

Resume

Naveen Kumar, Ph.D

Senior Scientist (Veterinary Virology)
Room No. 118, Division of Animal Health
Central Institute for Research on Goats
Indian Council of Agricultural Research
Makhdoom, PO-Farah, Mathura, UP-281122
Tel: +91 565-2763260 Ext 269
+91 8171301889 (cell)

Fax: +91 565-2763246

email: naveenkumar.icar@gmail.com



Career :

2011- Cont. Senior Scientist (Veterinary Virology)
Central Institute for Research on Goats, Makhdoom, Mathura, India
2006-2011: Postdoctoral research fellow
Emory University, Atlanta, USA
2004-2006: DAAD fellow (PhD research)
Friedrich Loeffler Institute, InselRiems, Greifswald, Germany
2003-2006: PhD (Veterinary Virology)
CCS Haryana Agricultural University, Hisar, India
2002-2003: Scientist
BioMed Pvt. Ltd. Ghaziabad, UP, India
2000-2002: MVSc (Veterinary Microbiology)
Rajasthan Agricultural University, Bikaner, India
1995-2000: BVSc&AH
Rajasthan Agricultural University, Bikaner, India

Awards:

2013: CSIR International travel grant to attend 32th Annual meeting of the American Society of Virology, (Pennsylvania, USA)
2012: First prize among best posters in ISSGPU annual conference 2012.
2010: Fellowship, American Society of Virology, USA.
2008: Fellowship, American Society of Virology, USA.
2008: Fellowship, Influenza Pathogenesis and Immunology Research Center, Atlanta, USA.
2006: Postdoctoral research fellowship, Emory University, Atlanta, USA.
2004: DAAD fellowship for PhD research, DAAD Bonn, Germany.
2002: Gold Medal, RAU Bikaner, India for first in MVSc (Vety. Microbiology).
2000: Sarabhai Zydus Animal Health Award for academic achievements.

Honors:

- Reviewer, Transboundary and Emerging Diseases
- Reviewer, Journal of Virological Methods
- Reviewer, Veterinary Record
- FAO/OIE expert on progressive control of PPR

Research Interest:

(*Innate immunity, Pathogen induced host cell signaling & antiviral drug discovery, Epidemiology and molecular diagnostics*).

The prime objective of my lab is isolation, identification and characterization of novel viruses from the goats. Worldwide, a very little research has done so far on viruses related to goats; there might be some novel viruses associated with common pathological conditions such as pneumonia, diarrhea, abortions etc in goats which has yet not been properly explored. Isolation, Identification and characterization of such novel viruses will enable us to prepare the proper diagnostic/prophylactic/therapeutic reagents for control of viral diseases of the goats.

In particular, I am working on Peste des Petits Ruminants (PPR), a disease primarily of small ruminants caused by a RNA virus (family *Paramyxoviridae*, genus *morbillivirus*). The disease is economically so devastating that upto 90% of the animals on a farm/village may die within few days; goats and sheep are mainly affected whereas cattle remain unaffected (undergoes sub clinical infection). I am working on characterization of the innate immune receptors following exposure to PPR virus. The innate immune system can sense viruses, bacteria, parasites and fungi through the expression of pattern recognition receptors (PRRs), which recognize conserved structure in the pathogens called pathogen associated molecular patterns (PAMPs). The most common PRRs are toll-like receptors (TLRs), retinoic acid-inducible gene-I (RIG-I) like receptors (RLRs) such as RIG-I, melanoma differentiation antigen 5 (MDA-5) and Nod-like receptors (NLRs). The viral PAMPs such as dsRNA, uncapped ssRNA with 5' triphosphate, CpG DNA or specific viral proteins are sensed by at least three different types of PRRs viz: TLR3/7/8, RIG-I/MDA-5 and NLRP3. The engagement of the viral PAMPs with the PRRs leads to the activation of a complex network of intracellular signaling pathways, which ultimately results in transcription of several cytokine genes to produce an antiviral state in the host. Until now, there is very little information about the nature of PRRs triggered following PPRV infection. Further

characterization of the innate immune receptors (PRRs) following vaccination/infection with PPRV will help identifying those PRRs that may play a significant role in generation of persistent antibody and cell-mediated immune response against PPRV.

