 40226.* PMID: 28067290.

- **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.

6. **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. *Scientific Reports. 2018; 8(1): 7807.* PMID: 29773829.

7. 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. *Scientific Reports. 2018; 8: 4577.* PMID: 29545521.

- **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.

8. **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.

9. **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. *Immunology Research. 2014; 58(1): 139-53.* PMID: 23666811.

10. **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.