



Dr. Saravanan Subramaniam

PhD (Veterinary Virology)

Sr. Scientist

ICAR-DFMD

saranvirol@gmail.com

Current areas of work:

1. Molecular surveillance of foot and mouth disease virus in India
2. Antigenic analysis of field isolates by micro-neutralization test.

Research Paper (79)

1. **Subramaniam S**, Biswal JK, Mohapatra JK, Khulape SA, Madhanmohan M, Singh RK (2020). Emergence of foot-and-mouth disease virus serotype Asia1 group IX in India. **Arch Virol**. doi:10.1007/s00705-020-04766-5
2. Miranda R. Bertram, Rachel M. Palinski, Steven J. Pauszek, Ethan J. Hartwig, George R. Smoliga, Jitendra K. Biswal, Rajeev Ranjan, **Saravanan Subramaniam**, Jajati K. Mohapatra, Biswajit Das, Ian H. Fish, Bramhadev Pattnaik, Luis L. Rodriguez, Jonathan Arzt (2020). Genome Sequences of Seven Foot-and-Mouth Disease Virus Isolates Reveal Diversity in the O/ME-SA/Ind2001 Lineage in India between 1997 and 2009. **Microbiology Resource Announcements** 9 (16) e00287-20
3. Biswal JK, **Subramaniam S**, Ranjan R, VanderWaal K, Sanyal A, Pattnaik B, Singh RK (2019). Differential antibody responses to the major antigenic sites of FMD virus serotype O after primo-vaccination, multiply-vaccination and after natural exposure. **Infect Genet Evol.** 6;78:104105. doi: 10.1016/j.meegid.2019.104105
4. Bertram MR, Palinski RM, Ranjan R, Biswal JK, Pauszek SJ, Hartwig EJ, Smoliga GR, Fish IH, Vierra D, **Subramaniam S**, Mohapatra JK, Das B, Pattnaik B, Arzt J5 (2019). Genome Sequences of 18 Foot-and-Mouth Disease Virus Outbreak Strains of Serotype O Sublineage Ind2001d from India, 2013 to 2014. **Microbiol Resour Announc.** 15;8(33). pii: e00776-19.

5. Biswal JK, Ranjan R, **Subramaniam S**, Mohapatra JK, Patidar S, Sharma, MK, Bertram MR, Brito B, Rodriguez LL, Pattnaik B, Arzt, J (2019). Genetic and antigenic variation of foot-and-mouth disease virus during persistent infection in naturally infected cattle and Asian buffalo in India. **Plos One**. <https://doi.org/10.1371/journal.pone.0214832>
6. Saxena A, Biswas SK, Chand K, Chauhan A, Mohd G, **Subramaniam S**, Naskar J, Mondal B, Ramakrishnan MA, Pandey AB (2019). Genetic characterization and ex-vivo neutralization behavior of bluetongue virus serotype-16 recovered from apparently healthy goat. **Acta Tropica**. 194, 13-22.
7. **Subramaniam S**, Rekha G, Biswal JK, Ranjan R, Pattnaik B (2019). Development and evaluation of Reverse Transcription-Polymerase Chain Reaction (RT-PCR) Assay for differentiation of foot and mouth disease virus serotype O lineages circulating in India. **Indian J. Vet. Pathol (Diva enterprises Pvt Ltd)**.
8. Sharma AK, Bhatt M, Sankar M, Mohapatra JK, Dash BB, Gowane GR, **Subramaniam S**, Ranjan R, Pattnaik B (2018) Kinetics of Interferon gamma and Interleukin-21 response following foot and mouth disease virus infection. **Microb Pathog**. 4010(18)31264-6.
9. Mohapatra JK, Das B, Rout M, Sreenivasa BP, **Subramaniam S**, Sanyal A, Pattnaik B (2018) Alternate vaccine strain selection in the wake of emerging foot-and-mouth disease virus serotype A antigenic variants in India. **Vaccine**, <https://doi.org/10.1016/j.vaccine.2018.04.090>
10. Sarangi LN, Mohapatra JK, **Subramaniam S**, Das B, Sanyal A, Pattnaik B (2018). Substitutions accrued on Foot-and-mouth disease virus capsid during propagation in cell culture. **Proc. Natl. Acad. Sci., India, Sect. B Biol. Sci**. <https://doi.org/10.1007/s40011-018-0986-9>
11. Dash L, **Subramaniam S**, Khulape SA, Prusty BR, Pargai K, Narnaware SD, Patil NV, Pattnaik B (2018) Development and utilization of VHH antibodies derived from Camelus Dromedarius against Foot and-Mouth Disease Virus. **Animal Biotechnology**. doi.org/10.1080/10495398.2018.1433191
12. Ranjan R, Biswal JK, **Subramaniam S**, Dash BB, Singh KP, Arzt J, Rodriguez LL, Pattnaik B (2018) Evidence of subclinical foot-and-mouth disease virus infection in young calves born from clinically recovered cow under natural condition. **Trop Anim Health Prod**. doi: 10.1007/s11250-018-1518-6.
13. Brito BP, Mohapatra JK, **Subramaniam S**, Pattnaik B, Rodriguez LL, Moore BR, Perez AM (2017) Dynamics of widespread foot-and-mouth disease virus serotypes A, O and Asia-1 in southern Asia: A Bayesian phylogenetic perspective. **Transbound Emerg Dis**. doi: 10.1111/tbed.12791.
14. Hayer SS, VanderWaal K, Ranjan R, Biswal JK, **Subramaniam S**, Mohapatra JK, Sharma GK, Rout M, Dash BB, Das B, Prusty BR, Sharma AK, Stenfeldt C, Perez A, Delgado AH, Sharma MK,

- Rodriguez LL, Pattnaik B, Arzt J (2017) Foot-and-mouth disease virus transmission dynamics and persistence in a herd of vaccinated dairy cattle in India. **Transbound Emerg Dis**. doi: 10.1111/tbed.12774.
15. Rout M, **Subramaniam S**, Mohapatra JK, Dash BB, Pattnaik B (2017) Investigation of foot-and-mouth disease outbreak in a pig farm at Kollam district of Kerala, India. **Indian J. Anim. Res** DOI: <https://doi.org/10.18805/ijar.B-3071>
 16. Rout M, **Subramaniam S**, Mohapatra JK, Sanyal A, Dash BB, Pattnaik B (2017) Phylogenetic characterization of foot-and-mouth disease virus recovered from mithuns and yaks in India. **Indian J. Anim. Res (ARCC Journals)** DOI:10.18805/ijar.v0iOF.9138
 17. Biswal JK, **Subramaniam S**, Ranjan R, Pattnaik B (2017) Uncleaved 2A-peptide of foot-and-mouth disease virus can display foreign epitope-tag at the virion surface. **Infect Genet Evol (Elsevier)** 54:324-329
 18. **Subramaniam S**, Das B, Biswal JK, Ranjan R, Pattnaik B (2017) Antigenic variability of foot-and-mouth disease virus serotype O during serial cytolitic passage. **Virus Genes (Springer)**. DOI 10.1007/s11262-017-1494-3
 19. Rout M, **Subramaniam S**, Mohapatra JK, Pattnaik B (2017) Molecular epidemiologic investigation of foot-and-mouth disease in pig population of India. **Indian J. Anim. Res** (52):281-285
 20. Biswal JK, Ranjan R, Das B, **Subramaniam S**, Pattnaik B (2017) The direct boil RT-mPCR: A simple and rapid method for detection of foot-and-mouth disease virus genome in clinical samples without nucleic acid extraction. **Indian J. Vet. Pathol (Diva enterprises Pvt Ltd)**. 41(1) : 12-17, 2017
 21. Hayer SS, Ranjan R, Biswal JK, **Subramaniam S**, Mohapatra JK, Sharma GK, Rout M, Dash BB, Das B, Prusty BR, Sharma AK, Stenfeldt C, Perez A, Rodriguez LL, Pattnaik B, VanderWaal K, Arzt J (2017) Quantitative characteristics of the foot-and-mouth disease carrier state under natural conditions in India. **Transbound Emerg Dis** (Blackwell Verlag GmbH) doi: 10.1111/tbed12627
 22. Das B, Mohapatra JK, Pande V, **Subramaniam S**, Sanyal A (2016) Evolution of foot-and-mouth disease virus serotype A capsid coding (P1) region on a timescale of three decades in an endemic context. **Infect Genet Evol** 41:36-46
 23. Ranjan R, Biswal JK, **Subramaniam S**, Singh KP, Stenfeldt C, Rodriguez LL, Pattnaik B, Arzt J (2015) Foot-and-Mouth Disease Virus-Associated Abortion and Vertical Transmission following Acute Infection in Cattle under Natural Conditions. **PLoS One** 11(12):e0167163
 24. Sharma GK, Mahajan S, Matura R, Biswal JK, Ranjan R, **Subramaniam S**, Misri J, Bambal RG, Pattnaik B (2016) Herd Immunity Against Foot-and-Mouth Disease Under Different Vaccination Practices in India. **Transbound Emerg Dis** doi: 10.1111/tbed12478

