

CReSA/ T. Mussà

# 2011

## Annual Report

**CReSA<sup>R</sup>**  
Centre de Recerca en Sanitat Animal

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Presentation

01

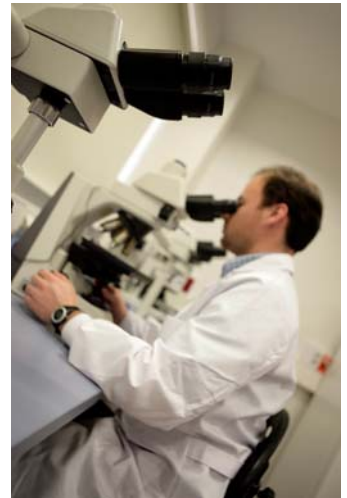
# Who are we?

## What is CReSA?

The Centre de Recerca en Sanitat Animal (CReSA) is a foundation created in 1999 to conduct research into animal health. It was founded by initiative of the Universitat Autònoma de Barcelona (UAB) and Institut de Recerca i Tecnologia Agroalimentàries (IRTA).

The CReSA unites the human potential for research into animal health of both founding institutions, and takes advantage of a new and technologically advanced

building, with level-3 bio-containment (BSL3) for conducting research, grouping efforts and channeling new resources in this field. The CReSA researchers are searching for innovative and effective vaccines, study epidemiology, immunological responses and pathogenic mechanisms, while assessing risks for human health and developing standardised infection models and diagnosis techniques.



## Objectives

In general terms, the objectives of the CReSA are: research and technological development, and all aspects of studies and education in the field of animal health. The projects are carried out in collaboration with the UAB, IRTA, other institutions, and the private sector.

To achieve our objectives:

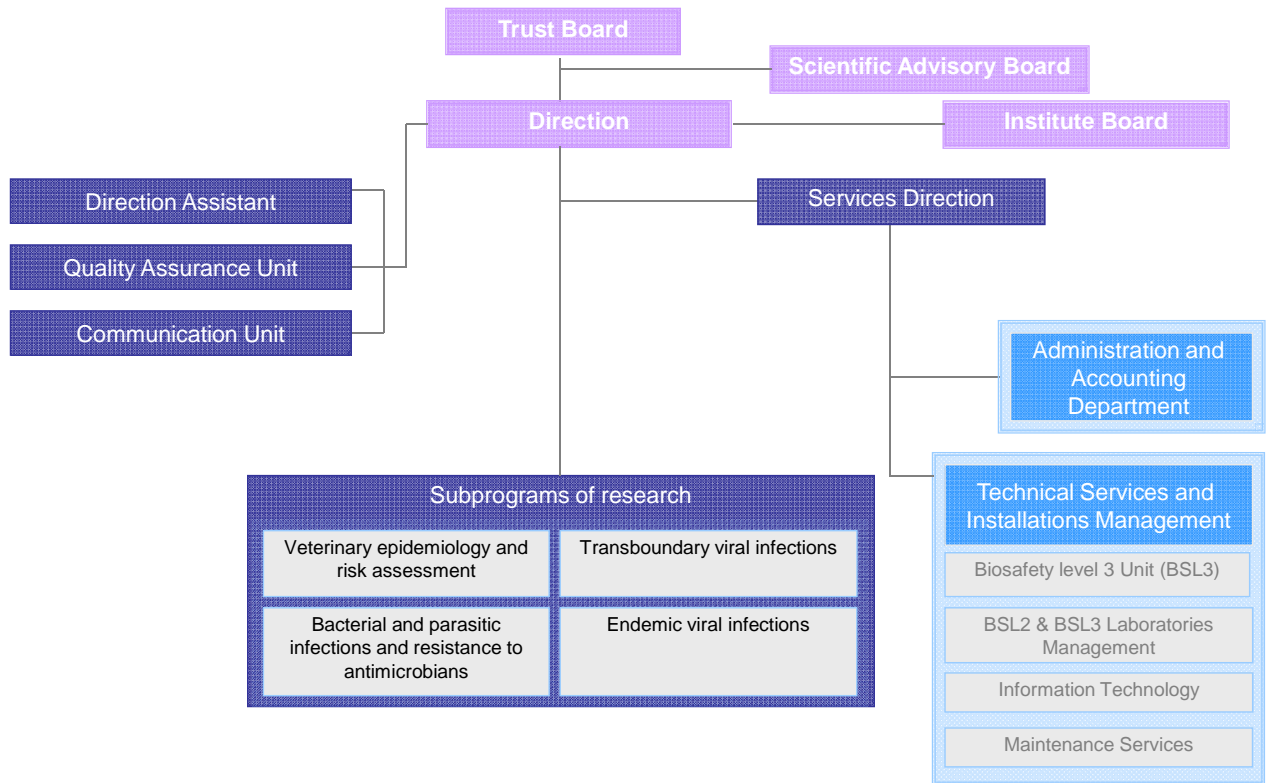
- We develop research and development programs within the field of animal health.
- We transfer the scientific advances that we achieve to the sector.
- We offer services in the research and development field by means of arranged R&D programs.
- We advise agrifood companies and public administration and offer technological support in the field of animal health.
- We organize scientific and technical training programs.



