World Organisation for Animal Health

Paul Becher - - GERMANY

WOAH Reference Laboratory Reports Activities 2024

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LABORATORY INFORMATION

***Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:**	Classical swine fever
***Address of laboratory:**	Bünteweg 17 30559 Hannover
***Tel:**	+49-511 953 88 40
***E-mail address:**	109670@tiho-hannover.de
Website:	https://www.tiho-hannover.de/kliniken-institute/institute/institut-fuer-virologie/eu-and-woah-reference-laboratory
***Name (including Title) of Head of Laboratory (Responsible Official):**	Prof. Dr. Paul Becher
***Name (including Title and Position) of WOAH Reference Expert:**	Prof. Dr. Paul Becher, Director
***Which of the following defines your laboratory? Check all that apply:**	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 WOAH Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
Comparative neutralizing peroxidase-linked assay (antibodies against CSFV and BDV/ BVDV for discriminating serology testing	Yes	0	19

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Direct diagnostic tests		Nationally	Internationally
Reverse-transcription polymerase chain reaction (CSFV/ Panpesti)	Yes	0	18

TOR2: REFERENCE MATERIAL

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

No

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

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient WOAH Member Countries	Country of recipients
Permissive cell line for cell-culture based techniques	NPLA; Virus isolation	produced & provided	0	360	2	AUSTRIA, NORTH MACEDONIA (REP. OF),
Monoclonal antibodies (hybridoma cell-culture supernatant)	NPLA; Virus isolation	produced & provided	10	148	7	CHINESE TAIPEI, FINLAND, GERMANY, IRELAND, NORTH MACEDONIA (REP. OF), NORWAY, UNITED KINGDOM,
Reference sera for Antibody detection techniques	Neutralising peroxidase-linked (NPLA) assay; enyzme-linked immunosorbent assay (ELISA) for antibody detection	produced & provided	0	64	7	AUSTRIA, ITALY, LITHUANIA, NORWAY, POLAND, SLOVAKIA, UNITED KINGDOM,
Virus reference strains/ isolates	NPLA; Virus isolation	produced & provided	0	3	1	NORTH MACEDONIA (REP. OF),

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

No

TOR3: NEW PROCEDURES

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

No

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

No

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

No

9. Did your laboratory validate vaccines according to WOAH Standards for the designated pathogen or disease?

No

TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

Name of WOAH Member Country seeking assistance	Date	Which diagnostic test used	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
BELGIUM	2024-01-31	Neutralizing peroxidase-linked assay; reverse-transcription polymerase chain reaction	1	0
CHILE	2024-09-06	Neutralizing peroxidase-linked assay; reverse-transcription polymerase chain reaction	18	0

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

Yes

Name of the WOAH Member Country receiving a technical consultancy	Purpose	How the advice was provided
FINLAND	Testing of reference sera for batch release of CSF antibody ELISAs	remote
ITALY	Techniques to fix cells that are infected with CSFV or other pestivirus, e.g. protocol for heat treatment	in loco
MALTA	Calculation of blocking percentage with regard to the evaluation of CSF antibody ELISA results; coefficient of variation (tolerance range)	remote
PORTUGAL	Comparison of manual and automatic extraction of RNA, which is used for CSFV genome detection by quantitative RT-PCR	remote
SWEDEN	Sensitivity of virus neutralization test	remote
SWITZERLAND	Detection of CSFV in cell culture by monoclonal antibodies after	remote

	virus isolation	
THE NETHERLANDS	Comparison of sample matrices used for early CSFV genome detection (comparison of serum and EDTA samples)	remote
THE NETHERLANDS	Singleton reactors or false-positive results detected in CSF antibody ELISAs	remote
CZECH REPUBLIC	Sensitivity of virus neutralization test	remote

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOAH 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
DISCONTOOLS	ongoing	Update on current knowledge on CSF situation, diagnosis and control, gap analysis	APHA, United Kingdom; USDA, Plum Island, USA Intervet International, MSD Animal Health, The Netherlands Boehringer Ingelheim Vetmedica GmbH, Germany; Friedrich-Loeffler-Institut (FLI), Greifswald – Island Riems, Germany Laboratory of Microbiology, Department of Disease Control, Faculty of Veterinary Medicine, Hokkaido University, Japan	GERMANY JAPAN THE NETHERLANDS UNITED KINGDOM UNITED STATES OF AMERICA

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

No

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:
- Country Reports on CSF Situation and Laboratory Diagnosis from EU - and Non-EU Member States countries - CSF Wild Boar Data of EU - and Non-EU Member States countries - EURL Classical- and African swine fever in Wild Boar Surveillance Database (developed by the Friedrich-Loeffler-Institute)

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:

- Country Reports on CSF Situation and Laboratory Diagnosis from EU - and Non-EU Member States countries
- CSF Wild Boar Data of EU - and Non-EU Member States countries
- EURL Classical- and African swine fever in Wild Boar Surveillance Database (developed by the Friedrich-Loeffler-Institute)

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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Leveringhaus E; Poljakovic R; Herrmann G; Roman-Sosa G; Becher P, Postel A, Porcine low-density lipoprotein receptor plays an important role in classical swine fever virus infection, 2024, Emerging microbes & infections https://doi.org/10.1080/22221751.2024.2327385.

Söder L, Meyer D, Isken O, Tautz N, König M, Postel A, Becher P. Characterization of the First Marine Pestivirus, Phocoena Pestivirus (PhoPeV), 2025, Viruses https://doi.org/10.3390/v17010107.

Roman-Sosa G, Meyer D, Dellarole M, Wengen D, Lerch S, Postel A, Becher P, Virus-neutralizing monoclonal antibodies against bovine viral diarrhea virus and classical swine fever virus target conformational and linear epitopes on E2 glycoprotein subdomains, 2025, ASM, accepted.

b) International conferences:

11

Leveringhaus E, Becher P, Postel A. The cell junction and adhesion protein vinculin restricts permissivity to pestiviruses. 33rd Annual Meeting of the Society for Virology, Wien, Austria, 25.-28.03.2024, poster presentation.

Pitters M; Su A; Yan M; Leveringhaus E; Fritzsch H; Beinecke A; Becher P. Overcoming the nasal airway epithelial barrier in the early phase of bovine viral diarrhea virus infection. 33rd Annual Meeting of the Society for Virology, Wien, Austria, 25.-28.03.2024, poster presentation.

Söder L, Meyer D, Postel A, Becher P. Investigation of the viral properties of Phocoena pestivirus in comparison to other pestiviruses. 33rd Annual Meeting of the Society for Virology, Wien, Austria, 25.-28.03.2024, poster presentation.

Blome S, Meyer D, Ebner L, Becher P. Blood swabs represent an alternative sample matrix for Classical swine fever antibody ELISAs. Workshop on Laboratory Diagnosis of ASF and CSF, Hannover, Germany, 11.-12.06.2024, oral presentation.

Meyer D. Results of the Interlaboratory Comparison Test 2023-2024 -Serology Panel. Workshop on Laboratory Diagnosis of ASF and CSF,

Hannover, Germany, 11.-12.06.2024, oral presentation.

Meyer D. Report of the CSF EURL activities in 2023-2024 and additional research activities. Workshop on Laboratory Diagnosis of ASF and CSF, Hannover, Germany, 11.-12.06.2024, oral presentation.

Postel A. The cell junction and adhesion protein vinculin: An important restriction factor for pestiviruses?. Workshop on Laboratory Diagnosis of ASF and CSF, Hannover, Germany, 11.-12.06.2024, oral presentation.

Wiedemann A. Results of the Interlaboratory Comparison Test 2023-2024 –Virology Panel. Workshop on Laboratory Diagnosis of ASF and CSF, Hannover, Germany, 11.-12.06.2024, oral presentation.

Wiedemann A. Results of the Interlaboratory Comparison Test 2023-2024 –Virus Isolation Panel. Workshop on Laboratory Diagnosis of ASF and CSF, Hannover, Germany, 11.-12.06.2024, oral presentation.

Leveringhaus E, Becher P, Postel A. The cell junction and adhesion protein vinculin restricts permissivity to pestiviruses. 16th Annual Meeting of EPIZONE, Uppsala, Sweden, 25.-27.09.2024, oral presentation.

Meyer D, Blome S, Ebner L, Becher P. Blood swabs represent an alternative sample matrix for Classical swine fever antibody ELISAs. 16th Annual Meeting of EPIZONE, Uppsala, Sweden, 25.-27.09.2024, oral presentation.

c) National conferences:

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

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 0

b) Seminars : 1

c) Hands-on training courses: 6

d) Internships (>1 month) 0

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
B	CHINESE TAIPEI	3
C	CROATIA	2
C	ITALY	2