It is also planned to develop antiviral agents against some acute viral pathogens of goats such as PPRV, and Goatpox virus. The intriguing feature of the viral pathogen is that its high mutation rate allows it to escape the pre-existing immunity and become resistant to available antiviral drugs. Most of the clinically approved antiviral drugs exclusively targets one or another viral components, repeated use of which allows the virus to escape the selection pressure and become resistant. Upon viral infection, an array of signal transduction events are initiated by the host cells that are basically antiviral. However, we have recently shown that the virus has acquired the capability to misuse some of these signaling functions (host factors) to support its effective replication. My laboratory is involved in identifying some novel cellular targets that are required for viral replication but are, at the same time dispensable for the host. The overall strategy will lead to a paradigm changes in antiviral drug development in terms of drug resistance, as virus can not easily replace the missing cellular functions by mutations.

Important publications:

1. Khandelwal N, Kaur G, Singh P, Tiwari A, Singh SV and **Kumar N***. (2014). Silver nanoparticles impair Peste des Petits Ruminants virus replication. **Virus Research** (Accepted). (***Corresponding author**).
2. **Kumar N***, Sharma S and Singh SV (2014). Peste des Petits Ruminants Virus Infection of Small Ruminants: A Comprehensive Review. **Viruses**, 6, 2287-2327. (***Corresponding author**).
3. **Kumar N***, Chaubay KK, Singh, SV, Gupta S, Sharma S, Sharma DK, Mishra AK and Singh MK. (2014). Phylogenetic analysis of an orf virus from an outbreak in sheep at Makhdoom, India, **Virus Genes**, 48, 312-319. (***Corresponding author**).
4. **Kumar N***, Chaudhary K, Chaubay KK, Singh, SV, Sharma DK, Gupta VK, Mishra AK and Sharma S. (2013). Isolation, identification, and characterization of a Peste des Petits Ruminants virus from outbreak in Nanakpur India, **J. Virological Methods** 189, 388-92 (***Corresponding author**).
5. **Kumar N**, Wang J, Lan S, Danzy S, Schelde LM, Seladi, J, Ly H and Liang Y. (2012). Characterization of virulence-associated determinants in the envelope glycoprotein of Pichinde virus, **Virology**, 433, 97-103.
6. Wang J, Danzy S, **Kumar N**, Ly H and Liang Y. (2012). Biological Roles and Functional Mechanisms of Arenavirus Z Protein in Viral Replication. **Journal of Virology**, 86, 9794-801.
7. Sharma S, Sundararajan A, Suryavanshi A, **Kumar N**, Tamara VP, Kuchroo VK, Thomas PG, Sangster MY and Rouse BT. (2011). T cell immunoglobulin and mucin protein-3 (Tim-3)/Galectin-9 interaction regulates influenza A virus-specific humoral and CD8 T-cell responses. **PNAS, USA**, 108, 19001-19006.
8. **Kumar N**, Sharma NR, Ly H, Parslow TG and Liang Y. (2011). Receptor tyrosine kinase inhibitors that block influenza A and other virus replication. **Antimicrobial agents and chemotherapy**, 55,5553-5559.
9. Xin Z, Carrol K, **Kumar, N**, Song K and Ly H. (2011). Transcriptional activation of TIN2, a gene encoding the telomerase-associated protein by SP1 and NF- κ B. **PLOS one**, 6(6): e221333. doi:10.1371/journal.pone.0021333.
10. **Kumar N**, Liang Y, Parslow TG and Liang Y. (2011). Tyrosine kinase inhibitors block multiple steps of influenza A virus replication. **Journal of Virology**, 85, 2818-27.
11. Sharma S, Mulick S, **Kumar N**, Suryavanshi A and Ruse B. (2011). An Anti-inflammatory role of VEGFR2/Src kinase inhibitor in HSV-1 induced immunopathology, **Journal of Virology**, 85, 5995-6007.
12. Lan S, McLay L, Wang J, **Kumar N**, Ly H, and Liang Y. (2009). Development of infectious clones for virulent and avirulent Pichinde viruses – a model virus to study arenavirus-induced hemorrhagic fevers. **Journal of Virology**, 83, 6357-6352.
13. **Kumar N**, Zin Z, Liang Y, Ly H and Liang Y. (2008). NF- κ B signaling differentially regulates influenza viral RNA synthesis. **Journal of Virology**. 82:9880-9889.
14. Brehm KE, **Kumar N**, Thulke, HH and Haas B. (2008). Protection against heterologous challenge with foot and mouth disease by high potency emergency vaccines. **Vaccine**, 26, 1681-1687.