*The CReSA has been directed by Dr. Mariano Domingo Álvarez, since it was created in 1999 by initiative of the IRTA and UAB.*

# Organization

## Organization chart



### The Institute Board of the CReSA

The Institute Board, or Junta de Centre, was created in 2009 as a consultant and advisory body of the CReSA, assisting the Direction in discussions of aspects of the center's activity that require advice and intermediation. Meetings are held every two months, or more frequently if required. The Institute Board is composed of the coordinators of the Scientific Subprograms of the CReSA, and the people responsible for BSL2, BSL3, Communication, Administration and Quality Assurance, plus one representative of the Graduate Students, one representative of Technicians and one representative of works council.

# Board of trustees

## Members

### **PRESIDENT**

**Ana Ripoll i Aracil**  
(UAB Rector)

### **VICEPRESIDENT**

**Josep Maria Monfort i Bolívar**  
(General Director of IRTA)

### **BOARD MEMBERS DESIGNATED BY THE UAB**

**Carles Jaime Cardiel**  
Vice-rector for Strategic Projects and Planning

**Jordi Marquet i Cortés** Commissioned by the Rector for the UAB Research Park

**Reyes Pla Soler**  
Dean of the Veterinary Faculty of UAB

### **BOARD MEMBERS DESIGNATED BY THE IRTA**

**Carles Rosell i Rufat**  
Business Development of IRTA

**Dolors Vidal Calvet**  
General Subdirector for Livestock of DAAM

**Ramón Jové i Miró**  
Territorial Delegate of the Health Protection Agency in Lleida

### **BOARD MEMBERS DESIGNATED BY THE IRTA AND UAB**

**Josep Maria Martorell Rodón**  
General Director for Research of ECO

**Miquels Molins Elizalde**  
General Director for Agriculture and Livestock of DAAM

**Lluís Rovira Pato**  
ICERCA Program

*\* Members on: 31/12/2011*



### Functions of the Board of Trustees

The maximum decision-making body is the Board of Trustees, which approves the statutes and amendments, annual reports, strategic plans, budgets and annual accounts.

# Scientific advisory board

## Members

The Scientific Advisory Board (SABC) of the CReSA was created in 2009 as a consultative body providing advice to the Board of Trustees and to the Direction of the CReSA in all those aspects related to the scientific activities of the center.

During 2011, the CReSA staff worked on the recommendations made in the first SABC report (2010).

Currently, the SABC is comprised of 5 members:

**Dr Philippe Vannier**  
France  
PRESIDENT  
Expert in different European organizations (DG Research, EFSA). Director of Animal Health and Welfare in the French Agency for Food, Environmental and Occupational Health & Safety, Anses (retired 2011)



Dr

**Jürgen Dämmgen** Germany  
Research and Development, Boehringer Ingelheim Animal Health GmbH (retired 2008)



**Dr Esteban Domingo**  
Spain  
Centro de Biología Molecular "Severo Ochoa" (CBMSO)



**Dr Marion Koopmans**  
Holland  
National Public Health Laboratory (RIVM)



**Dr Luis Ortega Mora**  
Spain  
Universidad Complutense de Madrid (UCM)



*Currently, the Scientific Advisory Board is comprised of 5 members from the European Union.*

# Biosafety

## The level 2 biosafety laboratories

The CReSA building, which opened in 2003, consists of highly-specialised equipment and technologically advanced facilities that enable studies to be performed in the fields of microbiology, immunology, molecular biology, entomology and prions.