C	SERBIA	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	PDF	DAkkS Urkunde englisch_2020.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Isolation, propagation and quantification of CSFV in cell culture	DAkkS /ILAC-MRA
Detection of CSFV antigen by ELISA	DAkkS /ILAC-MRA
Detection of antibodies directed against CSFV by ELISA	DAkkS /ILAC-MRA
Detection of antibodies directed against CSFV by neutralization assay	DAkkS /ILAC-MRA
Detection of antibodies directed against Border Disease Virus (BDV) by neutralization assay	DAkkS /ILAC-MRA
Detection of antibodies directed against Bovine Viral Diarrhea Virus (BVDV) by neutralization assay	DAkkS /ILAC-MRA
Detection of CSFV genome using RT-PCR (and subsequent preparation for genotyping)	DAkkS /ILAC-MRA
Detection of CSFV genome and detection of genome of other pestiviruses using real-time RT-PCR (SYBR Green)	DAkkS /ILAC-MRA
Detection of CSFV genome using real-time RT-PCR with TaqMan probe	DAkkS /ILAC-MRA
Detection of CSFV genome using virotype CSF RT-PCR-Kit	DAkkS /ILAC-MRA
Isolation, propagation and quantification of BVDV, BDV and other pestiviruses in cell culture	DAkkS /ILAC-MRA

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

Yes

A biological risk analysis is performed by the head of the laboratory together with the management of laboratory biological risk. Biosafety and laboratory biosecurity measures are implemented and summarized in the corresponding operating instructions of the laboratory.

TOR9: SCIENTIFIC MEETINGS

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

No

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

No

TOR10: NETWORK WITH WOAH REFERENCE LABORATORIES

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

Yes

24. Do you network (collaborate or share information) with other WOAH Reference Laboratories designated for the same pathogen?

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS
WOAH-Terrestrial Manual , Chapter CSF	Update of the vaccine part and justification for the listed diagnostic methods in the chapter CSF of the WOAH Terrestrial Manual	7	China, Japan, UK, Germany, Spain, Chinese Taipei, Poland, Canada

25. Did you organise or participate in inter-laboratory proficiency tests with WOAH Reference Laboratories designated for the same pathogen during the past 2 years?

Yes

Purpose of the proficiency test:	Role of your Reference Laboratory (organiser/ participant)	No. participating Laboratories	Participating WOAH Ref. Labs/ organising WOAH Ref Lab
Validation of diagnostic protocols: Real-time RT-PCR Conventional RT-PCR Antigen ELISA, Virus isolation, Sequencing, Virus Neutralization assay Antibody ELISA	organiser	6	National Veterinary Research Institute, Pulawy, Poland; National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, Canada; Veterinary Research Institute, Council of Agriculture, New Taipei City, Chinise Taipei ; National Institute of Animal Health Department of Exotic Diseases, Tokyo, Japan ; Institut de Recerca i Tecnologia Agroalimentàries (IRTA) Centre de Recerca en Sanitat Animal (CReSA), Edifici CreSA, Barcelona, Spain, Animal and Plant Health Agency, Surrey, United Kingdom

26. Did your laboratory collaborate with other WOAH 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 WOAH Reference Laboratories

Characterisation of monoclonal antibodies against pestiviruses	Testing of novel monoclonal antibodies against Classical Swine fever Virus using different pestivirus strains (including various genotypes of CSFV)	Veterinary Research Institute, Tamsui, New Taipei City, Chinese Taipei
Characterisation of monoclonal antibodies against pestiviruses	Testing of monoclonal antibodies using pestivirus strains that were discovered in ruminants, pigs or in non-ungulate hosts.	Animal and Plant Health Agency, Surrey, United Kingdom

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOAH Reference Laboratories for the same pathogen during the past 2 years?

Yes

Purpose for inter-laboratory test comparisons1	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the test	WOAH Member Countries
Determining laboratory ´s capability to conduct specific diagnostic tests: Antigen ELISA Real-time RT-PCR Conventional RT-PCR, Sequencing Virus isolation Virus Neutralization assay Antibody ELISA	Organiser	33	CSF ILCT 2024	AUSTRIA, BELGIUM, BRAZIL, BULGARIA, CANADA, CHINESE TAIPEI, CROATIA, CYPRUS, CZECH REPUBLIC, DENMARK, ESTONIA, FINLAND, FRANCE, GERMANY, GREECE, HUNGARY, IRELAND, ITALY, JAPAN, LATVIA, LITHUANIA, LUXEMBOURG, MALTA, MONTENEGRO, NORTH MACEDONIA (REP. OF), NORWAY, POLAND, PORTUGAL, ROMANIA, SERBIA, SLOVAKIA, SLOVENIA, SPAIN, SWEDEN, SWITZERLAND, THE NETHERLANDS, UNITED KINGDOM, UNITED STATES OF AMERICA,
Inter-laboratory comparison test for CSF RT-PCR	Participant	9	Inter-laboratory comparison test for CSF RT-PCR	FRANCE,

TOR12: EXPERT CONSULTANTS

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

Yes

Kind of consultancy	Location	Subject (facultative)

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Review and update of the WOAH-Terrestrial Manual, chapter 3.9.2: Update of the vaccine part and justification for the listed diagnostic methods	remote	Update of the vaccine part and justification for the listed diagnostic methods

29. Additional comments regarding your report:

No