

# OIE Reference Laboratory Reports Activities

## *Activities in 2021*

**This report has been submitted : 2022-01-26 13:39:41**

<b>Name of disease (or topic) for which you are a designated OIE Reference Laboratory:</b>	Classical swine fever
<b>Address of laboratory:</b>	Institut de Recerca i Tecnologia Agroalimentàries (IRTA) Centre de Recerca en Sanitat Animal (CReSA) Edifici CReSA Campus de la Universidad Autònoma de Barcelona Bellaterra 08193 (Barcelona) SPAIN
<b>Tel.:</b>	+34-934 67 40 40 Ext
<b>Fax:</b>	+34-935 81 44 90
<b>E-mail address:</b>	llilianne.ganges@irta.cat
<b>Website:</b>	<a href="http://www.irta.cat/ca/produccio-animal/sanitat-animal/">http://www.irta.cat/ca/produccio-animal/sanitat-animal/</a> and <a href="http://www.irta.cat/en/servei/oie-laboratory-reference-center-for-classical-swine-fever/">http://www.irta.cat/en/servei/oie-laboratory-reference-center-for-classical-swine-fever/</a>
<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Dr. Josep Usall, General Director at IRTA
<b>Name (including Title and Position) of OIE Reference Expert:</b>	Dr. Lillianne Ganges Principal Investigator in the Research line: Diagnosis, Vaccines and Evolution of Relevant Viral Diseases in Animal Health, Emphasizing in pestiviruses. Head in the CSF OIE Reference Laboratory at IRTA-CReSA.
<b>Which of the following defines your laboratory? Check all that apply:</b>	Governmental

**ToR 1: To use, promote and disseminate diagnostic methods validated according to OIE Standards**

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 OIE Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests		Nationally	Internationally
ELISA: Classical swine fever virus (CSFV) Antibody test Kit (IDEXX)	Yes	277	0
Seroneutralization (NPLA Test)	Yes	301	56
Direct diagnostic tests		Nationally	Internationally
RT-qPCR for CSFV RNA detection (Hoffmann et al., 2005)	Yes	1793	0
RT-qPCR for Pestivirus RNA detection (Hoffmann et al., 2006)	Yes	98	0

**ToR 2: To develop reference material in accordance with OIE requirements, and implement and promote the application of OIE Standards. To store and distribute to national laboratories biological reference products and any other reagents used in the diagnosis and control of the designated pathogens or disease.**

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

No

3. Did your laboratory supply standard reference reagents (non OIE-approved) and/or other diagnostic reagents to OIE Member Countries?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient OIE Member Countries	Region of recipients
10 Reference RNA samples	RT-qPCR for CSFV specific RNA detection (Hoffmann et al., 2005)	Produced and Provided	0	10 samples of 0,1mL	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
10 Reference sera samples	ELISA: Classical swine fever virus (CSFV) Antibody test Kit (IDEXX) and Seroneutralization (NPLA Test)	Produced and Provided	0	10 samples of 1mL	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
10 Reference RNA samples	RT-qPCR for CSFV specific RNA detection (Hoffmann et al., 2005)	Produced and Provided	10 samples of 0,1mL	0	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to OIE Member Countries?

No

**ToR 3: To develop, standardise and validate, according to OIE Standards, new procedures for diagnosis and control of the designated pathogens or diseases**

6. Did your laboratory develop new diagnostic methods validated according to OIE Standards for the designated pathogen or disease?

Yes

7. Did your laboratory develop new vaccines according to OIE Standards for the designated pathogen or disease?

No

Name of the new test or diagnostic method or vaccine developed	Description and References (Publication, website, etc.)
CSFV-ASFV Duplex real time PCR:	Development of a new Duplex real-time PCR assay for the molecular detection of classical swine fever and African swine fever viruses in the same reaction tube. Currently under ISO17025 accreditation process.
Development of a Dendrimeric Peptide-Based Approach for the Differentiation of Animals Vaccinated with FlagT4G against Classical Swine Fever from Infected Pigs	Development of a Dendrimeric Peptide-Based Approach for the Differentiation of Animals Vaccinated with FlagT4G against Classical Swine Fever from Infected Pigs. Bohórquez JA, Defaus S, Rosell R, Pérez-Simó M, Alberch M, Gladue DP, Borca MV, Andreu D, Ganges L. Viruses. 2021 Oct 2;13(10):1980. doi: 10.3390/v13101980. European patent (application number: EP2138539.1) titled "Peptide-based assay to differentiate animals infected with CSFV from vaccinated animals".

