

WOAH Reference Laboratory Reports Activities 2022

Activities in 2022

This report has been submitted : 31 mai 2023 15:25

Laboratory Information

Name of disease (or topic) for which you are a designated WOA Reference Laboratory:	foot-and-mouth disease
Address of laboratory:	No.1, Xujiaping, Chengguan District, Lanzhou, Gansu Province 730046 CHINA (PEOPLE REP. OF)
Tel.:	+86-931 8342585
E-mail address:	liuxiangtao@caas.cn
Website:	https://lvri.caas.cn/en/
Name (including Title) of Head of Laboratory (Responsible Official):	Dr. Haixue Zheng, Director General of Lanzhou Veterinary Research Institute, CAAS
Name (including Title and Position) of WOA Reference Expert:	Dr. Xiangtao Liu, deputy director of Lanzhou Veterinary Research Institute; head of OIE&China National Foot-and-Mouth Disease Reference Laboratory
Which of the following defines your laboratory? Check all that apply:	Governmental Research agency Academic institution

TOR1: DIAGNOSTIC METHODS

1. Did your laboratory perform diagnostic tests for the specified disease/topic for purposes such as disease diagnosis, screening of animals for export, surveillance, etc.? (Not for quality control, proficiency testing or staff training)

Yes

Diagnostic Test	Indicated in WOA Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
LPB-ELISA (type O)	yes	2369	0
LPB-ELISA (type Asia 1)	yes	1300	0
LPB-ELISA (type A)	yes	2369	0
NSP-3ABC ELISA	yes	2369	0

Direct diagnostic tests		Nationally	Internationally
Virus isolation	yes	3	0
Antigen typing ELISA	yes	14	0
Real Time-RT-PCR	yes	2196	0
VP1 sequencing	yes	39	0
Whole genome sequencing	yes	0	0

TOR2: REFERENCE MATERIAL

2. Did your laboratory produce or supply imported standard reference reagents officially recognised by WOA?H?

No

3. Did your laboratory supply standard reference reagents (nonWOAH-approved) and/or other diagnostic reagents to WOA?H Members?

Yes

TYPE OF REAGENT AVAILABLE	RELATED DIAGNOSTIC TEST	PRODUCED/ PROVIDE	AMOUNT SUPPLIED NATIONALLY (ML, MG)	AMOUNT SUPPLIED INTERNATIONALLY (ML, MG)	NO. OF RECIPIENT WOA?H MEMBER COUNTRIES	COUNTRY OF RECIPIENTS
Guinea pig antisera (against FMDV type O and A)	ELISA	produced	10 ml	0	1	Asia and Pacific
FMDV immune sera (type O)	ELISA	produced	150 ml	0	1	Asia and Pacific
FMDV infected sera	ELISA	produced	30 ml	0	1	Asia and Pacific
FMDV cell culture (inactivated)	RT-PCR	produced	50 ml	0	1	Asia and Pacific
FMD LBP-ELISA kit (type O, A, Asia1)	ELISA for FMDV Antibody detection	produced	20883 kits	0	1	Asia and Pacific
FMDV-NSP 3ABC ELISA kit	ELISA for FMDV NSP antibody detection	produced	1802 kits	0	1	Asia and Pacific
SPCE (type O)	ELISA for FMDV antibody detection	produced	2358 kits	0	1	Asia and Pacific
Conventional MultiRT-PCR	RT-PCR for FMDV RNA detection	produced	82 kits	0	1	Asia and Pacific
FMDV real time RT-PCR kit	qRT-PCR for FMDV molecular detection	produced	1000 kits	0	1	Asia and Pacific
Typing real- time RT-PCR	qRT-PCR for FMDV RNA detection, type O, A, and Asia1	produced	300 kits	0	1	Asia and Pacific

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOA H Members?