The CReSA has technologically advanced facilities for such studies, with two clearly differentiated areas:

- level 2 biosafety laboratories
- level 3 biocontainment unit.

The laboratory zone, of biosafety level 2, occupies 717 m<sup>2</sup>.

The area consists of eleven laboratories and equipment rooms in which specific activities are carried out: bacteriology, virology, immunology, molecular biology, pathological anatomy, cell culture, thermocyclers, PCR

sample extraction, electrophoresis, entomology, ultra-freezing, equipment, preparation of reagents, etc.



## The level 3 biocontainment unit

### Biocontainment systems, barriers and protocols

- Secure management of high-risk infectious agents
- Hermetic isolation systems
- Negative pressure gradients
- Absolute air filtration
- Treatment of liquids and solids wastes
- Mandatory showers on leaving the biocontainment unit
- 6 high security laboratories: virology, bacteriology, cell culture, equipment, molecular biology and prions
- 12 high security rooms for experimental inoculations to house pigs, poultry, cattle, sheep, goats and rabbits, among others
- Climatic chamber for entomology studies

The centre has a Biocontainment Unit of level 3 biosecurity, which has several laboratories and stables that mainly house food supply animals (pigs, poultry, cattle, sheep, goats and rabbits), as well as wild animals (chamois, deer, quails, partridges, falcons, ferrets) and laboratory animals (rats, mice, guinea pigs).

This Biocontainment Unit, of

a total surface area of 4500 m<sup>2</sup> distributed over three floors, is equipped with strict access control measures and biocontainment barriers that prevent the pathogens from getting outside, and which are studied using hermetic isolation systems.



## The level 3 biocontainment unit

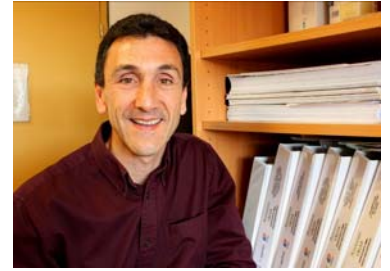
This unit enables the research team to carry out research into pathogenic agents listed as diseases notifiable to the World Organization for Animal Health (OIE).

All laboratories have independent ventilation systems, with negative pressure gradient with regard to the corridor and HEPA filters for air on entry and exit.

The boxes have strict control and containment measures, in addition to having negative pressure with respect to

the corridor. All air entering and exiting the boxes is filtered through absolute HEPA filters. Waste coming from this zone, such as excrement and waste water, is subjected to a chemical decontamination process before it leaves the building. Personnel entering the boxes must change clothes and take a shower before leaving. Animals are on conventional livestock slats, with standard feeding and drinking troughs, living in a controlled atmosphere. All

pathological clinical variables are thoroughly supervised. A video-surveillance system records images 24 hours a day, permitting control of the animals inside the boxes at all times. In order to maintain these strict conditions of biocontainment and biosecurity, there is a complex centralised management system that permits direct and rapid control of all elements and parameters that directly influence the running of the facilities.



*David Solanes is responsible for the Biocontainment Unit.*



*Francesc Xavier Abad is responsible for the BSL2/BSL3 laboratories.*



*A team of specialised technicians participates in experimental BSL3 protocols while the study is in progress.*



# Human resources

## Direction

### Director

Domingo Álvarez, Mariano

## Direction of Services

Solanes Foz, David  
(Director of Services)

### Administration and Accounting Department

Pratsavall Badillo, Sílvia  
(Responsible for administration, accounting and human resources)

Gutiérrez Cabello, Marta  
(Accounting)

Pastó López, Montse  
(Assistant director; management of projects, contracts and human resources)

Menéndez Cabrera, Isabel  
(Reception and accounting support)

Lozano Padilla, Carme  
(Administrative support to Consolider and DAAM)

### Technical services and facilities support

*Level 2 biosafety laboratories (BSL2)*

Royuela Marín, Fernando/  
Abad Morejón de Girón,  
Francesc Xavier  
(Responsible for BSL2 laboratories)

Mora Salvatierra, Mercedes  
(coordinator for BSL2 technicians)

Ivars Espuñes, Josep Maria  
(BSL2 technician)