***ToR 4: To provide diagnostic testing facilities, and, where appropriate, scientific and technical advice on disease control measures to OIE Member Countries***

8. Did your laboratory carry out diagnostic testing for other OIE Member Countries?

Yes

Name of OIE Member Country seeking assistance	Date (month)	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
SWITZERLAND	01/2021	14 sera samples (56 NPLA test) for surveillance and differentiation of CSFV from other circulating pestiviruses	0

9. Did your laboratory provide expert advice in technical consultancies on the request of an OIE Member Country?

Yes

Name of the OIE Member Country receiving a technical consultancy	Purpose	How the advice was provided
ECUADOR	Technical consultation for the standardization and validation of seroneutralization test for CSFV	Remote
ECUADOR	Technical consultation for CSFV diagnostic	Remote
ECUADOR	Technical consultation for cell culture procedures	Remote
ECUADOR	Technical consultation for CSFV isolation	Remote
COLOMBIA	Serological differentiation of CSFV from other pestiviruses	Remote
COLOMBIA	Consultation on possible application of ELISA techniques with oral fluids	Remote

***ToR 5: To carry out and/or coordinate scientific and technical studies in collaboration with other laboratories, centres or organisations***

10. Did your laboratory participate in international scientific studies in collaboration with OIE Member Countries other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	OIE Member Countries involved other than your country
CSFV virulent factors	2017-2026	Update on CSFV pathogenesis for disease control	Institute of Virology and Immunology	SWITZERLAND
CSFV Diagnosis, pathogenesis and evolution studies	2017-2022	study of CSFV variants circulating in endemic situation under vaccination	CENSA, Cuba -Institute of VeterinaryMedicine, Cuba -	CUBA
CSFV diagnosis and vaccine control	2020-2023	CSFV diagnosis and vaccine control	USDA, USA	UNITED STATES OF AMERICA
European Researchgroup: EPIZONE	Indefinite	Strengthen the cooperation between National and International Reference Laboratories in the field of Epizootic diseases. - facilitate and coordinate scientific research applied to "Epizootic Disease Diagnosis and Control" -develop and support strategies for durable cooperation,particularly to inform about opportunities for further funding - develop,share and upgrade common research tools and platforms for joint research projects - develop common research methods,standardsand protocols-share data and information among partners and better facilitate public access to selected information on epizootic diseases	-L'Agence nationale chargée de lasécurité sanitaire de l'alimentation, del'environnement et du travail(ANSES),France -Animal and Plant Health Agency(APHA), UK -Centre de Recerca en SanitatAnimal (IRTA-CReSA), Spain - WageningenBioveterinaryResearch(WBVR),Netherlands -TechnicalUniversity of Denmark, NationalVeterinary Institute (DTU Vet), Denmark -Friedrich-Loeffler-Institute(FLI),Germany -Institute for Animal Health (IAH) UK -Institute of Virology and Immunology(IVI), Switzerland -Istituto ZooprofilatticoSperimentale della Lombardia e dell'Emilia Romagna Brescia(IZSLER), Italy -Istituto Zooprofilattico Sperimentaledelle Venezie (IZS-Ve), Italy - NationalResearch Institute of Veterinary Virologyand Microbiology (NRIVVaMR), Russia -National Veterinary Research Institute(NVRI), Poland - StatensVeterinarmedicinska Anstalt (SVA),Sweden - Veterinary and AgrochemicalResearch centre, VAR-CODA-CERVA(VAR), Belgium -Emerging PathogensInstitute, University of Florida (EPI), USA	
CSFV and ASFV diagnosis	2020-2022	Improve CSFV and ASFV diagnostic tools	- University of Illinois, US - USDA	UNITED STATES OF AMERICA
Genotyping of CSFV and CSF pathogenesis	2020-2021	Genotyping analysing of CSFV	-Agrocalidad	ECUADOR
CSFV-cell interaction	2020-2022	CSFV-cell interaction	Universidad de Concepción	CHILE
Pestiviruses Research	2019-2021	Pestiviruses Research	Istituto Zooprofilattico Sperimentale della Lombardia e Dell'Emilia Romagna, Via Antonio Bianchi 7/9, 25124 Brescia, Italy.	ITALY

**ToR 6: To collect, process, analyse, publish and disseminate epizootiological data**

**relevant to the designated pathogens or diseases**

11. Did your Laboratory collect epizootiological data relevant to international disease control?

Yes

If the answer is yes, please provide details of the data collected:

The new emerging ovine pestivirus can infect pigs and confers strong protection against classical swine fever virus: The OVPV virus was able to replicate, as shown by the RNA levels found in sera and swabs and persisted in tonsil for at least 5 weeks. Viral replication activated the innate and adaptive immunity, evidenced by the induction of interferon-alpha levels early after infection and cross-neutralizing antibodies against CSFV, including humoral response against CSFV E2 and Erns glycoproteins. Close antigenic relation between OVPV and CSFV genotype 2.3 was detected. To determine the OVPV protection against CSFV, the OVPV-infected pigs were challenged with a highly virulent strain. Strong clinical, virological and immunological protection was generated in the OVPV-infected pigs, in direct contrast with the infection control group. Our findings show, for the first time, the OVPV capacity to infect swine, activate immunity, and the robust protection conferred against CSFV. In addition, their genetic and antigenic similarities, the close relationship between both viruses, suggest their possible coevolution as two branches stemming from a shared origin at the same time in two different hosts.