25. Biswal JK, **Subramaniam S**, Ranjan R, Pattnaik B (2016) Partial deletion of stem-loop 2 in the 3' untranslated region of foot-and-mouth disease virus identifies a region that is dispensable for virus replication. **Arch Virol** 161(8):2285-90
26. Knowles NJ, Bachanek-Bankowska K, Wadsworth J, Mioulet V, Valdazo-Gonzalez B, Eldaghayes IM, Dayhum AS, Kammon AM, Sharif MA, Waight S, Shamia AM, Tenzin S, Wernery U, Grazioli S, Brocchi E, **Subramaniam S**, Pattnaik B, King DP (2016) Outbreaks of Foot-and-Mouth Disease in Libya and Saudi Arabia During 2013 Due to an Exotic O/ME-SA/Ind-2001 Lineage Virus. **Transbound Emerg Dis** 63(5)
27. Behura M, Mohapatra JK, Pandey LK, Das B, Bhatt M, **Subramaniam S**, Pattnaik B (2015) The carboxy-terminal half of nonstructural protein 3A is not essential for foot-and-mouth disease virus replication in cultured cell lines. **Arch Virol** 161(5):1295-305
28. Rout M, Pawar SS, Nair NS, Benjamin ED, Usha AP, Anil KS, Mohapatra JK, **Subramaniam S**, Pattnaik B (2016) Detection of foot-and-mouth disease virus infection in cattle and pigs at Mannuthy, Kerala. **Indian J Vet Pathol** 40(1):55
29. Rout M, Nair NS, Das B, **Subramaniam S**, Mohapatra JK, Pattnaik B (2016) Foot-and-mouth disease in elephants in Kerala state of India during 2013. **Indian J Anim Sci** 86 (6): 627–631
30. Dash L, **Subramaniam S**, Khulape SA, Prusty B, Pargai K, Narnaware SD, Patil NV, B Pattnaik (2016) Development of naïve phage display VHH libraries from Indian camel. **Indian J Anim Sci** 86 (8): 1–00
31. Biswal JK, **Subramaniam S**, Ranjan R, Pattnaik B (2016) Evaluation of FTA((R)) card for the rescue of infectious foot-and-mouth disease virus by chemical transfection of extracted RNA in cultured cells. **Mol Cell Probes** 30(4):225-30
32. Rout M, **Subramaniam S**, Mohapatra JK, Pattnaik B (2016) Clinico-molecular diagnosis and phylogenetic investigation of foot-and-mouth disease in small ruminant population of India. **Small Ruminant Res** 144: 1-5
33. Rout M, **Subramaniam S**, Das B, Mohapatra JK, Dash BB, Sanyal A, Pattnaik B (2016) Foot-and-mouth disease in wildlife population of India. **Indian J Anim Res**. DOI: <http://dx.doi.org/10.18805/ijar.11333>
34. Mohanty NN, Das B, Sarangi LN, **Subramaniam S**, Mohapatra JK, Panda HK (2016) Isolation and characterization of foot-and-mouth disease virus from Odisha, India. **Trop Biomed** 33(4): 753–760
35. **Subramaniam S**, Mohapatra JK, Das B, Sanyal A, Pattnaik B (2015) Genetic and antigenic analysis of foot-and-mouth disease virus serotype O responsible for outbreaks in India during 2013. **Infect Genet Evol** 30:59-64

36. **Subramaniam S**, Mohapatra JK, Das B, Sharma GK, Biswal JK, Mahajan S, Misri J, Dash BB, Pattnaik B (2015) Capsid coding region diversity of re-emerging lineage C foot-and-mouth disease virus serotype Asia1 from India. **Arch Virol** 160(7):1751-9
37. **Subramaniam S**, Mohapatra JK, Sharma GK, Biswal JK, Ranjan R, Rout M, Das B, Dash BB, Sanyal A, Pattnaik B (2015) Evolutionary dynamics of foot-and-mouth disease virus O/ME-SA/Ind2001 lineage. **Vet Microbiol** 178(3-4):181-9
38. **Subramaniam S**, Bisht P, Mohapatra JK, Sanyal A, Pattnaik B (2015) A new genetic lineage of foot-and-mouth disease virus serotype O in India. **Vet Ital** 51 (2), 145-149
39. Mahapatra M, Yuvaraj S, Madhanmohan M, **Subramaniam S**, Pattnaik B, Paton DJ, Srinivasan VA, Parida S (2015) Antigenic and genetic comparison of foot-and-mouth disease virus serotype O Indian vaccine strain, O/IND/R2/75 against currently circulating viruses. **Vaccine** 33(5):693-700
40. Mahajan S, Sharma GK, Matura R, **Subramaniam S**, Mohapatra JK, Pattnaik B (2015) Construction and characterization of yeast two-hybrid cDNA library derived from LFBK cell line. **Biologicals** 43(3):202-8
41. Sharma GK, Mahajan S, Matura R, **Subramaniam S**, Mohapatra JK, Pattnaik B (2015) Quantitative single dilution liquid phase blocking ELISA for sero-monitoring of foot-and-mouth disease in India. **Biologicals** 43(3):158-64
42. Biswal JK, Bisht P, **Subramaniam S**, Ranjan R, Sharma GK, Pattnaik B (2015) Engineering foot-and-mouth disease virus serotype O IND R2/1975 for one-step purification by immobilized metal affinity chromatography. **Biologicals** 43(5):390-8
43. Sharma GK, Mahajan S, Matura R, **Subramaniam S**, Ranjan R, Biswal J, Rout M, Mohapatra JK, Dash BB, Sanyal A, Pattnaik B (2015) Diagnostic assays developed for the control of foot-and-mouth disease in India. **World J Virol** 12;4(3):295-302
44. Biswal JK, **Subramaniam S**, Ranjan R, Sharma GK, Misri J, Pattnaik B (2015) Marker vaccine potential of foot-and-mouth disease virus with large deletion in the non-structural proteins 3A and 3B. **Biologicals** 43(6):504-11
45. Biswal JK, **Subramaniam S**, Sharma GK, Mahajan S, Ranjan R, Misri J, Pattnaik B (2015) Megaprimer-mediated capsid swapping for the construction of custom-engineered chimeric foot-and-mouth disease virus. **Virus Genes** 51(2):225-33
46. Sarangi LN, Mohapatra JK, **Subramaniam S**, Pandey LK, Das B, Sanyal A, Misri J, Pattnaik B (2015) Spectrum of VP1 region genetic variants in the foot-and-mouth disease virus serotype O populations derived from infected cattle tongue epithelium. **Acta Virol** 59(3):305-10
47. Mohanty NN, **Subramaniam S**, Rout M, Sarangi LN, Bisht P, Pandey LK, Mohapatra JK, Panda HK (2015) Serosurveillance of foot-and-mouth disease in ruminant population of Coastal Odisha, India. **Beni-Suef Univ J Appl Scis** 4: 279-283