### Cleaning team

Carrero Torres, Mercedes  
Castillo Alcalá, Manuela  
Muñoz Aguilar, Rosario

*Level 3 Biocontainment Unit (BSL3)*

Solanes Foz, David  
(Responsible for BSL3)  
Cordón Morales, Iván  
(Animal housing technical coordinator)  
Galindo Cardiel, Iván José  
(Pathologist)

Abad Morejón de Girón,  
Francesc Xavier  
(Responsible for BSL3 Laboratories)

BSL3 laboratory technicians:

Maeso García, Raquel  
Núñez Llaves, Raul  
Alberch Raurell, Monica

Animal care-takers technicians:

Osuna Marín, M. Àngels  
Rosell Bellsolà, Valentí  
Torras Sales, Concepció  
Prieto Martín, Juan Carlos  
López Aceña, Javier  
Pereira Sanchez, Claudia

### Information Technologies



The IT manager supports the hardware and software in the centre, and maintains the server and webmail. He also posts the content provided by the Communication Unit on the CReSA website.



The administrative staff are responsible for administration, accounting and human resources.

## Quality Assurance Unit (QAU)

Ordóñez Ordóñez,  
Montserrat (Responsible  
for QAU)

López Jodra, Marta (QAU  
administrative support)



*The Quality Assurance Unit is responsible for the implementation of quality in the activities carried out in the center.*

## Communication Unit

Rodríguez González, Elisa-  
bet (Responsible for Com-  
munication)  
Josep Rexach Fumanya  
(Communication technici-  
an)



*The Communication Unit is responsible for the design and coordination of the promotion, scientific divulgation and innovation activities addressed at the agrarian sector and general public.*

## Researchers

### Researchers

Accensi Alemany, Francesc  
Alba Casals, Ana  
Allepuz Palau, Alberto  
Almería de la Merced,  
Sonia  
Aragón Fernández, Virgi-  
nia  
Badiola Sáiz, Ignacio  
Ballester Devis, María  
Bensaid, Albert Moisés  
Busquets Martí, Núria  
Casal Fàbrega, Jordi  
Cerdà Cuéllar, Marta  
Darji, Ayub  
Darwich Soliva, Laila

De la Torre Martínez, Eu-  
genia  
Díaz Luque, Iván  
Dolz Pascual, Roser  
Fraile Sauce, Lorenzo José  
Ganges Espinosa, Lillianne  
García Migura, Lourdes  
Hernández de la Plaza, Bruno  
Kekarainen, Tuija  
López Soria, Sergio  
Majó Ferrer, Natàlia  
Martín Castillo, Margarita  
Mateu de Antonio, Enric  
Montoya González, María  
Napp Avelli, Ernesto  
Nofrarías Espadamala,  
Miquel

Núñez Garrote, Jose Igna-  
cio  
Olvera Van der Stoep, Alex  
Pagès Martínez, Nonito  
Pérez de Rozas Ruiz de  
Gauna, Ana  
Pérez de Val, Bernat  
Pina Pedrero, Sonia  
Pujols Romeu, Joan  
Ramis Salvà, Antonio José  
Rodríguez González, Fer-  
nando  
Rosell Bellsola, Rosa  
Segalés Coma, Joaquim  
Sibila Vidal, Marina  
Talavera Forcades, Sandra

## Technicians

Aloy Escudero, Núria  
Ayats Murillo, Teresa  
Cano Carrasco, Esmeralda  
Cervera Muñoz, Zoraida  
Córdoba Muñoz, Lorena  
Espinar Guardañó, María  
Galofré Milà, Núria  
González Oliver, Judit  
Huerta Medina, Eva

Llorens Segalés, Anna  
López Jiménez, Rosa M<sup>a</sup>  
Martín Fernández, Maite  
Moreno Bustos, Mariano  
Muñoz Calvo, Iván  
Muñoz Campaña, Marta  
Navarro Toro, Nuria  
Navas Sánchez, María Jesús  
Ozaez Puerto, Laura

Pérez Maillo, Mónica  
Pérez Rodríguez, Diego  
Pérez Simó, Marta  
Pujol Lucas, Núria  
Riquelme Guerrero, Cristina  
Rivas Adán, Raquel  
Serrano del Pozo, Erika  
Valle García, Rosa M<sup>a</sup>  
Valle González, Marta