No

TOR3: NEW PROCEDURES

6. Did your laboratory develop new diagnostic methods for the designated pathogen or disease?

Yes

NAME OF THE NEW TEST OR DIAGNOSTIC METHOD DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
Development and Validation of a Competitive ELISA Based on Bovine Monoclonal Antibodies for the Detection of Neutralizing Antibodies against Foot-and-Mouth Disease Virus Serotype A	Cao Y, Li K, Xing X, et al. Development and Validation of a Competitive ELISA Based on Bovine Monoclonal Antibodies for the Detection of Neutralizing Antibodies against Foot-and-Mouth Disease Virus Serotype A. J Clin Microbiol. 2022;60(4):e0214221. doi:10.1128/jcm.02142-21
A Naked-Eye Visual Reverse Transcription Loop-Mediated Isothermal Amplification with Sharp Color Changes for Potential Pen-Side Test of Foot-and-Mouth Disease Virus	Zhang J, Hou Q, Ma W, et al. A Naked-Eye Visual Reverse Transcription Loop-Mediated Isothermal Amplification with Sharp Color Changes for Potential Pen-Side Test of Foot-and-Mouth Disease Virus. Viruses. 2022;14(9):1982. Published 2022 Sep 7. doi:10.3390/v14091982
Development of a competitive ELISA method based on VLPs detecting the antibodies of serotype A FMDV	Zhang Y, Wang R, Bai M, et al. Development of a competitive ELISA method based on VLPs detecting the antibodies of serotype A FMDV. J Virol Methods. 2022;300:114406. doi:10.1016/j.jviromet.2021.114406

7. Did your laboratory validate diagnostic methods according to WOA H Standards for the designated pathogen or disease?

No

8. Did your laboratory develop new vaccines for the designated pathogen or disease?

Yes

NAME OF THE NEW VACCINE DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
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9. Did your laboratory validate vaccines according to WOA H Standards for the designated pathogen or disease?

No

TOR4: DIAGNOSTIC TESTING FACILITIES

10. Did your laboratory carry out diagnostic testing for other WOA H Members?

No

11. Did your laboratory provide expert advice in technical consultancies on the request of an WOA H Member?

Yes

NAME OF THE WOA H MEMBER COUNTRY RECEIVING A TECHNICAL CONSULTANCY	PURPOSE	HOW THE ADVICE WAS PROVIDED
CHINA (PEOPLE'S REP. OF)	FMD vaccination and PVM in 2022 in China	meeting, draft plan
CHINA (PEOPLE'S REP. OF)	FMD active surveillance in 2022 in China	training courses, meetings, draft plan

CHINA (PEOPLE'S REP. OF)	Revision of the technical specifications for the prevention and control of foot and mouth disease	meeting, draft
CHINA (PEOPLE'S REP. OF)	draft the technical specifications for the prevention and control of exotic foot and mouth disease	draft

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOA Members other than the own?

Yes

Title of the study	Duration	PURPOSE OF THE STUDY	PARTNERS (INSTITUTIONS)	WOAH MEMBER COUNTRIES INVOLVED OTHER THAN YOUR COUNTRY
Research and development of an attenuated edible FMD vaccine using salmonella as the vector	3 y	Research and development of an attenuated edible FMD vaccine using salmonella as the vector	Korea Atomic Energy Research Institute/Prof. Seo HoSeong	KOREA (REP. OF)
Cooperative creation and application studies of new products for prevention and control of major transboundary animal diseases	3 y	Cooperative creation and application studies of new products for prevention and control of major transboundary animal diseases	Kazakh National Agrarian University, Kazakhstan/Prof. Gulnaz Ilgekbayeva	KAZAKHSTAN
Immunological modification and mechanism of DC-recruiting foot and mouth disease virus like particles	3 y	Research and development of FMD viral like particle (VLP) fused with the specific DC targeting domain	Korea Atomic Energy Research Institute/Prof. Seo HoSeong	KOREA (REP. OF)
Exchange of vaccine technology for the delivery of oral vaccines to mucosal surface	3 y	To explore the potential of plants and OMVs for production of antigens for oral vaccination	University of East Anglia	UNITED KINGDOM
Prevention and control of TADs in China-Japan-Korea	5 y	prevention and control of TADs, such as FMD, PPR, ASF, HPAI	Offical organizations	KOREA (REP. OF)
Prevention and control of TADs in China-Monglia-Russia	5 y	Prevention and control of TADs, such as FMD, PPR, HPAI	Offical organizations	MONGOLIA

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

IF THE ANSWER IS YES, PLEASE PROVIDE DETAILS OF THE DATA COLLECTED:

Three serotype O lineages of FMDV have been detected since 2020: O/SEA/Mya-98, O/CATHAY and O/ME-SA/Ind-2001, while the last case of serotype A was seen in 2019. During 2022, there has been only one official FMD outbreak reported in China due to O/CATHAY although positive samples comprising O/SEA/Mya-98 (n=3), O/ME-SA/Ind-2001e (n=12) have been identified as well as O/CATHAY (n=24). It is believed that O/Mya-98 is circulating in pigs however no clinical cases have been reported since 2021. The total number of clinical cases is decreasing which could be due to a decrease in illegal animal movement from southeast Asia due to the COVID pandemic.

15. Did your laboratory disseminate epidemiological data that had been processed and analysed?

Yes

IF THE ANSWER IS YES, PLEASE PROVIDE DETAILS OF THE DATA COLLECTED:

Report FMD outbreaks to MARA, China and OIE. Perform phylogenetic analysis to trace the origin and evolution of strains. Share case informations with WRLFMD, SEACFMD member countries.

16. What method of dissemination of information is most often used by your laboratory? (Indicate in the appropriate box the number by category and list the details in the box)

a) Articles published in peer-reviewed journals:

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Zhang C, Yang F, Wojdyla JA, et al. An anti-picornaviral strategy based on the crystal structure of foot-and-mouth disease virus 2C protein. *Cell Rep.* 2022;40(1):111030. doi:10.1016/j.celrep.2022.111030

Zhang R, Qin X, Yang Y, et al. STING1 is essential for an RNA-virus triggered autophagy. *Autophagy.* 2022;18(4):816-828. doi:10.1080/15548627.2021.1959086

Shi X, Yang K, Song H, et al. Development and Efficacy Evaluation of a Novel Nano-Emulsion Adjuvant for a Foot-and-Mouth Disease Virus-like Particles Vaccine Based on Squalane. *Nanomaterials (Basel).* 2022;12(22):3934. Published 2022 Nov 8. doi:10.3390/nano12223934

b) International conferences:

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Experts or participants from OIE/China national foot and mouth diseases reference laboratory, LVRI, reported the current situation of FMD in China, exchange the information with other laboratories at the international meetings including 26th Meeting of the OIE Sub-Commission for Foot and Mouth Disease in South-East Asia, China and Mongolia, The 3rd Regional Expert Group Meeting on Foot and Mouth Disease, Special Meeting of the SEACFMD National Coordinators Meeting focused on FMD Preparedness and Response, 25th SEACFMD National Coordinators Meeting.

c) National conferences:

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The national conferences on FMD control and prevention, vaccine and vaccination, diagnosis technique and the training courses at national level (n=4) and provincial level (n=14), respectively.

d) Other (Provide website address or link to appropriate information):

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<http://www.moa.gov.cn/gk/sygb/>

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TOR7: SCIENTIFIC AND TECHNICAL TRAINING

17. Did your laboratory provide scientific and technical training to laboratory personnel from other WOA H Members?

Yes

a) Technical visit : 3

b) Seminars : 18

c) Hands-on training courses: 2

d) Internships (>1 month) 2

Type of technical training provided (a, b, c or d)	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
a	China	7
b	China	18
c	China	2
d	China	2

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO 17025	jpg	认可决定书(英文).jpg

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
LPB ELISA for FMDV antibody detection	CNAS
ELISA for FMDV NSP antibody detection	CNAS
FMDV Antigen detection ELISA	CNAS
RT-PCR for FMDV	CNAS
Real-time RT-PCR for FMDV	CNAS
FMDV 1D Gene sequencing	CNAS
SPC ELISA for FMDV antibody detection	CNAS
virus isolation(VI)	CNAS
virus neutralization test (VNT)	CNAS
FMDV Vaccine safety and efficacy testing	CNAS

