

OIE Reference Laboratory Reports Activities

Activities in 2020

This report has been submitted : 2021-01-20 16:30:52

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Classical swine fever
Address of laboratory:	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
Tel.:	+34-934 67 40 40 ext
Fax:	+34-935 81 44 90
E-mail address:	llilianne.ganges@irta.cat
Website:	http://www.irta.cat/ca/produccio-animal/sanitat-animal/ and http://www.irta.cat/en/servei/oie-laboratory-reference-center-for-classical-swine-fever/
Name (including Title) of Head of Laboratory (Responsible Official):	Josep Usall, General Director at IRTA
Name (including Title and Position) of OIE Reference Expert:	Dr. Lillianne Ganges Principal investigator in Pestivirus Research line Head in CSF OIE Reference Laboratory at IRTA-CReSA
Which of the following defines your laboratory? Check all that apply:	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	924	0
Seroneutralization (NPLA Test)	Yes	1061	0
Direct diagnostic tests		Nationally	Internationally
Viral Isolation Test	Yes	10	0
RT-qPCR for CSFV RNA detection (Hoffmann et al., 2005)	Yes	2598	68
RT-qPCR for Pestivirus RNA detection (Hoffmann et al., 2006)	Yes	1582	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 RNA samples	RT-qPCR for CSFV specific RNA detection (Hoffmann et al., 2005)	Produced and Provided	0	10 samples of 0,05 ml	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
10 porcine sera samples	ELISA and Neutralising peroxidase-linked(NPLA) assay	Produced and Provided	0	10 ml	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
CSFV Hyperimmune porcine sera	Neutralising peroxidase-linked(NPLA) assay	Produced and Provided	0	25 ml	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
CSFV viral strain	Neutralising peroxidase-linked(NPLA) assay	Produced and Provided	0	2 ml	1	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input 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.)
Design and Validation of a New RT-qPCR for the Specific Detection of the new Ovine Pestivirus (OVPV) for the accurate differentiation with CSFV	Decrypting the Origin and Pathogenesis in Pregnant Ewes of a New Ovine Pestivirus Closely Related to Classical Swine Fever Virus. Wang M, Sozzi E, Bohórquez JA, Alberch M, Pujols J, Cantero G, Gaffuri A, Lelli D, Rosell R, Bensaïd A, Domingo M, Pérez LJ, Moreno A, Ganges L. Viruses. 2020 Jul 17;12(7):775. doi: 10.3390/v12070775.

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
ECUADOR	September	45	0
SWITZERLAND	December	14	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
COLOMBIA	Technical consultation on the differentiation of CSFV from other pestiviruses by serological methods	remote
ECUADOR	Technical consultation for the standardization and validation of seroneutralization test for CSFV	remote
ECUADOR	Technical consultation for CSFV diagnostic	remote
CUBA	Technical consultation for vaccination control program	remote
JAPAN	Technical consultation for CSFV vaccine design	remote
CHINESE TAIPEI	Consultation for CSFV infection in cells (SIE)	remote
KOREA (REP. OF)	Consultation on CSF vaccine efficacy studies, pathogenesis and immune response studies of CSFV	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

Classical swine fever - Lilliane Ganges - Spain

Title of the study	Duration	Purpose of the study	Partners (Institutions)	OIE Member Countries involved other than your country
CSFV virulent factors	2017-2022	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 - IRTA-CReSA, Spain	CUBA
CSFV diagnosis and vaccine control	3 years	CSFV diagnosis and vaccine control	USDA, USA and IRTA-CReSA	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 of CSFV and CSF pathogenesis	-Agrocalidad	ECUADOR
CSFV-cell interaction	2020-2022	CSFV-cell interaction	Universidad de Concepción	CHILE
CSFV diagnostic	2019-2021	Development of CSFV diagnostic tools	Kansas State University	UNITED STATES OF AMERICA
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:

Study the origin and the pathogenic role in pregnant ewes of a novel ovine pestivirus (OVPV) isolated in 2017 in Italy. Determination of molecular and serological diagnostics cross-reactivity between CSFV and OVPV

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:

The study shows the origin and the pathogenic role of a novel ovine pestivirus (OVPV) isolated in 2017 in Italy, as a pathogenic agent causing severe abortions after infection in pregnant ewes and high capacity for virus trans-placental transmission as well as the birth of lambs suffering OVPV-persistent infection. The OVPV infection induced early antibody response detected by the specific ELISA against classical swine fever virus (CSFV), another important virus affecting swine. The neutralizing antibody response were similar against CSFV strains from genotype 2 and the OVPV. These viruses showed high identity in the B/C domain of the E2-glycoprotein. Close molecular diagnostics cross-reactivity between CSFV and OVPV was found and a new OVPV molecular assay was developed. The phylodynamic analysis showed that CSFV seems to have emerged as the result of an inter-species jump of Tunisian sheep virus (TSV) from sheep to pigs. The OVPV and the CSFV share the TSV as a common ancestor, emerging around 300 years ago. This suggests that the differentiation of TSV into two dangerous new viruses for animal health (CSFV and OVPV) was likely favored by human intervention for the close housing of multiple species for intensive livestock production.

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. Classical swine fever virus: the past, present and future.

Ganges L, Croke HR, Bohórquez JA, Postel A, Sakoda Y, Becher P, Ruggli N. *Virus Res.* 2020 Nov;289:198151. doi: 10.1016/j.virusres.2020.198151. Epub 2020 Sep 6.