*A large team of BSL2 laboratory technicians provides essential support for research and development.*

## PhD Students

Antillés Silva, Noelia  
Aramouni, Mario  
Baratelli, Massimiliano  
Bello Orti, Bernardo  
Bertran Dols, Kateri  
Burgura Estrella, Alexel J.  
Caridi, Flavia  
Ciprián Arratia, Adriana  
Costa Hurtado, Mar  
Crisci, Elisa  
Chaves, Aida  
García Saenz, Ariadna

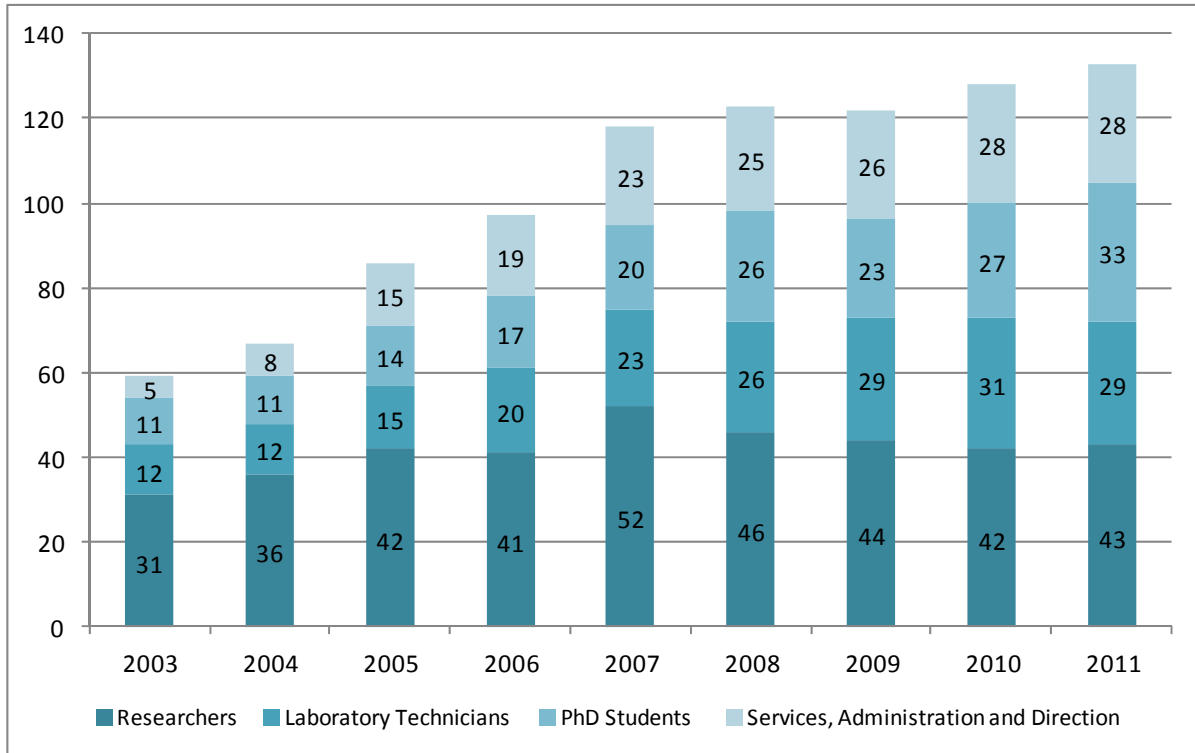
Gimeno Terradellas, Mariona  
González Zabala, Julia del Pilar  
Guta Debela, Sintayehu  
Hua, Feng  
Kuzemtseva, Liudmila  
Jiménez Melsió, Alexandra  
Lacasta Marín, Anna  
López Monteagudo, Paula  
Lorca Oro, Cristina  
Manrique Ramírez, Paula  
Marco Salazar, Paola

Martin Valls, Gerard Eduard  
Martínez Guinó, Laura  
Martínez Orellana, Pamela  
Martínez, Verónica  
Mussà, Tufària  
Nuñez Hernández, Fernando  
Pérez, Lester Josué  
Pileri, Emanuela  
Tarradas Font, Joan  
Urdaneta Vargas, Saulo Hely  
Vergara Alert, Júlia  
Vidaña Mateo, Beatriz