12. Did your laboratory disseminate epizootiological data that had been processed and analysed?

Yes

If the answer is yes, please provide details of the data collected:

Potency trials of the live attenuated vaccine against CSFV, Thiverval strain, efficacy and virological protection capacity. Early and Solid Protection Afforded by the Thiverval Vaccine Provides Novel Vaccination Alternatives Against Classical Swine Fever Virus. Lamothe-Reyes Y, Bohórquez JA, Wang M, Alberch M, Pérez-Simó M, Rosell R, Ganges L. *Vaccines (Basel)*. 2021 May 6;9(5):464. doi: 10.3390/vaccines9050464.

**13. What method of dissemination of information is most often used by your laboratory?  
(Indicate in the appropriate box the number by category)**

a) Articles published in peer-reviewed journals: 7

1. Abrogation of the RNase activity of Erns in a low virulence classical swine fever virus enhances the humoral immune response and reduces virulence, transmissibility, and persistence in pigs.

Wang M, Bohórquez JA, Hinojosa Y, Muñoz-González S, Gerber M, Coronado L, Perera CL, Liniger M, Ruggli N, Ganges L. *Virulence*. 2021 Dec;12(1):2037-2049. doi: 10.1080/21505594.2021.1959715.

2- Early and Solid Protection Afforded by the Thiverval Vaccine Provides Novel Vaccination Alternatives Against Classical Swine Fever Virus.

Lamothe-Reyes Y, Bohórquez JA, Wang M, Alberch M, Pérez-Simó M, Rosell R, Ganges L. *Vaccines (Basel)*. 2021 May 6;9(5):464. doi: 10.3390/vaccines9050464.

3- A Novel E2 Glycoprotein Subunit Marker Vaccine Produced in Plant Is Able to Prevent Classical Swine Fever Virus Vertical Transmission after Double Vaccination.

Park Y, Oh Y, Wang M, Ganges L, Bohórquez JA, Park S, Gu S, Park J, Lee S, Kim J, Sohn E. *Vaccines (Basel)*. 2021 Apr 22;9(5):418. doi: 10.3390/vaccines9050418.

4- Development of a Dendrimeric Peptide-Based Approach for the Differentiation of Animals Vaccinated with FlagT4G against Classical Swine Fever from Infected Pigs.

Bohórquez JA, Defaus S, Rosell R, Pérez-Simó M, Alberch M, Gladue DP, Borca MV, Andreu D, Ganges L. *Viruses*. 2021 Oct 2;13(10):1980. doi: 10.3390/v13101980.

5- The new emerging ovine pestivirus can infect pigs and confers strong protection against classical swine fever virus.

Bohórquez JA, Sozzi E, Wang M, Alberch M, Abad X, Gaffuri A, Lelli D, Rosell R, Pérez LJ, Moreno A, Ganges L. *Transbound Emerg Dis*. 2021 Apr 25. doi: 10.1111/tbed.14119. Online ahead of print.

6- Peptide-Based Vaccines: Foot-and-Mouth Disease Virus, a Paradigm in Animal Health

Mar Forner, Rodrigo Cañas-Arranz, Sira Defaus, Patricia de León, Miguel Rodríguez-Pulido, Lillianne Ganges, Esther Blanco, Francisco Sobrino, David Andreu. *Vaccines (Basel)*. 2021 May 8;9(5):477. doi: 10.3390/vaccines9050477.

7- Identification and Characterization of Swine Influenza Virus H1N1 Variants Generated in Vaccinated and Nonvaccinated, Challenged Pigs.

López-Valiñas Á, Sisteré-Oró M, López-Serrano S, Baioni L, Darji A, Chiapponi C, Segalés J, Ganges L, Núñez JI. *Viruses*. 2021 Oct 16;13(10):2087. doi: 10.3390/v13102087.

b) International conferences: 1

Plenary lecture. Ganges L. New Challenge for CSFV control. Int. Symp. for CSF. December 2021 in Beijing, China.

c) National conferences: 0

d) Other:

(Provide website address or link to appropriate information) 1

<http://www.irta.cat/ca/produccio-animal/sanitat-animal/> and

<http://www.irta.cat/en/servei/oie-laboratory-reference-center-for-classical-swine-fever/>

**ToR 7: To provide scientific and technical training for personnel from OIE Member Countries**

**To recommend the prescribed and alternative tests or vaccines as OIE Standards**

14. Did your laboratory provide scientific and technical training to laboratory personnel from other OIE Member Countries?