20. Does your laboratory maintain a "biorisk management system" for the pathogen and the disease concerned?

Yes

Same as Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, Chapter 1.1.4

TOR9: SCIENTIFIC MEETINGS

21. Did your laboratory organise scientific meetings related to the pathogen in question on behalf of WOA?H?

No

22. Did your laboratory participate in scientific meetings related to the pathogen in question on behalf of WOA?H?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
26 th Meeting of the OIE Sub-Commission for Foot and Mouth Disease in South-East Asia, China and Mongolia	2022-03-16	Virtual meeting	speaker	country report
The 3rd Regional Expert Group Meeting on Foot and Mouth Disease	2022-06-02	Virtual	speaker	Brief introduction on FMD diagnosis at LVRI
Special Meeting of the SEACFMD National Coordinators Meeting focused on FMD Preparedness and Response	2022-06-09	Virtual	short communications	
25th SEACFMD National Coordinators Meeting	2022-10-03	Virtual	speaker	Thoughts on control and eradication of FMD

TOR10: NETWORK WITH WOA?H REFERENCE LABORATORIES

23. Did your laboratory exchange information with other WOA?H Reference Laboratories designated for the same pathogen or disease?

Yes

24. Are you a member of a network of WOA?H Reference Laboratories designated for the same pathogen?

Yes

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOA?H REF. LABS/ ORGANISING WOA?H REF. LAB.
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25. Did you organise or participate in inter-laboratory proficiency tests with WOA?H Reference Laboratories designated for the same pathogen?

No

26. Did your laboratory collaborate with other WOA?H Reference Laboratories for the same disease on scientific research projects for the diagnosis or control of the pathogen of interest?

Yes

TITLE OF THE PROJECT OR CONTRACT	SCOPE	NAME(S) OF RELEVANT WOAHP REFERENCE LABORATORIES
Monitoring and analysis of the genetic and antigenic evolution of the FMDV from China (OIE/FAO FMD Reference lab network MOU)	Evaluation of the efficacy of the current vaccine; selection of the new vaccine strains; Effective control of Foot-and-Mouth Disease.	The World reference laboratory for FMD, The Pirbright Institute, UK
Testing and validation of the molecular diagnostic methods for recommending application in SEA region	To evaluation the the specificity and sensitivity of FMDV serotyping qRT- PCR, lineage specific qRT-PCR and primers and probes for sequencing methods.	The OIE reference laboratories for FMD in Korea; The OIE regional reference laboratories for FMD in Thailand; The World reference laboratory for FMD, UK

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOAHP Reference Laboratories for the same pathogen?

Yes

Purpose for inter-laboratory test comparisons ¹	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Region(s) of participating WOAHP Member Countries
Monitoring the provincial laboratory capacity in China for FMDV antibody detection	organizer	31	Asia and Pacific
Confirm detection and analysis on FMDV field samples	organizer	5	Asia and Pacific
FMDV 3ABC antibody detection	organizer	5	Asia and Pacific

TOR12: EXPERT CONSULTANTS

28. Did your laboratory place expert consultants at the disposal of WOAHP?

Yes

KIND OF CONSULTANCY	Location	SUBJECT (FACULTATIVE)
SEACFMD roadmap(2021-2025) implementation plan	virtual meeting	Comments and suggestions on SEACFMD roadmap(2021-2025) plan
Review of OIE code and Manual	China	Review of OIE code and manual revision 2022
SEACFMD labnet and EpiNet	virtual meeting	SEACFMD LabNet and EpiNet online surveys and sharing active surveillance in China
the 3rd Regional Expert Group Meeting on Foot and Mouth Disease	virtual meeting	Experts agreed to develop a regional FMD molecular diagnostic algorithm with pilot testing in member countries and draft protocols for different samples and serological testing according to the REG recommendations.

29. Additional comments regarding your report:

No

None