## Master Students

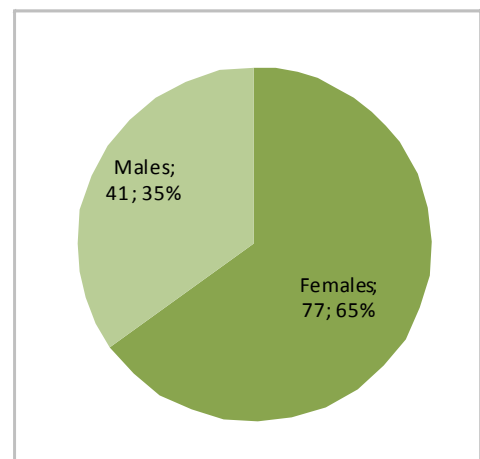
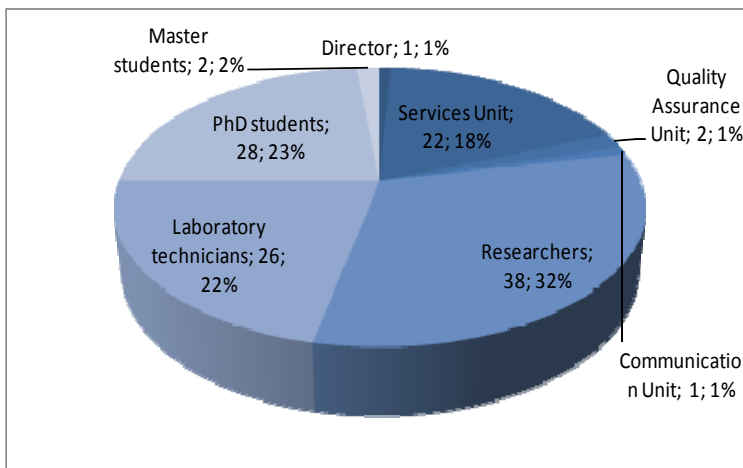
Herrero Gil, Aldara  
Nieto Blanco, David

## Evolution of the CReSA staff (2003-2011)



The total number of collaborators that worked at CReSA throughout 2011 (vs 2010) increased due to the higher number of PhD students.

## A committed team with equal opportunities



The CReSA research team consisted of 92 persons (78.0%) in 2011. Likewise, the CReSA promotes equal opportunities between men and women. The CReSA staff consists of 118 persons (data obtained on December 31st, 2011); 65.3% of these (77) were female.



Summary of the activity

02

# Relevant facts 2011

## Research and development

- **11 research projects in ongoing funded by the Ministry of Science and Innovation** agrees as part of the National Plan.
- **Participation in 6 European projects and networks:** 5 projects of the VII European Framework Program and 2 COST actions.
- **1 Recercaixa project awarded.**
- **Two research projects (Dr Marina Sibila and Dr Tuija Kekarainen) were awarded** by the fifth edition of the European PCV2 Research Award sponsored by Boehringer Ingelheim.
- **76 peer reviewed papers (ISI Citation Index) published and 103 communications at congresses (88% internationals).**
- **1 book and 2 book chapters published.**
- Funding from **competitive projects: €1.134.833,54.**
- **4 doctoral theses** and 5 research studies.
- Accreditation to carry out assays using agri-food products **certified by the Entidad Nacional de Acreditación (ENAC)** since 2009.
- **Certified as a research laboratory complying with Good Laboratory Practices (GLP)** and registered in the GLP Verification Programme with number 6/BPL/2011.



## Technology transfer and services

- **32 contracts with private companies** plus other agreements for a total income of **1.922.313,85 €** (+9% vs. 2010).
- **1 patent** application.
- **9 service contracts for the departments of the Generalitat de Catalunya** involving animal and human health.
- **More than 1,000 attendants at the 6th International Symposium** on Emerging and Re-emerging Pig Diseases organized by CReSA.
- **CReSA exhibited at the 6th International Symposium** on Emerging and Re-emerging Pig Diseases.
- **1 European meeting (NADIR project), 1 national conference (XIII Jornades de Porcí de la UAB) and 4 workshops for dissemination of results** for cooperative vets.
- **2 technical seminars for the PATT Plan of the DAAM and 26 technical seminars** organized.
- A new **journal for scientific dissemination** was launched (CReSAPIENS).
- **15,047 analyses for the diagnosis of viral notifiable diseases** of swine and ruminants carried out.
- The **PRIOCAT laboratory analyzed 15,633 samples** for the diagnosis of Transmissible Spongiform Encephalopathies in Catalonia.
- The Servei de Suport a Escorxadors (SESC) **managed a total of 148 consultations.**
- **403 students (and 22 teachers) from 17 secondary schools** in Catalonia visited the center for education activities.
- **476 subscribers to the CReSADIGITAL online bulletin.**