Yes

a) Technical visits: 0

b) Seminars: 0

c) Hands-on training courses: 0

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
d	Chile	1
d	Cuba	1

**ToR 8: To maintain a system of quality assurance, biosafety and biosecurity**



**relevant for the pathogen and the disease concerned**

15. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)
ISO17025	Alcance acreditacion Anexo 900LE1557. ISO 17025. CReSA Rev. 8.pdf
ISO9001	AENOR-ISO-9001-ER-0591-hasta-2024.pdf
GLP According to Directive 2004/9/CE	20200121_IRTA_Certificat_Digit.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Seroneutralization test (NPLA) for CSFV antibody detection and and differentiation with other Pestiviruses (IT-A4 ESE 005)	ENAC
qRT-PCR (Hoffmann et al., 2005) for CSFV RNA diagnosis (IT-A4-EPCR 132)	ENAC
Conventional RT-PCR for Pestivirus detection (IT-A4-EPCR 232)	ENAC
Virus isolation test (CSFV) (IT-A4-EVI 019)	ENAC
ELISA for CSFV antibody detection (IT-A4-EELS 008)	ENAC

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

Yes

(See *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, Chapter 1.1.4*)

**ToR 9: To organise and participate in scientific meetings on behalf of the OIE**

18. Did your laboratory organise scientific meetings on behalf of the OIE?

Yes

National/ International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
International	Epizone 14 AM	IRTA-CReSA and Epizone Committee	05/22	Barcelona	300

19. Did your laboratory participate in scientific meetings on behalf of the OIE?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
International Symposium for classical swine fever	12/21	Beijing, China	Speaker, L. Ganges. Plenary lecture.	New Challenge for CSFV control

***ToR 10: To establish and maintain a network with other OIE Reference Laboratories designated for the same pathogen or disease and organise regular inter-laboratory proficiency testing to ensure comparability of results***

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

Yes

21. Was your laboratory involved in maintaining a network with OIE Reference Laboratories designated for the same pathogen or disease by organising or participating in proficiency tests?

Yes

Purpose of the proficiency tests: <sup>1</sup>	Role of your Reference Laboratory (organiser/participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
Validation of diagnostic protocols: Real time RT-PCR, Conventional RT-PCR, Antigen ELISA, Virus Isolation, Sequencing, Virus neutralization assay antibody ELISA	Participant	Approx: 30 labs	Participating CSF OIE Ref. Labs: -National Veterinary Research Institute, Pulawy, Poland -Animal Health and Veterinary Laboratories Agency, Weybridge, UK - Canadian Food Inspection Agency National Centre for Foreign Animal Disease Winnipeg, Canada -Animal Health Research Institute, Tamsui, New Taipei City, Taiwan - IRTA CReSA Bellaterra (Barcelona), Spain - Organising OIE Ref. Lab: University of Veterinary Medicine of Hannover, Department of Infectious Diseases, Institute of Virology, Hannover, German

<sup>1</sup> validation of a diagnostic protocol: specify the test; quality control of vaccines: specify the vaccine type, etc.

22. Did your laboratory collaborate with other OIE 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 OIE Reference Laboratories
Pestivirus Characterization	Update on the pathogenesis, molecular biology and immunology of Pestiviruses	OIE Ref. Lab: University of Veterinary Medicine of Hannover, Department of OIE/EU CSF Reference Laboratory, Infectious Diseases, Institute of Virology, Hannover, German
Pestivirus Characterization and differentiation	Molecular and serological pestiviruses characterization and differentiation	-National Veterinary Research Institute, Pulawy, Poland (CSF OIE Reference Lab.)

**ToR 11: To organise inter-laboratory proficiency testing with laboratories other than OIE Reference Laboratories for the same pathogens and diseases to ensure equivalence of results**

23. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than OIE Reference Laboratories for the same disease?

Yes

Note: See Interlaboratory test comparisons in: Laboratory Proficiency Testing at: <http://www.oie.int/en/our-scientific-expertise/reference-laboratories/proficiency-testing> see point 1.3

Purpose for inter-laboratory test comparisons <sup>1</sup>	No. participating laboratories	Region(s) of participating OIE Member Countries
Validation of diagnostic protocols: Real time RT-PCR, Conventional RT-PCR, Sequencing, antibody ELISA	2	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

**ToR 12: To place expert consultants at the disposal of the OIE**

24. Did your laboratory place expert consultants at the disposal of the OIE?

Yes

Kind of consultancy	Location	Subject (facultative)
Revision and update the OIE_Terrestrial_Manual,_chapter_on_Classical_swine_fever_(infection_with_classical_swine_fever_virus)	remote	Revision and update

25. Additional comments regarding your report: