

## PUBLICATIONS ON FMD (decreasing chronological order)

### Full papers on international refereed journals

1. [Efrem Alessandro Foglia](#), [Tengiz Chaligava](#), [Tamilla Aliyeva](#), [Satenik Kharatyan](#), [Vito Tranquillo](#), [Carsten Pöttsch](#), [Cornelis van Maanen](#), [Fabrizio Rosso](#), [Santina Grazioli](#), [Emiliana Brocchi](#) Evaluation of Two Vaccines against Foot-and-Mouth Disease Used in Transcaucasian Countries by Small-Scale Immunogenicity Studies Conducted in Georgia, Azerbaijan and Armenia Vaccines (Basel). 2024 Mar 12;12(3):295 [https://doi: 10.3390/vaccines12030295](https://doi.org/10.3390/vaccines12030295)
2. Simone Cavalera, Eugenio Alladio, Efrem Alessandro Foglia, Santina Grazioli, Barbara Colitti, Sergio Rosati, Chiara Nogarol, Fabio Di Nardo, Thea Serra, Valentina Testa, Claudio Baggiani, Giampietro Maccabiani, Emiliana Brocchi, Laura Anfossi Experimental design for the development of a multiplex antigen lateral flow immunoassay detecting the Southern African Territory (SAT) serotypes of foot-and-mouth disease virus. Microchimica Acta (2024) 191:9 <https://doi.org/10.1007/s00604-023-06090-6>
3. Jacquelyn Horsington, Elke Abbeloos, Labib Bakkali Kassimi, Kingkarn Boonsuya Seeyo, Alejandra V. Capozzo, Eunice Chepkwony, Phaedra Eblé, Sabrina Galdo-Novo, Daniel Gizaw, Lizelle Gouverneur, Santina Grazioli, Livio Heath, Pascal Hudelet, Joseph M. K. Hyera, Martin Illott, Alasdair King, David J. Lefebvre, David Mackay, Samia Metwally, Frank N. Mwiine, Charles K. Nfon, Min-Kyung Park, Edviges Maristela Pituco, Fabrizio Rosso, Francisco Simon, Hussaini G. Ularamu, Paul Vermeij, Wilna Vosloo and Donald P. King Application of the Nagoya Protocol to veterinary pathogens: concerns for the control of foot-and-mouth disease. Frontiers in Veterinary Science November 2023 Volume 10 - 2023 <https://doi.org/10.3389/fvets.2023.1271434>
4. [Fadila Abosrer](#), [Giulia Pezzoni](#), [Emiliana Brocchi](#), [Anna Castelli](#), [Stefano Baselli](#), [Santina Grazioli](#), [Hafsa Madani](#), [Elfurgani Kraim](#), [Abdunaser Dayhum](#), [Ibrahim Eldaghayes](#) FTA Cards as a Rapid Tool for Collection and Transport of Infective Samples: Experience with Foot-and-Mouth Disease Virus in Libya Animals (Basel). 2022 Nov 18;12(22):3198. doi: 10.3390/ani12223198
5. [Artur Summerfield](#), [Heidi Gerber](#), [Rebeka Schmitt](#), [Matthias Liniger](#), [Santina Grazioli](#), [Emiliana Brocchi](#) Relationship between neutralizing and opsonizing monoclonal antibodies against foot-and-mouth disease virus Front Vet Sci. 2022 Oct 12;9: 1033276. doi: 10.3389/fvets.2022.1033276

6. Anna B. Ludi, Alison Morris, Simon Gubbins, Amin Asfor, Madeeha Afzal, Clare F. Browning, Santina Grazioli, Efrem Alessandro Foglia, Ginette Wilsden, Alison Burman, Emiliana Brocchi, David J. Paton, Donald P. King Cross-serotype reactivity of ELISAs used to detect antibodies to the structural proteins of foot-and-mouth disease virus *Viruses*. 2022 Jul 8;14(7):1495. doi: 10.3390/v14071495.PMID: 35891476
7. Canini, Laëtitia, Blaise-Boisseau Sandra, Di Nardo Antonello, Shaw Andrew, Romey Aurore, Relmy Anthony, Bernelin-Cottet Cindy, Salomez Anne-Laure, Haegeman Andyd, Ularamu Hussainie, Madani Hafsaf, Ouoba Bruno Lalia Identification of diffusion routes of O/EA-3 topotype of foot-and-mouth disease virus in Africa and Western Asia between 1974 and 2019 – a phylogeographic analysis *Transboundary and Emerging Diseases* 2022 Jun 3;69(5): e2230-e2239. doi:10.1111/tbed.14562
8. Pezzoni G, Calzolari M, Foglia EA, Bregoli A, Nardo AD, Sghaier S, Madani H, Chiapponi C, Grazioli S, Relmy A, Bakkali Kassimi L, Brocchi [Characterization of the O/ME-SA/Ind-2001d foot-and-mouth disease virus epidemic recorded in the Maghreb during 2014-2015.](#) *E. Transbound Emerg Dis*. 2022 Jun 10. doi: 10.1111/tbed.14611
9. Andrew E Shaw \*, Alison Burman, Amin Asfor, Emiliana Brocchi, Santina Grazioli, Clare Browning, Anna Ludi, Tobias J Tuthill, Donald P King Avidity of polyclonal antibodies to foot-and-mouth disease virus in bovine serum measured using Bio-Layer interferometry. *Viruses* 2022, 14, 714. <https://doi.org/10.3390/v14040714>
10. Simone Cavalera, Alida Russo, Barbara Colitti, Sergio Rosati, Chiara Nogarol, Efrem Alessandro Foglia, Santina Grazioli, Giulia Pezzoni, Fabio Di Nardo, Thea Serra, Matteo Chiarella, Claudio Baggiani, Emiliana Brocchi and Laura Anfossi Design of multiplexing lateral flow immunoassay for detection and typing of foot-and-mouth disease virus using pan-reactive and serotype-specific monoclonal antibodies: evidence of a new hook effect *Talanta*. 240(2022) 123155 doi: 10.1016/j.talanta.2021.123155
11. Foglia EA, Lembo T, Kazwala R, Ekwem D, Shirima G, Grazioli S, Brocchi E, Pezzoni G [Combining Multiple Assays Improves Detection and Serotyping of Foot-and-Mouth Disease Virus. A Practical Example with Field Samples from East Africa.](#) *Viruses*. 2021 Aug 10;13(8):1583. doi: 10.3390/v13081583

12. Clare F. J. Browning, Antonello Di Nardo, Lissie Henry, Tim Pollard, Lynne Hendry, Aurore Romey, Anthony Relmy, Phaedra Eble, Emiliana Brocchi, Santina Grazioli, Donald P. King, and Anna B. Ludi. Inter-laboratory comparison of 2 ELISA kits used for foot-and-mouth disease virus nonstructural protein serology. *Journal of Veterinary Diagnostic Investigation* 2020 Oct7:1 <https://doi.org/10.1177/1040638720962070>
13. Grazioli S, Ferris NP, Dho G, Pezzoni G, Morris AS, Mioulet V, Brocchi E. Development and validation of a simplified serotyping ELISA based on monoclonal antibodies for the diagnosis of foot-and-mouth disease virus serotypes O, A, C and Asia 1 [published online ahead of print, 2020 Jun 12]. *Transbound Emerg Dis.* 2020;10.1111/tbed.13677. doi:10.1111/tbed.13677
14. Nthiwa D, Bett B, Odongo D, Kenya E, Wainaina M, Grazioli S, Foglia E, Brocchi E, Alonso S. Seroprevalence of foot-and-mouth disease virus in cattle herds raised in Maasai Mara ecosystem in Kenya. *Prev Vet Med.* 2020;176:104929. doi:10.1016/j.prevetmed.2020.104929
15. Asfor AS, Howe N, Grazioli S, Berryman S, Parekh K, Wilsden G, Ludi A, King DP, Parida S, Brocchi E, Tuthill TJ. Detection of Bovine Antibodies against a Conserved Capsid Epitope as the Basis of a Novel Universal Serological Test for Foot-and-Mouth Disease. *J Clin Microbiol.* 2020;58(6):e01527-19. Published 2020 May
16. Pezzoni G, Bregoli A, Grazioli S, Barbieri I, Madani H, Omani A, Sadaoui H, Bouayed N, Wadsworth J, Bachanek-Bankowska K, Knowles NJ, King DP, Brocchi E. Foot-and-mouth disease outbreaks due to an exotic virus serotype A lineage (A/AFRICA/G-IV) in Algeria in 2017. *Transbound Emerg Dis.* 2019 Jan;66(1):7-13. doi: 10.1111/tbed.13017
17. Ouagal M, Brocchi E, Grazioli S, Adel BY, Keith S, Kiram D, Oussiguere A, Hendrikx P, Berkvens D, Saegerman C. Study on seroprevalence and serotyping of foot and mouth disease in Chad. *Rev Sci Tech.* 2018;37(3):937-947. doi:10.20506/37.3.2897
18. Chitray M, Grazioli S, Willems T, Tshabalala T, De Vleeschauwer A, Esterhuysen JJ, Brocchi E, De Clercq K, Maree FF. Development and validation of a foot-and-mouth disease virus SAT serotype-specific 3ABC assay to differentiate infected from vaccinated animals. *J Virol Methods.* 2018 May;255:44-51. doi: 10.1016/j.jviromet.2018.02.006. Epub 2018 Feb 8.
19. Hamdy ME, Del Carlo M, Hussein HA, Salah TA, El-Deeb AH, Emara MM, Pezzoni G, Compagnone D. Development of gold nanoparticles biosensor for

- ultrasensitive diagnosis of foot and mouth disease virus. *J Nanobiotechnology*. 2018 May 11;16(1):48. doi: 10.1186/s12951-018-0374-x
20. Shimmon G, Kotecha A, Ren J, Asfor AS, Newman J, Berryman S, Cottam EM, Gold S, Tuthill TJ, King DP, Brocchi E, King AMQ, Owens R, Fry EE, Stuart DI, Burman A, Jackson T. Generation and characterisation of recombinant FMDV antibodies: Applications for advancing diagnostic and laboratory assays. *PLoS One*. 2018 Aug 16;13(8):e0201853. doi: 10.1371/journal.pone.0201853. eCollection 2018
  21. Bachanek-Bankowska K, Di Nardo A, Wadsworth J, Mioulet V, Pezzoni G, Grazioli S, Brocchi E, Kafle SC, Hettiarachchi R, Kumarawadu PL, Eldaghayes IM, Dayhum AS, Meenowa D, Sghaier S, Madani H, Abouchoaib N, Hoang BH, Vu PP, Dukpa K, Gurung RB, Tenzin S, Wernery U, Panthumart A, Seeyo KB, Linchongsubongkoch W, Relmy A, Bakkali-Kassimi L, Scherbakov A, King DP, Knowles NJ. Reconstructing the evolutionary history of pandemic foot-and-mouth disease viruses: the impact of recombination within the emerging O/ME-SA/Ind-2001 lineage. "ScientificReports" 2018 Oct 2;8(1):14693. doi: 10.1038/s41598-018-32693-8.
  22. Douglas Gladue, Eneko Largo, Igor de la Arada, Vicente Aguilera, Antonio Alcaraz, Jose Arrondo, Lauren Holinka, Emiliana Brocchi, Elizabeth Ramirez-Medina, Elizabeth Vuono, Keith Berggren, Consuelo Carrillo, José Nieva, and Manuel Borca. Molecular characterization of the viroporin function of foot-and-mouth disease virus non-structural protein 2B. *J Virol*. 2018 Sep 19. pii: JVI.01360-18. doi: 10.1128/JVI.01360-18. [Epub ahead of print].
  23. Fishbourne E, Ludi AB, Wilsden G, Hamblin P, Statham B, Bin Tarif A, Brocchi E, Grazioli S, Dekker E, Eblé P, King DP. Efficacy of a high potency O1 Manisa foot-and-mouth disease vaccine in cattle against heterologous challenge with a field virus from the O/ME-SA/Ind-2001 lineage collected in North Africa. *Vaccine*. - Vol. 35 (2017). - p 2761-2765.
  24. Eldaghayes I, Dayhum A, Kammon A, Sharif M, Ferrari G, Bartels C, Sumption K, King DP, Grazioli S, Brocchi E. Exploiting serological data to understand the epidemiology of foot-and-mouth disease virus serotypes circulating in Libya. *Open Vet J*. - Vol. 7 no 1 (2017) . - p 1-11.
  25. Shimmon G, Wood BA, Morris A, Mioulet V, Grazioli S, Brocchi E, Berryman S, Tuthill T, King DP, Burman A, Jackson T. Truncated bovine integrin Alpha-v/Beta-6 as a universal capture ligand for FMD diagnosis. *PLoS One* - Vol. 11 no 8 (2016) p e0160696 (132 p).

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 Outbreaks of foot-and-mouth disease virus in Libya and Saudi Arabia during 2013 due to an exotic O/ME-SA/Ind-2001 lineage virus *Transbound Emerg Dis* - Vol. 63 (2016) - p e431-e435.
27. Gladue DP, O'Donnell V, Baker-Bransetter R, Pacheco JM, Holinka LG, Arzt J, Pauszek S, Fernandez-Sainz I, Fletcher P, Brocchi E, Lu Z, Rodriguez LL, Borca MV Interaction of foot-and-mouth disease virus nonstructural protein 3A with host protein DCTN3 is important for viral virulence in cattle. *J Virol* . - Vol. 88 no 5 (2014) . - p 2737-2747
28. Grazioli S, Fallacara F, Brocchi E Mapping of antigenic sites of foot-and-mouth disease virus serotype Asia 1 and relationships with sites described in other serotypes. *J Gen Virol* . - Vol. 94 (2013) . - p 559-569.
29. Roodgar M, Perez AM, Carpenter TE, Ferrari G, Khan E, Grazioli S, Brocchi E, Abubakar M. Foot-and-mouth disease virus transmission and vaccine efficacy in Punjab, Pakistan. *J Vet Sci Med Diagn* . - Vol. 1 no 2 (2012) <http://dx.doi.org/10.4172/jvsmd.1000103>
30. Gladue DP, O'Donnell V, Baker-Bransetter R, Holinka LG, Pacheco JM, Fernandez-Sainz I, Lu Z, Brocchi E, Baxt B, Piccone ME, Rodriguez L, Borca MV. Foot-and-mouth disease virus nonstructural protein 2C interacts with Beclin1, modulating virus replication. *J Virol* . - Vol. 86 no 22 (2012) - p 12080-12089.
31. Ferris NP, Grazioli S, Hutchings GH, Brocchi E. Validation of a recombinant integrin  $\alpha 6$ /monoclonal antibody based antigen ELISA for the diagnosis of foot-and-mouth disease. *J Virol Methods* - Vol. 175 (2011) - p 235-260.
32. Ferris NP, Nordengrahn A, Hutchings GH, Paton DJ, Kristersson T, Brocchi E, Grazioli S, Merza M. Development and laboratory validation of a lateral flow device for the detection of serotype SAT 2 foot-and-mouth disease viruses in clinical samples. *J Virol Methods*. - Vol. 163 (2010). - p. 474 - 476.
33. Ferris NP, Nordengrahn A, Hutchings GH, Reid SM, King DP, Ebert K, Paton DJ, Kristersson T, Brocchi E, Grazioli S, Merza M. Development and laboratory validation of a lateral flow device for the detection of foot-and-mouth disease virus in clinical samples. *J Virol Methods*. - Vol. 155 (2009). - p. 10-17.

34. Rodriguez-Sanchez B, Sanchez-Vizcaino JM, Uttenthal A, Rasmussen TB, Hakhverdyan M, King DP, Ferris NP, Ebert K, Reid SM, Kiss I, Brocchi E, Cordioli P, Hjerner B, Mcmenamy M, Mckillen J, Ahmed Js, Belak S. Improved diagnosis for nine viral diseases considered as notifiable by the World Organization for Animal Health. *Transboundary Emerg Dis.* - Vol. 55 (2008). - p 215-225.
35. Nordengrahn A, Gustafsdottir SM, Ebert K, Reid SM, King DP, Ferris NP, Brocchi E, Grazioli S, Landegren U, Merza M. Evaluation of a novel proximity ligation assay for the sensitive and rapid detection of foot-and-mouth disease virus *Vet Microbiol.* - Vol. 127 (2008). - p 227-236.
36. Martín-Acebes MA, González-Magaldi M, Rosas MF, Borrego B, Brocchi E, Armas-Portela R, Sobrino F. Subcellular distribution of swine vesicular disease virus proteins and alterations induced in infected cells: a comparative study with foot-and-mouth disease virus and vesicular stomatitis virus *Virology.* - Vol. 374 (2008). - p 432-433.
37. Engel B, Buist W, Orsel K, Dekker A, De Clercq K, Grazioli S, Van Roermund Herman. A Bayesian evaluation of six diagnostic tests for foot-and-mouth disease for vaccinated and non-vaccinated cattle. *Prev Vet Med.* - Vol. 86 (2008). - p 124-138.
38. Dekker A, Sammin D, Greiner M, Bergmann I, Paton D, Grazioli S, De Clercq K, Brocchi E. Use of continuous results to compare ELISAs for the detection of antibodies to non-structural proteins of foot-and-mouth disease virus. *Vaccine.* - Vol. 26 (2008). - p 2723-2732.
39. Campos RDM, Malirat V, Neitzert E, Grazioli S, Brocchi E, Sanchez C., Falczuk AJ, Ortiz S, Rebello MA, Bergmann IE. Development and characterization of a bovine serum evaluation panel as a standard for immunoassays based on detection of antibodies against foot-and-mouth disease viral non-capsid proteins. *J Virol Methods.* - Vol. 151 no 1 (2008). - p 15-23.
40. Parida S, Fleming L, Gibson D, Hamblin PA, Grazioli S, Brocchi E, Paton DJ. Bovine serum panel for evaluating foot-and-mouth disease virus nonstructural protein antibody tests. *J Vet Diagn Investig.* - Vol. 19 no 5 (2007). - p 539-544.
41. Goris N, Praet N, Sammin D, Yadin H, Paton D, Brocchi E, Berkvens D, De Clercq K. Foot-and-mouth disease non-structural protein serology in cattle: use of a Bayesian framework to estimate diagnostic sensitivity and specificity of six ELISA tests and true prevalence in the field. *Vaccine.* - Vol. 25 no 41 (2007). - p 7177-7196.

42. Paton DJ, De Clercq K, Greiner M, Dekker A, Brocchi E, Bergmann I, Sammin JD, Gubbins S, Parida S. Application of non-structural protein antibody tests in substantiating freedom from foot-and-mouth disease virus infection after emergency vaccination of cattle. *Vaccine*. - Vol. 24 no 42-43 (2006). - p 6503-6512.
43. Nunez JJ, Fusi P, Borrego B, Brocchi E, Pacciarini Ml, Sobrino F. Genomic and antigenic characterization of viruses from the 1993 Italian foot-and-mouth disease outbreak. *Arch Virol*. - Vol. 151 (2006). - p 127-142.
44. Ferris NP, King DP, Reid SM, Hutchings GH, Shaw AE, Paton DJ, Goris N, Haas B, Hoffmann B, Brocchi E, Bugnetti M, Dekker A, De Clercq K. Foot-and-mouth disease virus: a first inter-laboratory comparison trial to evaluate virus isolation and RT-PCR detection methods. *Vet Microbiol*. - Vol. 117 (2006). - p 130-140.
45. Brocchi E, Bergmann IE, Dekker A, Paton Dj, Sammin DJ, Greiner M, Grazioli S, De Simone F, Yadin H, Haas B, Bulut N, Malirat V, Neitzert E, Goris N, Parida S, Sorensen K. De Clercq K. Comparative evaluation of six ELISAs for the detection of antibodies to the non-structural proteins of foot-and-mouth disease virus. *Vaccine*. - Vol. 24 no 47-48 (2006). - p 6966-6979.
46. Sørensen KJ, De Stricker K, Dyrting KC, Grazioli S, Haas B Differentiation of foot-and-mouth disease virus infected animals from vaccinated animals using a blocking ELISA based on baculovirus expressed FMDV 3ABC antigen and a 3ABC monoclonal antibody. *Arch Virol*. - Vol. 150 (2005). - p 805-814.