48. Biswal JK, **Subramaniam S**, Ranjan R, Sharma GK, Pattnaik B (2015) Isolation and characterisation of foot-and-mouth disease virus from a captive Indian elephant (*Elephas maximus*). **Indian J. Vet. Pathol** 39(4) : 376-379
49. Pandey LK, Mohapatra JK, **Subramaniam S**, Sanyal A, Pande V, Pattnaik B (2014) Evolution of serotype A foot-and-mouth disease virus capsid under neutralizing antibody pressure in vitro. **Virus Res** 181:72-6
50. Gowane GR, Sharma AK, Sankar M, Narayanan K, Bisht P, **Subramaniam S**, Pattnaik B (2014) The expression of IL6 and 21 in crossbred calves upregulated by inactivated trivalent FMD vaccine. **Anim Biotechnol** 25(2):108-18
51. Rout M, Biswal JK, Dash BB, Hegde R, **Subramaniam S**, Mohapatra JK (2014) Investigation of foot - and - mouth disease outbreaks in Chikkaballapur district of Karnataka. **Indian J Anim Sci.** 84 (3): 231–235
52. Ranjan R, Kangayan M, **Subramaniam S**, Mohapatra JK, Biswal JK, Sharma GK, Sanyal A, Pattnaik B (2014) Development and evaluation of a one step reverse transcription-loop mediated isothermal amplification assay (RT-LAMP) for rapid detection of foot and mouth disease virus in India. **Virus disease** 25(3):358-64
53. Sharma GK, Mohapatra JK, Mahajan S, Matura R, **Subramaniam S**, Pattnaik B (2014) Comparative evaluation of non-structural protein-antibody detecting ELISAs for foot-and-mouth disease sero-surveillance under intensive vaccination. **J Virol Methods** 207:22-8
54. Sharma GK, Mahajan S, Matura R, **Subramaniam S**, Mohapatra JK, Pattnaik B (2014) Production and characterization of single-chain antibody (scFv) against 3ABC non-structural protein in *Escherichia coli* for sero-diagnosis of Foot and Mouth Disease virus. **Biologicals** 42(6):339-45
55. Biswal JK, Mohapatra JK, Bisht P, **Subramaniam S**, Sanyal A, Pattnaik B (2015) A positively charged lysine residue at VP2 131 position allows for the enhanced adaptability of foot-and-mouth disease virus serotype A in BHK-21 cells. **Biologicals** 43(1):71-8
56. Mohapatra JK, Pandey LK, Rai DK, Das B, Rodriguez LL, Rout M, **Subramaniam S**, Sanyal A, Rieder E, Pattnaik B (2015) Cell culture adaptation mutations in foot-and-mouth disease virus serotype A capsid proteins: implications for receptor interactions. **J Gen Virol** 96(Pt 3):553-64
57. **Subramaniam S**, Mohapatra JK, Sharma GK, Das B, Dash BB, Sanyal A, Pattnaik B (2013) Phylogeny and genetic diversity of foot and mouth disease virus serotype Asia1 in India during 1964-2012. **Vet Microbiol** 27;167(3-4):280-8
58. **Subramaniam S**, Sanyal A, Mohapatra JK, Sharma GK, Biswal JK, Ranjan R, Rout M, Das B, Bisht P, Mathapati BS, Dash BB, Pattnaik B (2013) Emergence of a novel lineage genetically divergent from the predominant Ind2001 lineage of serotype O foot-and-mouth disease virus in India. **Infect Genet Evol** 18: 1-7

59. Sarangi LN, Mohapatra JK, **Subramaniam S**, Sanyal A, Pattnaik B (2013) Antigenic site variation in foot-and-mouth disease virus serotype O grown under vaccinal serum antibodies in vitro. **Virus Res** 176(1-2):273-9
60. Gowane GR, Sharma AK, Sankar M, Narayanan K, Das B, **Subramaniam S**, Pattnaik B (2013) Association of BoLA DRB3 alleles with variability in immune response among the crossbred cattle vaccinated for foot-and-mouth disease (FMD). **Res Vet Sci** 95(1):156-63
61. Gowane GR, Sharma AK, Sankar M, Thirumurugan P, Narayanan K, **Subramaniam S**, Pattnaik B (2013) Evaluation of genetic and environmental parameters determining antibody response induced by vaccination against Foot and Mouth Disease. **Agric Res** 2: 140.
62. Gowane GR, Sharma AK, Sankar M, Vandre R, Thirumurugan P, **Subramaniam S**, Pattnaik B (2013) Association of Foot and Mouth Disease (FMD) virus vaccine elicited immune response with productive and reproductive performance in crossbred cattle. **Indian J Anim Sci** 83(6)
63. Bisht P, Mohapatra JK, **Subramaniam S**, Das B, Pande V, Biswal JK, Sharma GK, Rout M, Ranjan R, Dash BB, Sanyal A, Pattnaik B (2014) Efficient rescue of foot-and-mouth disease virus in cultured cells transfected with RNA extracted from clinical samples. **J Virol Methods** 196:65-70
64. Sharma GK, **Subramaniam S**, De A, Das B, Dash BB, Sanyal A, Mishra AK, Pattnaik B (2012) Detection of Foot and Mouth Disease virus in semen of infected cattle bulls. **Indian J Anim Sci** 82 (12): 1472–1476.
65. **Subramaniam S**, Pattnaik B, Sanyal A, Mohapatra JK, Pawar SS, Sharma GK, Das B, Dash BB (2013) Status of Foot-and-mouth Disease in India. **Transbound Emerg Dis** 60: 197-203
66. Rudreshappa AG, Sanyal A, Mohapatra JK, **Subramaniam S**, De A, Das B, Singanallur NB, Jangam AK, Muthukrishnan M, Villuppanoor SA, Pattnaik B (2012) Emergence of antigenic variants with in serotype A foot and mouth disease virus in India and evaluation of a new vaccine candidate panel. **Vet Microbiol** 158(3-4):405-9
67. Pattnaik B, **Subramaniam S**, Sanyal A, Mohapatra JK, Dash BB, Ranjan R, Rout M (2012) Foot-and-mouth Disease: Global Status and Future Road Map for Control and Prevention in India. **Agric Res** 1: 132-147
68. Biswal JK, Sanyal A, Rodriguez LL, Subramaniam S, Arzt J, Sharma GK, Hammond JM, Parida S, Mohapatra JK, Mathapatii BS, Dash BB, Ranjan R, Rout M, Venketaramanan R, Misri J, Krishna L, Prasad G, Pathak KML, Pattnaik B (2012) Foot-and-mouth Disease: Global status and Indian Perspective. **Indian J Anim Sci.** 82(2): 109-131.
69. Das B, Sanyal A, **Subramaniam S**, Mohapatra JK, Pattnaik B (2012) Field outbreak strains of serotype O foot-and-mouth disease virus from India with a deletion in the immunodominant betaG-betaH loop of the VP1 protein. **Arch Virol** 157(10):1967-70

70. Mohapatra JK, **Subramaniam S**, Singh NK, Sanyal A, Pattnaik B (2012) Experimental evidence for competitive growth advantage of genotype VII over VI: implications for foot-and-mouth disease virus serotype A genotype turnover in nature. **Res Vet Sci** 92(2):317-9
71. Mohapatra JK, Pawar SS, Tosh C, **Subramaniam S**, Palsamy R, Sanyal A, Hemadri D, Pattnaik B (2011) Genetic characterization of vaccine and field strains of serotype A foot-and-mouth disease virus from India. **Acta Virol** 55(4):349-52
72. **Subramaniam S**, Sanyal A, Mohapatra JK, Hemadri D, Pattnaik B (2011) Comparative complete genome analysis of Indian type A foot-and-mouth disease virus field isolates. **Virus Genes** 43(2):224-33
73. Mohapatra JK, **Subramaniam S**, Pandey LK, Pawar SS, De A, Das B, Sanyal A, Pattnaik B (2011) Phylogenetic structure of serotype A foot-and-mouth disease virus: global diversity and the Indian perspective. **J Gen Virol** 92(Pt 4):873-9
74. Sanyal A, **Subramaniam S**, Mohapatra JK, Tamilselvan RP, Singh NK, Hemadri D, Pattnaik B (2010) Phylogenetic analysis of Indian serotype Asia1 foot-and-mouth-disease virus isolates revealed emergence and reemergence of different genetic lineages. **Vet Microbiol** 144(1-2):198-202
75. Mohapatra JK, Priyadarshini P, Pandey L, **Subramaniam S**, Sanyal A, Hemadri D, Pattnaik B (2009) Analysis of the leader proteinase (Lpro) region of type A foot-and-mouth disease virus with due emphasis on phylogeny and evolution of the emerging VP359-deletion lineage from India. **Virus Res** 141: 34-46
76. Mohapatra JK, Priyadarshini P, Pandey L, **Subramaniam S**, Hemadri D, Sanyal A, Pattnaik B (2009) Phylogenetic analysis of 3C protease (3C(pro)) coding region of Foot-and-mouth disease virus type A. **Acta Virol** 53(3):175-83
77. Mohapatra JK, Hemadri D, Rao TV, Sreenivasa BP, **Subramaniam S**, Sanyal A, Periyasamy TR, Singh NK, Pattnaik B, Venkataramanan R (2008) Assessment of suitability of two serotype A candidate vaccine strains for inclusion in FMD vaccine in India. **Vet Microbiol** 131(1-2):65-72
78. Mohapatra JK, **Subramaniam S**, Tosh C, Hemadri D, Sanyal A, Periyasamy TR, Rasool TJ (2007) Genotype differentiating RT-PCR and sandwich ELISA: Handy tools in epidemiological investigation of foot and mouth disease. **J Virol Methods** 143: 117-121
79. **Subramaniam S**, Singh RP, Balamurugan V, Saravanan P, Sen A, Sahay B, Sarkar J, Singh RK (2007) Production and Characterization of Neutralizing Monoclonal Antibodies Against Haemagglutinin Protein of peste des petits ruminants (PPR) Vaccine Virus. **J Appl Anim Res** 32: 207-210

Abstracts (Lead/Oral/Poster) Published / Presented in Seminars/Symposia (55)

1. Biswal JK, **Subramaniam S**, Ranjan R, Pattnaik B, Singh, R (2020) Genetic basis of the antigenic variation of the FMD virus during persistent infection in naturally infected cattle and buffalo. XXXIII Annual convention of IAVMI. National conference on challenges and threats of microbes to animals and humans during February 6-7, 2020 at IVRI, Izatnagar, UP
2. M. Rout, K. Pargai, R. Hegde, N. Gautham, **S. Subramaniam**, S.M. Byregowda, J.K. Mohapatra and R.K. Singh (2020). Foot-and-mouth disease seroprevalence in goat population of Karnataka. International conference on evolution of viruses and viral diseases (VIROCON 2020) at INSA, New Delhi during 18-20, January, 2020
3. Biswal JK, **Subramaniam S**, Ranjan R, Pattnaik B, Arzt J, Singh, R (2019) Genetic basis of the antigenic variation of the FMD virus during persistent infection in naturally infected cattle and Asian buffalo. Global Foot-and-Mouth Disease Research Alliance (GFRA). Scientific Meeting Bangkok, Thailand 29-31 October, 2019
4. Ranjan R, Biswal JK, **Subramaniam S**, Pattnaik B (2019). Understanding FMD virus ecology in cattle and buffalo under natural. *Annual convention cum conference of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases on Scientific and Technological Innovations in Animal Health Care for better production and trade*. Department of Veterinary Microbiology, Bihar Veterinary College, Bihar Animal Sciences University, Patna-800014, Bihar- Reg. to be held from February 04-06, 2019
5. Ranjan R, Biswal JK, **Subramaniam S**, Pattnaik B (2018). Foot-and-Mouth Disease virus: Subclinical infection in cattle and buffalo. *Veterinary Pathology Congress- 2018*. Department of Veterinary Pathology, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar Dantiwada AU, Sardarkrushinagar- 385 506, Banaskantha, Gujarat, India October 22-24th, 2018.
6. **Subramaniam S**, Das B, Dahiya SS, Khulape SA, Biswal JK, Ranjan R, Pattnaik B (2018) Genetic and antigenic analysis of FMD virus serotype O collected during 2016-17 from India. *XXXI Annual convention of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases and National symposium on Innovations in animal health – current challenges and future prospective. 29th to 31st January, 2018. Department of Veterinary Microbiology, College of Veterinary Science. Sri Venkateswara Veterinary University, Tirupati – 517 502, AP, India (Oral)*
7. Biswal JK, Ranjan R, **Subramaniam S**, Pattnaik B (2018). FMDV Serotype O epitope dominance in the antibody response of primo vaccinated, re vaccinated and naturally infected animals. *XXXI Annual convention of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases and National symposium on Innovations in animal health –*

current challenges and future prospective. 29th to 31st January, 2018. Department of Veterinary Microbiology, College of Veterinary Science. Sri Venkateswara Veterinary University, Tirupati – 517 502, AP, India (Oral)

8. Biswal JK, Rajeev R, **Subramaniam S**, Das B, Rodriguez LL, Pattnaik B (2017) Foot-and-mouth disease virus expressing chimeric capsid protein: a Tool for delineation of new antigenic sites and vaccine strain Selection. *GFRA-2017, 25-27 October 2017, in Incheon, Korea.(oral)*
9. Ranjan R, Biswal JK, **Subramaniam S**, Das B, Rodriguez LL, Arzt J, Pattnaik B (2017) FMD virus ecology and its landscape epidemiology in cattle and Buffalo under natural condition in India. *GFRA-2017, 25-27 October 2017, in Incheon, Korea.(poster)*
10. Ranjan R, Biswal JK, **Subramaniam S**, Singh KP, Pattnaik B (2017) Foot and mouth disease virus: abortion and vertical transmission in cattle under natural condition. *International seminar on “Emerging horizons in diagnosis of animal and poultry diseases: towards sustainable production in Asian countries” 34th Annual Conference of Indian Association of Veterinary Pathologists. Veterinary College, Hebbal, Bengaluru, 560024, Karnataka, India. 9-11, November, 2017 (poster)*
11. Ranjan R, Biswal JK, **Subramaniam S**, Singh KP, Pattnaik B (2017) Foot and mouth disease virus ecology in cattle and buffalo under natural condition in India. *International seminar on “Emerging horizons in diagnosis of animal and poultry diseases: towards sustainable production in Asian countries” 34th Annual Conference of Indian Association of Veterinary Pathologists. Veterinary College, Hebbal, Bengaluru, 560024, Karnataka, India. 9-11, November, 2017(poster)*
12. Ranjan R, Biswal JK, **Subramaniam S**, Pattnaik B (2017). Persistence of foot-and-mouth disease virus in cattle and buffalo. National Seminar on "Opportunities and Challenges of Transnational Research in the Frontier Areas of Animal Biotechnology", from 22- 23 September 2017 at C.V.Sc. & A.H., OUAT, Bhubaneswar, Odisha. Pp.- 62-65. (Lead Presentation)
13. Biswal JK, Ranjan R, **Subramaniam S**, Pattnaik B (2017). Reverse genetics approaches for the development of next generation vaccines against foot-and-mouth disease. National Seminar on "Opportunities and Challenges of Transnational Research in the Frontier Areas of Animal Biotechnology", from 22- 23 September 2017 at CVSc & AH, OUAT, Bhubaneswar, Odisha. Pp.- 65 (Lead Presentation).
14. Biswal JK, Ranjan R, **Subramaniam S**, Pattnaik B (2017). Marker vaccine potential of foot-and-mouth disease virus displaying the exogenous tetanus toxoid epitope-tag at the surface. National Seminar on "Opportunities and Challenges of Transnational Research in the Frontier Areas of Animal Biotechnology", from 22- 23 September 2017 at CVSc & AH, OUAT, Bhubaneswar, Odisha. Pp.-70. (Oral Presentation).
15. **Subramaniam S**, Biswal JK, Das B, Ranjan R, Pattnaik B (2016). A positively charged residue at antigenic site 4 of foot-and-mouth disease virus serotype O confers complete resistance to

- neutralization. *Open Session of the Standing Technical and Research Committees of the European Commission for the Control of Foot-and-Mouth Disease. Portugal. 26th-28th October 2016*
16. **Subramaniam S**, Das B, Biswal JK, Ranjan R, Dash BB, Pattnaik B (2016). Serial cytolitic passage of foot and mouth disease virus under non-immune pressure resulted in change of antigenicity. *International Conference on Global Perspectives in Virus Disease Management. VIROCON-2016, 8-10 December, 2016, ICAR-IIHR, Bengaluru.*
 17. Biswal JK, Ranjan R, **Subramaniam S**, Pattnaik B (2016). The cellular chaperone heat shock protein-90 facilitates foot and mouth disease viral particles assembly and a potential target for antiviral therapy. *International Conference on Global Perspectives in Virus Disease Management. VIROCON-2016, 8-10 December, 2016, ICAR-IIHR, Bengaluru.*
 18. Khulape SA, **Subramaniam S**, Pattnaik B (2016). Molecular pathotyping and Evolutionary dynamics of type Asia1 foot and mouth disease virus isolates of Mithun of north-east India. *International Conference on Global Perspectives in Virus Disease Management. VIROCON-2016, 8-10 December, 2016, ICAR-IIHR, Bengaluru.*
 19. Biswal JK, Ranjan R, Das B, **Subramaniam S**, Arzt J, Rodriguez L, Pattnaik B (2016). Genetic and Antigenic Variation of FMD Disease Virus during Persistence in naturally infected Cattle and Buffalo. *Open Session of the Standing Technical and Research Committees of the European Commission for the Control of Foot-and-Mouth Disease. Portugal. 26th-28th October 2016*
 20. Ranjan R, Biswal JK, **Subramaniam S**, Dash BB, Nandkumar S, Rodriguez L, Arzt J, Pattnaik B (2016). Localization of Foot-and-Mouth disease RNA and viral antigens in different tissues from apparently healthy cattle and buffalo under natural condition in India. *Open Session of the Standing Technical and Research Committees of the European Commission for the Control of Foot-and-Mouth Disease. Portugal. 26th-28th October 2016*
 21. Sankar M, Sharma AK, Bhatt M, Kumar, R, Dash BB, Subramaniam S, Pattnaik B (2016). Expression kinetics of Interferon gamma and Interleukine-21 during foot and mouth disease infection in cattle. *Global symposium on Animal Health; Newer technologies and their Applications. IAVMI-2015, 12-14 February, 2016, Guwahati, Asom.*
 22. Dash L, **Subramaniam S**, Khulape SA, Prusty B, Pargai K, Narnaware SD, Patil NV and Pattnaik B (2016) The naïve phage display variable heavy chain libraries from Camelus dromedarius showing specificity to Foot and Mouth disease serotype Asia1. *XXIX annual Convention of IAVMI and global symposium on Animal Health: Newer Technologies and their applications at Guwahati, 12-14 February 2016*
 23. Ranjan R, Biswal JK, Mohapatra JK, Sharma GK, Rout M, Subramaniam S, Dash BB, Sharma AK, Rodriguez L, Arzt J, Pattnaik B (2015). Understanding FMD Viral Ecology and Landscape

- epidemiology towards control and eradication of FMD in India. *GFRA-2015, 20-22 October 2015, Hanoi, Vietnam*.
24. Biswal JK, Ranjan R, Subramaniam S, Sharma GK, Misri J, Pattnaik B (2015). Determining the epitope dominance of FMDV serotype O circulating in India by site directed mutagenesis. *GFRA-2015, 20-22 October 2015, Hanoi, Vietnam*.
 25. Dash L, Subramaniam S, Sharma GK, Khulape S, Narnaware SD, Patil NV, Pattnaik B (2015). Characterization of single domain heavy chain libraries against foot and mouth disease virus structural proteins from camelus dromedarius. Transboundary viral diseases under one health: Perspectives and challenges. *VIROCON-2014, 8-10 October, 2015. Meghalaya*.
 26. **Subramaniam S** and Pattnaik B (2014). Characterization of 2013 outbreak strains of foot and mouth disease in southern peninsular India. Recent trends in Virology Research in the Omics Era. *VIROCON-2014, 18-20 December, 2014, TANU, Coimbatore (TN)*.
 27. Pattnaik B, **Subramaniam S**, Misri J (2014). Trends, current scenario and future perspectives for the prevention and control of FMD. International Conference on challenges and opportunities in animal health at the face of Globalization and Climate change. *IAVMI-2014, 30th October-1st November 2014, Mathura (UP)*
 28. Sarangi LN, Mohapatra JK, **Subramaniam S**, Pandey LK, Das B, Sanyal A, Pattnaik B (2014). Spectrum of VP1 region genetic variants in the foot and mouth disease virus serotype O population derived from infected cattle tongue epithelium. International Conference on challenges and opportunities in animal health at the face of Globalization and Climate change. *IAVMI-2014, 30th October-1st November 2014, Mathura (UP)*
 29. Rout M, Das B, **Subramaniam S**, Mohapatra JK, Pattnaik B (2014). Preparedness of foot and mouth disease virus by polymerase chain reaction. International Conference on challenges and opportunities in animal health at the face of Globalization and Climate change. *IAVMI-2014, 30th October-1st November 2014, Mathura (UP)*
 30. Rout M, **Subramaniam S**, Mohapatra JK, Dash BB, Pattnaik B (2014). Foot and mouth disease in a pig farm at Kollam district of Kerala. National Conference on Opportunities and Strategies for Sustainable Pig Production. *NRC-Pig, Guwahati, Assam, 20-21 December, 2014*.
 31. Rout M, Nair NS, Das B, **Subramaniam S**, Mohapatra JK, Pattnaik B (2014). Foot and mouth disease in Elephants in Kerala during 2013. Recent trends in Virology Research in the Omics Era. *VIROCON-2014, 18-20 December, 2014, TANU, Coimbatore (TN)*
 32. Sharma GK, Mahajan S, Matura R, **Subramaniam S**, Pattnaik B (2013). Production and Characterization of Single Chain variable fragment (scFv) antibodies against 3ABC non-structural

- protein in Immuno-diagnosis of FMD. *Asia-Pacific Congress of Virology. VIROCON-2013, Amity, Noida, 17th-20th December 2013.*
33. Rout M, Pawar SS, Nair NS, Benjamin ED, Usha AP, Anil KS, Mohapatra JK, **Subramaniam S**, B. Pattnaik (2013). Detection of foot-and-mouth disease virus infection in cattle and pig farm in Kerala. *Asia-Pacific Congress of Virology. VIROCON-2013, Amity, Noida, 17th-20th December 2013.*
 34. **Subramaniam S**, Mohapatra JK, Sanyal A, Pattnaik B (2012). Emergence and re-emergence of different genotypes/lineages in India. *FAO-ICAR International conference on scientific developments and technical challenges in the progressive control of Foot-and-Mouth Disease in South Asia. February 13-15, 2012, New Delhi.*
 35. **Subramaniam S**, Das B, Mohapatra JK, Dash BB, Pattnaik B (2012) Emergence of novel genetic lineage of Serotype O Foot-and-Mouth Disease Virus in India. *Appliance of Science in the Progressive Control of FMD. eufmd. 29-31, October 2012, Spain*
 36. **Subramaniam S**, Mohapatra JK, Sanyal A, Rout M, Prasad G, Pattnaik B (2012) Molecular epidemiology of Foot-and-mouth disease in India. *AO-ICAR International Conference Scientific Developments and Technical Challenges in the Progressive Control of FMD in South Asia. 13th-15th February' 2012, New Delhi pp. 21-25.*
 37. Sanyal A, **Subramaniam S**, Biswal JK, Mohapatra JK, Ranjan R, Dash BB, Misri J, Pathak KML, Pattnaik B (2012). Current scenario of Foot and Mouth Disease in India. *FAO-ICAR International Conference on Scientific developments and technical challenges in the progressive control of Foot and Mouth Disease in South Asia. New Delhi (India), 13- 15 February 2012, pp 16- 20.*
 38. Sarangi LN, Mohapatra JK, Dash BB, **Subramaniam S**, Sanyal A, Pattnaik B (2012). Selection of amino acid substitution on the capsid of FMD virus serotype O propagated *in vitro* under vaccinal serum antibody pressure. *Immunobiology and Management of Viral Diseases in 21st century. VIROCON-2012. 8-10 November, Mukteswar (India).*
 39. Gowane GR, Sharma AK, Sankar M, Narayanan K, Das B, Subramaniam S, Pattnaik B (2012). Association of BoLA DRB3 alleles with variability in immune response among the crossbred cattle vaccinated for Foot-and-Mouth Disease (FMD). *Immunobiology and Management of Viral Diseases in 21st century. VIROCON-2012. 8-10 November, Mukteswar (India).*
 40. Gowane GR, Sharma AK, Sankar M, Narayanan K, Subramaniam S, Sanyal A, Pattnaik B (2012). Non-genetic factors affecting variability in immune response and transcriptional profile of IL6 and 21 in crossbred cattle vaccinated with FMD trivalent vaccine. *FAO-ICAR International conference on scientific developments and technical challenges in the progressive control of Foot-and-Mouth Disease in South Asia. February 13-15, 2012, New Delhi.*

41. Bisht P, Das B, **Subramaniam S**, Biswal JK, Sharma GK, Mohapatra JK, Sanyal A, Pattnaik B (2012). Application of RNA transfection in diagnosis of FMD. *FAO-ICAR International conference on scientific developments and technical challenges in the progressive control of Foot-and-Mouth Disease in South Asia. February 13-15, 2012, New Delhi (India).*
42. Mathapati BS, Sharma GK, Das B, Sarangi LN, **Subramaniam S**, Sanyal A, Pattnaik B (2012). Antigenic cartography of foot and mouth disease virus serotype O Indian isolates. *FAO-ICAR International conference on scientific developments and technical challenges in the progressive control of Foot-and-Mouth Disease in South Asia. February 13-15, 2012, New Delhi*
43. Mathapati BS, Sanyal A, Sharma GK, Sarangi LN, Das B, **Subramaniam S** (2012). Evidence of recombination in structural and non-structural coding regions of Serotype O FMD Virus. *Appliance of Science in the Progressive Control of FMD. eufmd. 29-31, October 2012, Spain*
44. Mathapati BS, Sanyal A, Sharma GK, Bisht P, Sarangi LN, **Subramaniam S** (2012). Antigenic Cartography For Analysis of Antigenic Variations in FMD Virus. *Appliance of Science in the Progressive Control of FMD. eufmd. 29-31, October 2012, Spain*
45. **Subramaniam S**, Rout M, Sharma GK, Mohapatra JK, Sanyal A, Pattnaik B (2011) Emergence and re-emergence of different genotypes/lineages of Foot-and-Mouth Disease Virus in India. XX National Conference of Indian Virological Society on Managing Emerging and Re-emerging Plant, Animal, Human and Aquatic Viral Diseases: One Health Perspective. *VIROCON-2011, 29-31 December 2011, Haryana, India.*
46. Mathapati BS, **Subramaniam S**, Das B, Sanyal A, Pattnaik B (2011). Recombination in structural and non structural protein coding region of Foot-and-mouth disease serotype O Indian isolates. XX National Conference of Indian Virological Society on Managing Emerging and Re-emerging Plant, Animal, Human and Aquatic Viral Diseases: One Health Perspective. *VIROCON-2011, 29-31 December 2011, Haryana, India.*
47. **Subramaniam S** and Pattnaik B (2010) Significance of molecular diagnosis of Foot and Mouth Disease. XIX National conference on recent trends in viral disease problems and management. *VIROCON-2010. Indian Virological Society. March 18-20, 2010, Tirupati, A.P.*
48. **Subramaniam S** and Sanyal A (2009) Molecular epidemiology of serotype Asia1 FMD virus in India. *OIE/FAO reference laboratories network meeting 2009. Nov. 2009, ICAR, New Delhi pp 23-27.*
49. Pawar S, Sanyal A, Sharma K, **Subramaniam S**, Tamilselvan RP, Pattnaik B (2009) Foot and Mouth Disease (FMD) in Indian Yak: An overview. *International conference on Yak. NRC on YAK. Arunachal Pradesh*

50. Sanyal A, Tamilselvan RP, **Subramaniam S**, Mohapatra JK, Venkataramanan R, Krishna L, Bujarbaruah KM, Bandyopadhyay SK, Pattnaik B (2009) The Application of a national laboratory network in India for FMD. *World Association of Veterinary Laboratory Diagnosticians-14th International Symposium, Madrid, Spain, 17-20 June 2009*
51. Mohapatra JK, Priyadarshini P, Pandey L, **Subramaniam S**, Sanyal A, Pattnaik B (2008) Analysis of the leader proteinase region of type A foot and mouth disease virus with due emphasis on phylogeny and evolution of the emerging VP3⁵⁹ deletion group. *XXIII annual conference of IAVMI and National symposium, November 25-26, IVRI, Izatnagar.*
52. **Subramaniam S**, Hemadri D, sanyal A, Tamilselvan RP, Muniswamy K, Pattnaik B (2008) Detection of foot and mouth disease virus in ELISA negative clinical samples by multiplex PCR. *XXIII annual conference of IAVMI and National symposium, November 25-26, IVRI, Izatnagar.*
53. Hemadri D, Sanyal A, Tosh C, Tamilselvan RP, Mohapatra JK, **Subramaniam S**, Rasool T J, Bandyopadhyay SK, Pattnaik B (2007). Changing faces of foot and mouth disease Type O Pan Asia strain, India. *13th International Symposium for the World Association of Veterinary Laboratory Diagnosticians (WAVLD), 1-14 November 2007, Melbourne, Australia.*
54. Sanyal A, Mohapatra JK, **Subramaniam S**, Tamilselvan RP, Hemadri D, Pattnaik B (2007) Phylogenetic analysis of recent Indian serotype Asia 1 Foot and Mouth Disease virus isolates revealed continuous emergence and reemergence of different genetic lineages. *International conference on Emerging and Re-Emerging Viral Disease of the Tropics and Sub-Tropics. VIROCON-2007, 11-14 Dec 2007, IARI, New Delhi.*
55. **Subramaniam S**, Singh RP, Sen A, Singh RK, Balamurugan V, Saravanan P (2004) Production and characterization of neutralizing monoclonal antibodies against peste des petits ruminants. *XI convention of ISVIB and National symposium on alternative strategies for livestock production and protection; Role of Biotechnology and immunology. 3-4 Nov, 2004, IVRI, Mukteswar*

Popular articles (6)

1. **Subramaniam S**, Ranjan R, Sanyal A, Pattnaik B (2012). Diagnosis of Foot and Mouth Disease. **Indian Farming. 61(11): 9-12**
2. Rout M, Sanyal A, **Subramaniam S**, Dash BB, Misri J, Pathak KML, Pattnaik B (2012). Foot and Mouth Disease: A Threat to Livestock Health, Productivity and Food Security. **Indian Farming. 61(11): 3-6**
3. Rout M, Subramaniam S, Sanyal A, Dash BB, Sharma K, Misri J, Pattnaik B (2012). Foot and Mouth Disease in Sheep, Goats, Semi-domesticated and Wild Animals. **Indian Farming: 61(11): 24-29**

4. Sharma GK, Mohapatra JK, Mahajan S, Subramaniam S (2012). Necessity of 'DIVA' strategy in Foot and Mouth Disease surveillance. **Indian Farming**. 61(11): 30-33.
5. Pawar SS, Tamilselvan RP, **Subramaniam S**, Sanyal A, Mohapatra JK, Pattnaik B (2010). Foot and Mouth Disease (FMD): India and the World. **Science India**: 13, 36-42.
6. Pawar SS, **Subramaniam S**, Amrurkar S (2009). Biotechnology: A tool for Dairy Development in India. **Dairy Planner**: 5(5).

