K. Gururaj

Highest Qualification: Ph.D. (Veterinary Microbiology)

Current Position:

Senior Scientist,

Division of Animal Health,

ICAR-Central Institute for research on Goats,

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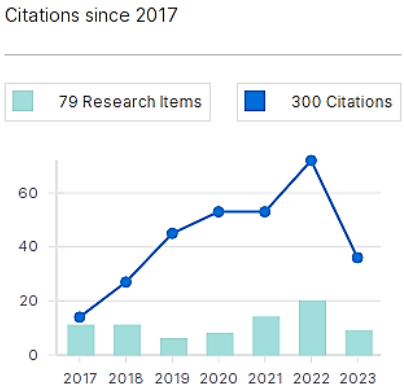
Educational Details:

S. No.	Institution	Degree Awarded	Year	Field of Study
1	Pondicherry University	B.V.Sc. & AH	2002	Veterinary science
2	ANGRAU, Hyderabad	M.V.Sc.	2006	Veterinary Microbiology
3	TANUVAS, Chennai	Ph.D.	2013	Veterinary Microbiology

Research Interests:

Zoonotic diseases including Brucellosis and Johne's disease. Antimicrobial resistance and surveillance in livestock. Disease diagnostics including molecular diagnostics like TaqMan® probe based Real time PCR, system Biology based molecular pathogenesis by qRT-PCR, sero-diagnostic development for Enterotoxaemia, brucellosis, Johne′s disease, coenurosis etc. Peptide antigen based DIVA ELISA development for *Mycobacterium avium Paratuberculosis*.



H-index: 11 *(Source: Researchgate)*

Research Projects:

Handled 15 projects of national and international importance as investigator related to infectious diseases, diagnostic development, disease control management in small ruminants in the past including

- World Bank funded NASF project on Johne's disease DIVA diagnostics,
- Centre for agricultural bioinformatics (CABin) project on peptide design and lateral flow assay development for enterotoxaemia in goats- Phase I&II
- Outreach programme on zoonotic disease (OPZD) – Human-animal interface and risk factors in Crohn's disease caused by *Mycobacterium avium subspecies paratuberculosis*
- DBT Twinning project on Cryptosporidiosis

Currently handling extramural projects as Principal investigator including

- FAO funded project on "Indian network for fisheries and animal antimicrobial resistance (INFAAR)" –an important project on surveillance of antimicrobial resistance and integration of pan-Indian data through a network mode
- Centre for agricultural bioinformatics (CABin) project on peptide design and lateral flow assay development for enterotoxaemia in goats- Phase III
- As a coinvestigator working on manipulation of rumen methanogens to reduce the methane emission in intensively reared goats in the project titled 'Early life nutritional intervention to reduce methane emission and improve feed efficiency in goats' funded by DBT
- As a coinvestigator working on effects of selective feeding in goats for production of meat and milk with desirable healthy traits in humans by capturing the cellular and systemic responses in experimental goats in the project titled 'Improved goat animal production for healthier products through guided nutrients and bio-actives feeding' funded by DBT
- As a coinvestigator working on the project 'Development of Goat Value Chain in Bundelkhand Region of Uttar Pradesh' funded by National Livestock mission (NLM), DAHD, Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India

Other salient achievements

- Published >85 research and review articles in national and international journals since 2008
- First in ICAR to get certified for four research technologies in a calendar year (2022-23) with commercial value
- First in India to develop a reverse genetics system for the full length genome of Newcastle disease virus (Strain – D58), as a part of doctoral research work.
- Chief Microbiologist of the NABL laboratory being set-up in the goat products technology for testing of meat and meat products for *Listeria monocytogenes, Salmonella, E. coli* and Staphylococcal enterotoxin, using VIDAS system. Certificate of accreditation obtained for 'General requirements for the competence of testing and calibration laboratories' from National accreditation board for testing of calibration laboratories (NABL) to GPT lab with the standard ISO/IEC 17025:2005, Certificate no. TC-8413/dt.28/03/2019.
- Guided 6 masters and 2 doctoral students and (including MVSc students from prestigious national veterinary institute, IVRI, Bareilly) for their research and dissertation work
- Commercialized four technologies as co-inventor which are herbal formulations for treatment of various ailments in ruminants including anti-diarrheal, acaricidal formulations, immune-modulatory bolus etc.
- Development of molecular diagnostics for various diseases including the *OMP31* gene based TaqMan® probe real time PCR assay for Brucella melitensis in small ruminants, *IS900* gene based TaqMan® probe real time PCR assay for Johne's disease, *bfp*A gene based differentiation of enteropathogenic *E. coli* (EPEC) from non-EPEC isolates
- Development of peptide based sero-diagnostics like TM16- based iELISA for quick and early detection of coenurosis in goats, ETX peptide based iELISA for titration of sero-protectivity to enterotoxaemia in goats, MAP2191c (mammalian cell entry protein) recombinant protein based ELISA for differentiation of infected from vaccinated animals against Johne's disease.

International publications (in the last three years)

1. Gangwar, N.K., Pawaiya, R.V.S., **Gururaj, K**., Andani, D., Kumar, A., Singh, R. and Singh, A.P., 2022. Enterocolitis in Goats Associated with Enterotoxaemia in the Perspective of Two Toxins: Epsilon Toxin and beta-2 Toxin–An Immunohistochemical and Molecular Study. Comparative Immunology, Microbiology and Infectious Diseases, pp.101837. JCR (2021) IF: **2.729**
2. Pachoori, A., **Gururaj, K**., Sachan, S. and Sharma, D., 2022. Multiplex qPCR for differentiation of Mycobacterium avium subspecies paratuberculosis in active and passive infection of goats. Applied Microbiology and Biotechnology, 106(12), pp.4705-4717. JCR (2021) IF: **5.56**
3. Sharma, A.K., **Gururaj, K**., Sharma, R., Goel, A., Paul, S. and Sharma, D.K., 2022. Development of duplex real-time PCR for quick detection of cryptosporidiosis in goats. Cell Biochemistry and Function. pp.1-13. doi:10.1002/cbf.3759. JCR (2021) IF: **3.963**
4. Kumar, S., Behera, S.K., **Gururaj, K**., Chaurasia, A., Murmu, S., Prabha, R., Angadi, U.B., Pawaiya, R.S. and Rai, A., 2023. In silico mutation of aromatic with aliphatic amino acid residues in Clostridium perfringens epsilon toxin (ETX) reduces its binding efficiency to Caprine Myelin and lymphocyte (MAL) protein receptors. Journal

of Biomolecular Structure and Dynamics, pp.1-13. DOI:10.1080/07391102.2023.2204362. IF: **5.235**