47. Arias A, Agudo R, Ferrer-Orta C, Pérez-Luque R, Airaksinen A, Brocchi E, Domingo E, Verdaguer N, Escarmís C Mutant viral polymerase in the transition of virus to error catastrophe identifies a critical site for RNA binding. *J Mol Biol*. - Vol. 353 (2005). - p 1021-1032.
48. Brocchi E, Sorensen K, Mackay D The use of serology as part of the exit strategy to the 1996 epidemic of FMD in the Balkans. *Dev Biol*. - Vol. 119 (2004). - p 283-292.
49. U. Bruderer, H. Swam, B. Haas, N. Visser, E. Brocchi, S. Grazioli, J. J. Esterhuysen, W. Vosloo, M. Forsyth, N. Aggarwal S. Cox R. Armstrong and J. Anderson. Differentiating infection from vaccination in foot-and-mouth-disease: evaluation of an ELISA based on recombinant 3ABC. *Veterinary Microbiology* (2004) 101, 187-19
50. Verdaguer N, Sevilla N, Valero Ml, Stuart D, Brocchi E, Andreu D, Giralt E, Domingo E, Mateu MG, Fita I A similar pattern of interaction for different

- antibodies with a major antigenic site of foot-and-mouth disease virus: implications for intratypic antigenic variation. *J Virol.* - Vol. 72 no 1 (1998). - p 739-748.
51. Brocchi E, De Diego MI, Berlinzani A, Gamba D, De Simone F Diagnostic potential of Mab-based ELISAs for antibodies to non-structural proteins of foot-and-mouth disease virus to differentiate infection from vaccination. *Vet Q.* - Vol. 20 no s2 (1998). - p S20-S24.
52. De Diego M, Brocchi E, Mackay D, De Simone F The non-structural polyprotein 3ABC of foot-and-mouth disease virus as a diagnostic antigen in ELISA to differentiate infected from vaccinated cattle. *Arch Virol.* - Vol. 142 (1997). - p 2021-2033.
53. Meyer RF, Pacciarini M, Hilyard EJ, Ferrari S, Vakharia VN, Donini G, Brocchi E, Molitor TW Genetic variation of foot-and-mouth disease virus from field outbreaks to laboratory isolation. *Virus Res.* - Vol. 32 (1994). - p 299-312.
54. Lea S, Hernandez J, Blakemore W, Brocchi E, Curry S, Domingo E, Fry E, Abu-Ghazaleh R, King A, Newman J, Stuart D, Mateu M G. The structure and antigenicity of a type C foot-and-mouth disease virus. *Structure.* Vol. 2 no 2 (1994). - p 123-139
55. McCullough Kc, De Simone F, Brocchi E, Capucci L, Crowther Jr, Kihm U. Protective immune response against foot-and-mouth disease. *J Virol.* - Vol. 66 no 4 (1992). - p 1835-1840
56. Mateu MG, Martinez MA, Capucci L, Andreu D, Giralt E, Sobrino F, Brocchi E, Domingo E A single amino acid substitution affects multiple overlapping epitopes in the major antigenic site of foot-and-mouth disease virus of serotype C. *J Gen Virol.* - Vol. 71 (1990). - p 629-637.
57. McCullough KC, Smale CJ, Carpenter WC, Crowther JR, Brocchi E, De Simone F Conformational alteration in foot-and-mouth disease virus virion capsid structure after complexing with monospecific antibody. *Immunology.* - Vol. 60 (1987). - p 75-82.
58. McCullough KC, Crowther JR, Carpenter WC, Brocchi E, Capucci L, De Simone F, Xie Q, Mccahon D Epitopes on foot-and-mouth disease virus particles: I. topology. *Virology.* - Vol. 157 (1987). - p 516-525.
59. McCullough KC, Crowther JR, Butcher RN, Carpenter WC, Brocchi E, Capucci L, De Simone F. Immune protection against foot-and-mouth disease virus studied using virus-neutralizing and non-neutralizing concentrations of monoclonal antibodies. *Immunology.* - Vol. 58 (1986). - p 421-428.