15. **Kumar N**, Sharma R and Kakker NK. (2007). Non-structural protein 3A for differentiation of foot-and-mouth disease infected and vaccinated animals in a Haryana (India). **Journal of Veterinary Medicine B. (now Zoonoses and Public Health)**, 54, 376-382.

Miscellaneous

16. Khandelwal N, Kaur G, **Kumar, N** and Tiwari A. (2014). Application of silver nanoparticles in viral inhibition: a new hope for antivirals. **Digest. J. Nanomaterials and Biostructure**, 9, 175-186.
17. Singh S.V., Singh P.K., Singh A.V., Sohal J.S., **Kumar N.**, Chaubey K.K., Gupta S., Kumar A., Bhatia A.K., Srivastav A.K., Dhama K. 2014. Bio-load and bio-type profiles of *Mycobacterium avium* subspecies *paratuberculosis* infection in the farm and farmer's herds / flocks of domestic livestock: A 28 years study (1985-2013). **Transboundary and Emerging Diseases**, 61, 1-13.
18. Kaur G, Khandelwal N, **Kumar, N** and Tiwari A. (2013). Revival of medicinal plants: channeling the traditional uses towards modern applications. **International Journal of Indigenous Medicinal Plants**, 46, 1196-1205.
19. Singh SV, **Kumar N**, Singh SN, Bhattacharyya TK, Gupta S, Chaubay KK, Singh PK, Singh AV and. (2013). Complete genome sequence analysis of Indian Bison type (S5) *Mycobacterium avium* subspecies *paratuberculosis*, **J. Bacteriology (GenomeA)**, Volume 1, Issue 1 e00005-13).

Research Projects:

1. Characterization of the innate immune receptors following exposure to Peste des Petits ruminants virus, ICAR, (PI), 2013-2016.
2. Development and characterization of indigenous vaccine and diagnostics for Johne's disease, CSIR-NMITLI, (Co-PI), 2011-2014.
3. Isolation, identification and characterization of the organisms associated with neonatal diarrhea, ICAR (Co-PI), 2012-2015.
4. Outreach programme on zoonotic diseases, ICAR Network programme, (Co-PI), 2011-2017.
5. Patho-epidemiological studies on emerging and existing diseases of goats, ICAR, (Co-PI), 2012-2017.
6. Isolation, identification and characterization of important viruses of goats: a pilot study, ICAR, (PI), 2011-2013 completed.

Books:

- Naveen Kumar (2012). Persistence of foot-and-mouth disease virus in cattle. LAP Lambert Academic Publishing, AV Akademikerverlag GmbH & Co. KG, Saarbrücken, Germany, ISBN 978-3-659-22943-5, paperback, 132 Pages.

Book Chapters:

- Kashyap SK, **Kumar N** and Maherchandani S. (2013). Ribotyping: An important tool in bacterial taxonomy. In, Animal Biotechnology: Models in discovery and translation, **Elsevier Press, USA**.
- Singh SV, Chaubey KK, **Kumar N**, Singh PK, Sohal JS and Gupta S. (2012). Impact of host genetics on the control of *Mycobacterium* in Small Ruminants Production and Health, page: 255-280. Satish Serial Publishing House, Azadpur Delhi.

Scientific Affiliations:

- Member, European Society of Virology (2012-onward).
- Member, American Society of Virology (2008-onward).
- Member, ISSGPU, India (2002-onward).
- Member, IAVMI, India (2003-onward)
- Member, Veterinary Council of India.
- Member, Rajasthan State Veterinary Council, India.