Book chapters (4)

1. **Subramaniam S**, Mohapatra JK, Sanyal A, Misri J, Pathak KML, Pattnaik B (2013). Emergence and re-emergence of different genotypes/lineages of Foot-and-mouth Disease virus in India. In: Pathak, K.M.L., Pattnaik, B., Rout, M., Bhasin, V., Sumption, K., Prasad, G, Misri, J. (Eds). **Topics in Foot and mouth disease**. Indian council of Agricultural Research. pp. 79-94
2. Mathapati BS, Sanyal A, Sharma GK, **S. Subramaniam** (2013). Antigenic Cartography of Indian FMD Virus isolates of serotype O. In: Pathak, K.M.L., Pattnaik, B., Rout, M., Bhasin, V., Sumption, K., Prasad, G, Misri, J. (Eds). **Topics in Foot and mouth disease**. Indian council of Agricultural Research. pp. 170-177
3. Ranjan R, **Subramaniam S**, Sharma GK, Mohapatra JK, Biswal JK, Rout M, Dash BB, Sanyal A, Pattnaik B. (2012). Recent Advances in Diagnosis of Foot and Mouth Disease. In: Pandey et al., **Advances in Diagnosis of Livestock and Poultry Disease** Division of Virology, IVRI Campus, Mukteswar, Uttarakhand. Pp. 15-23.
4. Rout M, Mohapatra JK, **Subramaniam S**, Muniswamy K, Dash BB, Sanyal A, Ranjan R, Sharma GK, Biswal JK, Pattnaik B. (2013). Foot and mouth disease. **Trends in Diagnosis of Animal Viral Diseases**. Agri-Biovet Press. Pp 63-80

Scientific Write Up (6)

1. **Subramaniam S**, Dash BB, Pattnaik B (2013) Scenario of Foot and Mouth Disease in India. All India conference on Livestock and Dairy Development, Gujarat, India. 11 June, 2013
2. Biswal JK, Sharma GK, **Subramaniam S**, Dash BB, Pattnaik B (2012). Transboundary Animal Diseases (TADs). Managing Trans-boundary Diseases of Agricultural Importance in Asia-Pacific. 10-12 October, NASC, New Delhi
3. Pattnaik B, Sharma GK, Sanyal A, Mohapatra JK **Subramaniam S** (2010) Foot and mouth disease: Indian scenario. Newer concepts in disease of animals. Farm animals, wildlife and laboratory animal diseases. ICAR Winter school, October 1-21, IVRI, Izatanagar

4. Pattnaik B, Sharma GK, Sanyal A, Mohapatra JK, **Subramaniam S (2010)** Foot and mouth disease: Indian scenario. Newer concepts in disease of animals. Farm animals, Poultry, wildlife and laboratory diseases ICAR Winter School IVRI, Izatnagar.
5. Sanyal A, Hemadri D, Tamilselvan RP, **Subramaniam S**, Mohapatra JK, Krishna L, Bajurbaruah KM, Pattnaik B. Diagnostic kits -priorities and gaps in Indian context
6. Hemadri D, Sanyal A, Tamil Selvan RP, **Subramaniam S**, Mohapatra JK, Krishna L, Bujarbaruah KM, Pattnaik B Constraints and Opportunities for the control of foot and mouth disease in India

Diagnostic manual/bulletin (7)

1. Suresh KP, Patil SS, Roy P, Mohapatra JK, Subramaniam S and Singh RK (2019). Sampling Plan for Serosurveillance and Seromonitoring of FMD in India under National FMD Control Programme (Volume I: serosurveillance), ICAR-NIVEDI. Bengaluru
2. Suresh KP, Patil SS, Roy P, Mohapatra JK, Subramaniam S and Singh RK (2019). Sampling Plan for Serosurveillance and Seromonitoring of FMD in India under National FMD Control Programme (Volume II: Seromonitoring), ICAR-NIVEDI. Bengaluru
3. Biswal JK, Subramaniam S, Mohapatra JK (2019). Training manual on Solid Phase Competitive ELISA (SPCE) for anti-FMDV structural antibody estimation. ICAR-DFMD, Mukteswar-263138, Nainital, India.
4. Instruction manual on Multiplex PCR for Serotyping of Foot-and-Mouth Disease Virus
5. Write up on 'Collection and Transportation of Specimens for Foot and Mouth Disease Diagnosis, PD on FMD, Mukteswar, India' for SAARC member countries
6. Manual on Regional Training on Vaccine Matching for analyzing the homology of field isolates/strains in relation to the in-use vaccine strain(s) of Foot and Mouth Disease for SAARC Member Countries' 29 October to 7 November 2012
7. Manual on Laboratory training on foot and mouth disease diagnosis for 'Laboratory Training on FMD Diagnosis for SAARC Member Countries' held at Project Directorate on Foot and Mouth Disease, Mukteswar from May 2- 7, 2011.

Awards (11)

1. **Best presentation:** Biswal JK, **Subramaniam S**, Ranjan R, Pattnaik B, Singh, R (2019) Genetic basis of the antigenic variation of the FMD virus during persistent infection in naturally infected cattle and buffalo. XXXIII Annual convention of IAVMI. National conference on challenges and threats of microbes to animals and humans during February 6-7, 2020 at IVRI, Izatnagar, UP

2. **Best Poster:** M. Rout, K. Pargai, R. Hegde, N. Gautham, **S. Subramaniam**, S.M. Byregowda, J.K. Mohapatra and R.K. Singh (2020). Foot-and-mouth disease seroprevalence in goat population of Karnataka. International conference on evolution of viruses and viral diseases (VIROCON 2020) at INSA, New Delhi during 18-20, January, 2020
3. Awarded a shield for delivering expert lecture on Molecular epidemiology of FMD in India at Central Institute for Research on Buffaloes, Hisar, Haryana during 14-15, September 2018
4. ICVP Best Poster Award: Ranjan R, Biswal JK, **Subramaniam S**, Singh KP, Pattnaik B (2017) Foot and mouth disease virus ecology in cattle and buffalo under natural condition in India. *International seminar on "Emerging horizons in diagnosis of animal and poultry diseases: towards sustainable production in Asian countries" 34th Annual Conference of Indian Association of Veterinary Pathologists. Veterinary College, Hebbal, Bengaluru, 560024, Karnataka, India. 9-11, November, 2017*
5. ASVP President Poster Award: Ranjan R, Biswal JK, **Subramaniam S**, Singh KP, Pattnaik B (2017) Foot and mouth disease virus ecology in cattle and buffalo under natural condition in India. *International seminar on "Emerging horizons in diagnosis of animal and poultry diseases: towards sustainable production in Asian countries" 34th Annual Conference of Indian Association of Veterinary Pathologists. Veterinary College, Hebbal, Bengaluru, 560024, Karnataka, India. 9-11, November, 2017*
6. VIROCON Best Oral Presentation: **Subramaniam S**, Das B, Biswal JK, Ranjan R, Dash BB, Pattnaik B (2016). Serial cytolytic passage of foot and mouth disease virus under non-immune pressure resulted in change of antigenicity. *International Conference on Global Perspectives in Virus Disease Management. VIROCON-2016, 8-10 December, 2016, ICAR-IIHR, Bengaluru.*
7. Late Dr. M. N. Kulkarni Memorial Award for best Research Paper presentation for the paper entitled 'The naïve phage display variable heavy chain libraries from Camelus dromedarius showing specificity to Foot and Mouth disease serotype Asia1' Dash L, Subramaniam S, Khulape SA, Prusty B, Pargai K, Narnaware SD, Patil NV and Pattnaik B. presented during XXIX annual Convention of IAVMI and global symposium on Animal Health: Newer Technologies and their applications at Guwahati, 12-14 February 2016.
8. Dr B S Rajya Memorial Award for best short/rapid communication for article Biswal JK, **Subramaniam S**, Ranjan R, Sharma GK, Pattnaik B (2015) Isolation and characterisation of foot-and-mouth disease virus from a captive Indian elephant (*Elephas maximus*). **Indian J. Vet. Pathol** 39(4): 376-379 at 33rd Annual Conference of Indian Association of Veterinary Pathologists at Department of Veterinary Pathology, College of Veterinary Science & AH, Durg-491001, Chhattisgarh, India, November 9-11, 2016.

9. **Best Poster:** Sarangi LN, Mohapatra JK, Dash BB, **Subramaniam S**, Sanyal A, Pattnaik B (2012). Selection of amino acid substitution on the capsid of FMD virus serotype O propagated in vitro under vaccinal serum antibody pressure. Immunobiology and Management of Viral Diseases in 21st century. *VIROCON-2012. 8-10 November, Mukteswar (India)*.
10. **IVRI-JRF** (2002) for MVSc (Veterinary Virology)
11. **IVRI- SRF** (2004) for PhD (Veterinary Virology)

Seminar/conference/workshop attended (30)

1. International conference on evolution of viruses and viral diseases (VIROCON 2020) at INSA, New Delhi during 18-20, January, 2020
2. 27th Annual Review Meeting of AICRP on FMD held during 30-31 August, 2019 at IAHVB, Bengaluru, Karnataka
3. 26th Annual Review Meeting of AICRP on FMD held at International Centre for FMD, Bhubaneswar, Odisha during 7-8, September, 2018
4. One day workshop on Disease Free Zone organized by DADF on 16th July 2018 at Hyderabad, Telangana
5. 2nd Brainstorming workshop on Development of pro-forma for ranking of ICAR institutes at NAAS, New Delhi on 28th July, 2018
6. FMD Brainstorming meeting at Central Institute for Research on Buffaloes, Hisar, Haryana during 14-15, September 2018 and delivered a expert lecture on Molecular epidemiology of FMD in India
7. XXXI Annual convention of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases and National symposium on Innovations in animal health – current challenges and future prospective. 29-31st January, 2018. Department of Veterinary Microbiology, College of Veterinary Science. Sri Venkateswara Veterinary University, Tirupati – 517 502, AP, India
8. Dairy Asia; For health and prosperity Domestic stakeholder meeting held at NDDDB, Anand , Gujarat on 15-05-17.
9. International seminar on “Emerging horizons in diagnosis of animal and poultry diseases: towards sustainable production in Asian countries” 34th Annual Conference of Indian Association of Veterinary Pathologists. Veterinary College, Hebbal, Bengaluru, 560024, Karnataka, India. 9-11, November, 2017
10. International Conference on Global Perspectives in Virus Disease Management (VIROCON-2016) during 8-10 December, 2016 at ICAR-IIHR, Bengaluru
11. SBS-ASM-ICAR Biosafety Awareness Programme, including workshops on: “Culture of Responsibility” “Pathogen Inventory Management” and “Safety is the Rule: Fundamentals of working with Biosafety Cabinets” March 13-14, 2015, ICAR-NIHSAD, Bhopal
12. 25th Annual Review Meeting of AICRP on FMD held at Guwahati during 10-11, October, 2014 and delivered a presentation on Epidemiology of Foot and mouth disease serotype O College of Veterinary Science
13. VIROCON-2014: Recent Trends in Virology in the Omics Era at TNAU, Coimbatore during 18-20 December 2014.
14. 24th Annual review Meeting (ARM) of AICRP on FMD during 21-22 Sep 2013 at Veterinary collage, Pondicherry.

15. FAO-ICAR International conference on Scientific Developments and Technical Challenges in the Progressive Control of FMD in South Asia. 13th-15th February 2012, NASC, New Delhi
16. VIROCON-2012: Immunobiology and Management of Viral Diseases in 21st century. VIROCON-2012. 8-10 November, Mukteswar
17. 23rd Annual Review Meeting of AICRP on FMD held at DUVASU, Mathura during 14-09-2012 and 15-09-2012
18. Workshop on Emerging Infectious and Transboundary Animal Diseases: Challenges for 21st Century at Mukteswar. June 2 2012
19. VIROCON-2011. Managing Emerging and Re-emerging Plant, Animal, Human and Aquatic Viral Disease: One health perspective. December 29-31, 2011, Hisar
20. Workshop on strengthening of statistical computing for NARS. IVRI, Izatnagar. 18-06-10 and 19-06-10
21. Interactive session on Biotechnology Research in ICAR held at NASC committee hall during 26th and 27th July 2010. New Delhi
22. Annual scientist's meet of All India coordinated research project for the epidemiological studies on Foot and Mouth disease and the project directorate on Foot and Mouth Disease for the year 2005-06 and 2006-07. 23-25th January 2008. Kavarati, Union Territory of Lakshawep.
23. ICAR Training-cum-Workshop on IP and Technology Management. Theme: procedures of patenting. CCS Haryana Agricultural University, Hisar 19-21 May 2008.
24. National Symposium on Newer Concept & Strategies for Disease Diagnostics & Immunoprophylactics for Enhancing Livestock Health & Production. Indian Veterinary Research Institute, Izatnagar. November, 25-26, 2008.
25. National workshop on integrated livestock farming systems in the Foot-Hills of Himalayas (HILF-2008), May 17-18, 2008. IVRI, Mukteswar
26. Hands on training for Nodal officers/Data enterers of Intelligent Reporting system (I.R.S). IASRI, New Delhi. September 10 and 11, 2007.
27. Satellite Symposium on Vaccinology and Antiviral therapeutics. December 17-18, 2007. IVRI, Mukteswar
28. International seminar on conventional and biotechnological approaches for sustainable Development in Sub-Himalayan region (CBASD 2007), July 28-29, 2007, Mukteswar
29. National Symposium on Emerging and Exotic Diseases of Poultry. March 10-11, 2005, IVRI, Izatnagar
30. XI convention of ISVIB and National symposium on alternative strategies for livestock production and protection; Role of Biotechnology and immunology. Nov 3-4, 2004, IVRI, Mukteswar

Foreign deputation (2)

1. FAO sponsored 'Workshop on Laboratory Networking and Proficiency Testing for Priority HPEDs in SAARC Countries'. Dhaka (Bangladesh); 23-24 January, 2012.
2. FAO sponsored 'Second Laboratory Directors Meeting and Workshop on Enhancing the Laboratory Expertise through Quality Management Systems in SAARC Countries'. Colombo (Sri Lanka); 12-13 March, 2013.

Training Programme (9)

1. Five days training programme MDP on Priority setting, Monitoring and Evaluation (PME) of Agricultural Research Projects at NAARM, Hyderabad during 18-23 July 2019
2. Three days training programme on Introduction to Analytical Veterinary Epidemiology jointly organized by ILRI-ICAR during 3-5, December, 2018 at ICAR-NIVEDI, Bengaluru, Karnataka
3. Training programme on consultancy projects management during 22-27, August, 2014 at NAARM, Hyderabad
4. 21 days DST-SERB Training programme on Fundamentals of Livestock Meteorology during 2-22, December, 2013. Kerala Veterinary and animal Sciences University Mannuthy, Kerala
5. 21 days CAFT Training Programme on "Recent Advances in Statistical Modeling Techniques" under the aegis of Education Division, ICAR, New Delhi during May 31- June 20, 2013 at IASRI, New Delhi.
6. Regional training on Proficiency testing for veterinary Diagnostic Laboratories in SAARC Countries at PDFMD, Mukteswar. May 21-26, 2012
7. Laboratory training on Foot and Mouth Disease Diagnosis. SAARC Regional leading diagnostic laboratory of FMD (ICAR-DFMD) sponsored by FAO, during 2-7 May, 2011
8. 21 days CAS training programme on Development of contents for online e-learning systems from 10th to 30th September, 2008 at IASRI, New Delhi
9. FOCARS training at NAARM, Hyderabad during 08-01-2007 to 08-04-2007

Membership in Professional Bodies:

1. Veterinary Council of India (VCI)
2. Society for Biosafety (SBS), India
3. Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases (IAVMI)
4. Indian Virological Society (IVS)
5. Tamilnadu State Veterinary Council