2. High-Resolution Profiling of Innate Immune Responses by Porcine Dendritic Cell Subsets in vitro and in vivo.

Auray G, Talker SC, Keller I, Python S, Gerber M, Liniger M, Ganges L, Bruggmann R, Ruggli N, Summerfield A. *Front Immunol.* 2020 Jul 7;11:1429. doi: 10.3389/fimmu.2020.01429. eCollection 2020.

3. Decrypting the Origin and Pathogenesis in Pregnant Ewes of a New Ovine Pestivirus Closely Related to Classical Swine Fever Virus.

Wang M, Sozzi E, Bohórquez JA, Alberch M, Pujols J, Cantero G, Gaffuri A, Lelli D, Rosell R, Bensaid A, Domingo M, Pérez LJ, Moreno A, Ganges L. *Viruses.* 2020 Jul 17;12(7):775. doi: 10.3390/v12070775.

4. Foetal Immune Response Activation and High Replication Rate during Generation of Classical Swine Fever Congenital Infection.

Bohórquez JA, Muñoz-González S, Pérez-Simó M, Muñoz I, Rosell R, Coronado L, Domingo M, Ganges L. *Pathogens.* 2020 Apr 14;9(4):285. doi: 10.3390/pathogens9040285.

5. A neutralizing monoclonal antibody-based competitive ELISA for classical swine fever C-strain post-vaccination monitoring.

Wang L, Mi S, Madera R, Ganges L, Borca MV, Ren J, Cunningham C, Cino-Ozuna AG, Li H, Tu C, Gong W, Shi J. BMC Vet Res. 2020 Jan 14;16(1):14. doi: 10.1186/s12917-020-2237-6.

6. Causes of cetacean stranding and death on the Catalonian coast (western Mediterranean Sea), 2012-2019. Cuvertoret-Sanz M, López-Figueroa C, O'Byrne A, Canturri A, Martí-García B, Pintado E, Pérez L, Ganges L, Cobos A, Abarca ML, Raga JA, Van Bresse MF, Domingo M. Dis Aquat Organ. 2020 Dec 17;142:239-253. doi: 10.3354/dao03550.

7. A Polyuridine Insertion in the 3' Untranslated Region of Classical Swine Fever Virus Activates Immunity and Reduces Viral Virulence in Piglets.

Wang M, Liniger M, Muñoz-González S, Bohórquez JA, Hinojosa Y, Gerber M, López-Soria S, Rosell R, Ruggli N, Ganges L. J Virol. 2020 Jan 6;94(2):e01214-19. doi: 10.1128/JVI.01214-19. Print 2020 Jan 6. PMID: 31645448 Free PMC article.

b) International conferences: 2

LLilianne Ganges. Classical swine fever: the long history in vaccines development and its implications for the disease control. the 9th Leman China Swine Conference & 2020 World Swine Industry Expo. Chongqing Yuelai International Convention Center on October 14-16 2020. China Rep of

LLilianne Ganges. Pathogenesis of the novel OVPV in shepp and pigs. TNA 2. VETBIONET Third Annual meeting, 17-18 December 2020. -Video conference-

c) National conferences: 1

LLilianne Ganges. Pestivirus Emergentes. Reunión con el DARP, Catalonia Government. Noviembre, 2020. Videoconference

d) Other:

(Provide website address or link to appropriate information) 1

LLilianne Ganges. Avances recientes sobre el pestivirus atípico porcino como agente causal del temblor congénito tipo All. Revista Suis #172. Noviembre, 2020

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): 1

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 (six months)

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	Anexo 900LE1557. ISO 17025. CReSA Rev. 7.pdf
ISO9001	ISO 9001 (ANY 2018).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	14th EPIZONE Annual meeting Postponed for 2022 due to the Covid19 Pandemic	IRTA and EPIZONE Committee	09/20	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
9th Leman China Swine Conference & 2020 World Swine Industry Expo	10/2022	Chongqing, China	Speaker	Classical swine fever: the long history in vaccines development and its implications for the disease control.
VETBIONET Third Annual meeting, 17-18 December 2020. -Video conference-	12/2020	Videoconference	Speaker	Pathogenesis of the novel OVPV in shepp and pigs.

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: ¹	Role of your Reference Laboratory (organiser/ participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
Validation of diagnostic protocols: Real time RTPCR, Conventional RTPCR, Antigen ELISA, Virus Isolation, Sequencing, Virus neutralization assay antibody ELISA	Participant	43	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

¹ 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 Pestivirus	OIE Ref. Lab: University of Veterinary Medicine of Hannover, Department of OIE/EU CSF Reference Laboratory, Infectious Diseases, Institute of Virology, Hannover, German
Pathogenesis and immune response of African swine fever and classical swine fever virus infections.	The study of the pathogenesis and immune response of ASFV and CSFV subclinical infections	OIE CSF Reference Laboratory, National Veterinary Research Institute, Pulawy, Poland

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 ¹	No. participating laboratories	Region(s) of participating OIE Member Countries
Validation of diagnostic protocols: Real time RTPCR, Conventional RTPCR, antibody ELISA	2	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Validation of diagnostic protocols: Antibody ELISA	26	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
validation of diagnostic protocols: Real time RTPCR, Conventional RTPCR, Antigen ELISA, Virus Isolation, Sequencing, Virus neutralization assay antibody ELISA	43	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americas <input checked="" 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)
Review of the OIE Terrestrial Manual, Chapter on Classical swine fever	Remote	Review of OIE Standards

25. Additional comments regarding your report:

The Covid-19 pandemic has made particularly difficult to carry out research activities and coordination. Nevertheless, our laboratory has continued in our efforts to provide assistance to other OIE members. We hope that 2021 will allow us to continue improving in our tasks. Thanks to the OIE for the support in research and SARS-CoV II diagnostic, showing the importance of the One-Heath Approach.