5. **Gururaj. K**., Gangwar, C., Mishra, A.K., Kumar, A., Kharche, S.D., Singh, N.P. and Pachoori, A., 2022. Occurrence, molecular characterization and antimicrobial-resistance pattern of Staphylococcus species isolates from buck semen. Archives of Microbiology, 204(2), pp.1-10.
6. Pachoori, A., **Gururaj, K**., Sachan, S. and Sharma, D., 2022. Multiplex qPCR for differentiation of *Mycobacterium avium subspecies paratuberculosis* in active and passive infection of goats. Applied Microbiology and Biotechnology, 106(12), pp.4705-4717.
7. **Gururaj, K**., Pawaiya, R.V.S., Gangwar, N.K., Andani, D., Kumar, A., Mishra, A.K., Sharma, N. and Sharma, D.K., 2021. Pathological and Microbiological Study of Multiple Hepatic Abscesses in Barbari Goat. Journal of Immunology and Immunopathology, 23 (2), pp.159-165.
8. Sharma, S., Gautam, A.K., Singh, S.V., Chaubey, K.K., Rose, M.K., Bangar, Y. and **Gururaj, K**., 2021. In vivo kinetics of peripheral cellular immune responses in Mycobacterium avium subspecies paratuberculosis (MAP) infected and vaccinated goats. Comparative immunology, microbiology and infectious diseases, 79, p.101710.
9. Singh, S.P., Kharche, S.D., Pathak, M., Soni, Y.K., **Gururaj, K**., Sharma, A.K., Singh, M.K. and Chauhan, M.S., 2021. Temperature response of enriched pre-pubertal caprine male germline stem cells in vitro. Cell Stress and Chaperones, 26(6), pp.989-1000.
10. Bhargava, K., **Gururaj, K**., Aseri, G.K., Nath, G., Singh, N.P., Pawaiya, R.V.S., Kumar, A., Mishra, A.K., Yadav, V.B. and Jain, N., 2022. Bacteriophages: A possible solution to combat enteropathogenic Escherichia coli infections in neonatal goats. Letters in Applied Microbiology.
11. Gangwar, N.K., Pawaiya, R.V.S., **Gururaj, K**., Singh, D.D., Andani, D., Kumar, A., Sharma, D.K., Rao, A.R. and Rai, A., 2021. Chemotactic factor inducing Interleukin-8 (IL8) gene is transcriptionally elevated in experimental enterotoxaemia in goats caused by Clostridium perfringens type D. Heliyon, 7(7), p.e07568.
12. Ranjan, R., Singh, P., Singh, S.P., **Gururaj, K**., Kharche, S.D. and Singh, M.K., 2021. Status of Beta Defensin-1 and Its Effect on Post Thaw Semen Fertility Gene Expression in Indian Goat Breed. Cryoletters, 42(3), pp.137-145.
13. Gangwar, C., Mishra, A.K., **Gururaj, K**., Kumar, A., Kharche, S.D., Saraswat, S., Kumar, R. and Ramachandran, N., 2021. Semen quality and total microbial load: An association study in important Indian Goat breeds during different seasons. Andrologia, 53(4), p.e13995.
14. **Gururaj, K.**, Pawaiya, R.S., Gangwar, N.K., Mishra, A.K., Singh, D.D., Andani, D., Paul, S., Sharma, N., Shivasharanappa, N., Rahal, A. and Chaturvedi, V.K., 2019. Comparative molecular characterization and phylogenetic analysis of cerebral and non-cerebral coenurosis in Indian goats. Veterinary Parasitology: Regional Studies and Reports, 15, p.100266.
15. Gangwar, C., **Gururaj, K**., Mishra, A.K., Kumar, A., Pachoori, A., Saraswat, S., Singh, N.P. and Kharche, S.D., 2020. Molecular detection of important abortion-causing microorganisms in preputial swab of breeding bucks using PCR-based assays. Reproduction in Domestic Animals, 55(11), pp.1520-1525.
16. Chaubey, K.K., Gangwar, N., Pawaiya, R.S., Jatav, G.P., Sohal, J.S., Singh, S.V., Singh, M., Gupta, S., **Gururaj, K**., Kumar, N. and Jayaraman, S., 2019. Evaluation of newly developed 'six recombinant secretary proteins based 'cocktail ELISA' and

'whole cell lysate 'based' indigenous ELISA' and tissue microscopy' with 'Gold Standard' histo-pathology for the diagnosis of Johne's disease in slaughtered goats and buffaloes. Comparative Immunology, Microbiology and Infectious Diseases, p.101338.

17. Rajagunalan, S., **Gururaj, K**., Lakshmikantan, U., Murugan, M., Ganesan, A., Sundar, A., Sureshkannan, S., Andani, D. and Pawaiya, R.S., 2019. Detection of the presence of *Coxiella burnetii* in a case of goat abortion: a first report from India. Tropical animal health and production, 51(4), pp.983-986.
18. Singh, S.P., Ramachandran, N., Sharma, N., Goel, A.K., **Gururaj, K**. and Kharche, S.D., 2019. Temporal changes in plasma profile of pregnancy-associated glycoprotein, progesterone and estrone sulfate associated with fetal number during early-and mid-pregnancy in goats. Animal reproduction science, 205, pp.115-125.
19. Pawaiya, R.S., **Gururaj, K**., Gangwar, N.K., Singh, D.D., Kumar, R. and Kumar, A., 2020. The Challenges of Diagnosis and Control of Enterotoxaemia Caused by Clostridium perfringens in Small Ruminants. Advances in Microbiology, 10(5), pp.238-273.