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## SSBR - Sécurité sanitaire des biotechnologies de la reproduction

Rapport Hcéres

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# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

HCERES report on research unit:

Sanitary Security of Reproduction Biotechnology

SSRB

Under the supervision of  
the following institutions  
and research bodies:

Oniris - École Nationale Vétérinaire, Agroalimentaire et  
de l'Alimentation, Nantes Atlantique

# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

*In the name of HCERES,<sup>1</sup>*

Michel Cosnard, president

*In the name of the experts committee,<sup>2</sup>*

Ann Van Soom, chairwoman of the  
committee

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Under the decree N<sup>o</sup>2014-1365 dated 14 november 2014.

<sup>1</sup> The president of HCERES "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5)

<sup>2</sup> The evaluation reports "are signed by the chairman of the expert committee". (Article 11, paragraph 2)

## Evaluation report

This report is the sole result of evaluation by the expert committee, the composition of which is specified below.

The assessments contained herein are the expression of an independent and collegial reviewing by the committee.

Unit name: Sanitary Security of Reproduction Biotechnology

Unit acronym: SSRB

Label requested: EA

Current number: UPSP E26 or UPSP 5301

Name of Director  
(2015-2016): Mr Francis FIENI

Name of Project Leader  
(2017-2021): Mr Francis FIENI

## Expert committee members

Chair: Mr Ann VAN SOOM, Ghent University, Belgium

Experts: Mr Jean-Luc CADORE, Université de Lyon (representative of INRA)  
Ms Claire PONSART, Anses

Scientific delegate representing the HCERES:  
Mr Emmanuel LAGARDE

Representative of supervising institutions and bodies:  
Ms Dominique BUZONI-GATEL, ONIRIS

Head of Doctoral School:  
Mr Bruno LEBIZEC, Doctoral school ED BS n° 502, "Biologie Santé".

## 1 • Introduction

### History and geographical location of the unit

This unit was created as a “Young unit” in 2000 with the goal of studying the risk of transmission of CAEV through embryo transfer. Four years after the first evaluation, the research subject has been confirmed and the unit admitted as “Ministry of agriculture research unit” (UPSP). At that time, the unit included 6 researchers and was entitled “Sanitary risk of biotechnology of reproduction”. In 2008, another researcher joined the team and the research unit focused more on security than on risk and adopted a new name “Sanitary security of reproduction biotechnology”.

Oniris (“École nationale vétérinaire, agroalimentaire et de l'alimentation”, Nantes-Atlantique) hosts all facilities where animal semen are collected, where *in vivo*-derived and *in vitro*-produced embryos are produced and where laboratory diagnostics are performed.

### Management team

The research team headed by Mr Francis FIENI is composed of four researcher-teachers in theriogenology (pathology of reproduction) who have developed knowledge and skills in physiology and biotechnology of reproduction, one researcher-teacher in microbiology and general pathology, and another in molecular biology. These two last researchers increase the competencies in viral and bacterial pathology as well as in diagnostic tools and processes.

### HCERES nomenclature

SVE1\_LS3

### Scientific domains

Cell biology, biology of animal development

## Unit workforce

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	7 (FTE 3.5)	6 (FTE 3)
N2: Permanent researchers from Institutions and similar positions		
N3: Other permanent staff (technicians and administrative personnel)	6 (FTE 2.5)	6 (FTE 2.5)
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)		
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)		
N6: Other contractual staff (technicians and administrative personnel)		
N7: PhD students	1	
TOTAL N1 to N7	14 (FTE 7)	
Qualified research supervisors (HDR) or similar positions	6	

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	4
Postdoctoral scientists having spent at least 12 months in the unit	1
Number of Research Supervisor Qualifications (HDR) obtained during the period	1

## 2 ● Overall assessment of the unit

### Introduction

The main interest of the unit is to investigate sanitary security of reproductive biotechnologies through two main research lines, the first being sanitary security of gametes and embryos and the second one the substitution of animal-derived products used in assisted reproduction. The unit was renamed after the last visit in 2012 (“risks” became “security”, which is a more positive approach) and the part on embryo-pathogen interaction and molecular biology was reinforced.

### Global assessment of the unit

The group is very well known in the world of embryo transfer and semen preservation. The team has 15 years of experience in both areas. They work on neglected domestic species such as the horse and small ruminants.

The team is now at the forefront of the research in embryo-pathogen, with few or no competitors in the field. The group is also very well known for its semen research and is collaborating with commercial companies on this topic. Multiple activities of the staff (clinics, research, education, diagnostics, part-time recruitment of technical staff...) are done in parallel in this team. This has the advantage that the researchers know what is going on in the field and in practice, but it has also the disadvantage that less time is available to focus on a particular topic, both for scientists and technicians.

### Strengths and opportunities in the context

The team performs unique research, as team members are the only ones still involved in this area. The team includes experts in both reproduction and infectious diseases, and they benefit from their multiple networks related to training, international societies like IETS, HASAC, ECAR (European College of Animal Reproduction) and OIE, making it easier for them to collaborate with other relevant teams. Opportunities were taken from emerging diseases, since there was a focus recently on *Coxiella* and *Chlamydia*, two pathogens that are presently important for animal health. The lack of government funding opportunities on these topics was partly overcome by hiring a student who received an international grant for a PhD thesis, but this was only a temporary solution. The retirement (this or next year) of a senior scientist may be an opportunity to reconsider the merging and redirection of some research topics.

### Weaknesses and threats in the context

The team does not have its own P3 laboratory. There is only room for a small number of recipient cattle, which makes *in vivo* experiments more difficult. The difficulty to raise grant money on the embryo-pathogen interaction is a threat. The involvement of technical staff in clinical and diagnostic activities of the veterinary school makes it more difficult for them to focus on research activities. Finally, the scarcity of hypothesis-driven research and mechanistic approaches prevents the team to publish in high impact journals

### Recommendations

Permanent access to a P3 laboratory should be secured. It is also advisable to generate more hypothesis-driven research and to reinforce mechanistic approaches. This will make it possible to increase the scientific impact of the team and to succeed in getting more research grants.

It is recommended that the research line on synthetic culture media in cattle embryos be merged with embryo-pathogen research, so that bovine embryos which are not contaminated with proteins of animal origin can be produced and serve as a cheap source of embryos which can be used to investigate interactions with bovine pathogens. Since *in vitro* produced embryos have a different zona pellucida as compared to *in vivo* derived bovine embryos and react differently to the coincubation with pathogens, this research line is important and needs to be continued.