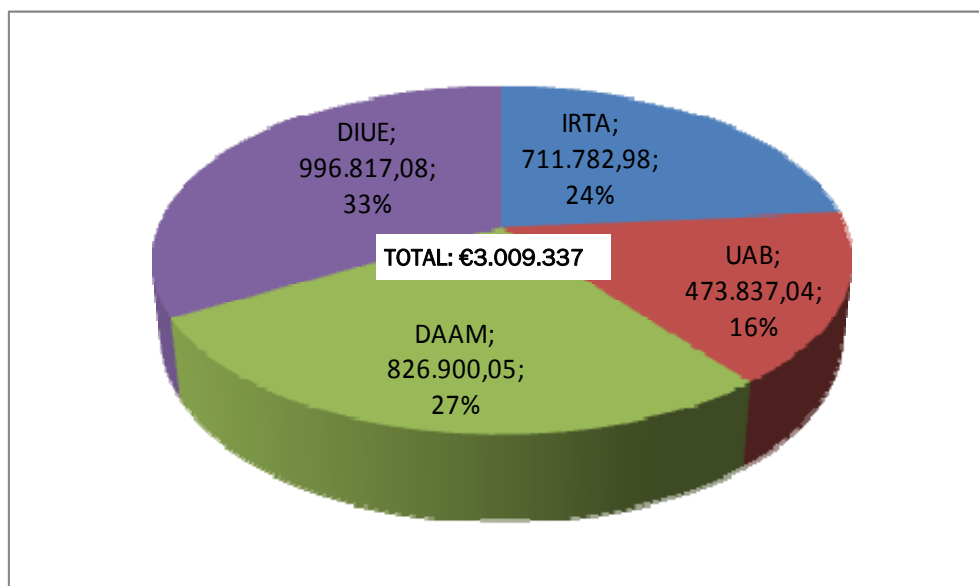
# Economic information

In 2011, the CReSA received most of its financing from public sources (trustees and competitive funds). The public budget for 2011 was around 5 million € (competitive income: €1.134.834; non-competitive income: €3.009.337). Twenty-nine private contracts with companies represented a total income of €1,751,759.

## Competitive income

BODY	RESEARCH PROJECTS	SUBVENTIONS FOR STAFF	OTHERS	TOTAL
ACCÍÓ	3.000	0	0	3.000
AGAUR	0	65.743	10.940	76.683
CARLOS III	158.222	0	0	158.222
FECYT	0	0	16.800	16.800
INIA	217.655	0	0	217.655
MICINN	94.743	257.624	15.950	368.317
ME	0	29.732	0	29.732
UE	207.473	0	0	207.473
ALTRES	7.000	0	0	7.000
RECERCAIXA	49.953	0	0	49.953
<b>TOTAL</b>	<b>738.045</b>	<b>353.099</b>	<b>43.690</b>	<b>1.134.834</b>

## Non-competitive income from UAB, IRTA and Generalitat de Catalunya



\* UAB and IRTA also includes contribution for staff.



# Projects

## National Research Plan

### Selección de candidatos vacunales para bloquear los pasos iniciales de la infección por *Haemophilus parasuis*

AGL-2010-15232  
IP CReSA: Virginia Aragón  
Awarded: 2009  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013

### Caracterización de los mecanismos inmunológicos implicados en protección frente al virus de la peste porcina africana (VPPA) y desarrollo de vacunas contra el virus

AGL 2010-22229-C03-01  
IP CReSA: Fernando Rodríguez  
Awarded: 2009  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013

### MicroRNAs en infecciones víricas del cerdo: análisis funcional e implicaciones en patogenicidad viral

AGL 2010-22358-C02-02  
IP CReSA: José Ignacio Núñez  
Awarded: 2009  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013

### Caracterización antigénica de cepas del virus del síndrome reproductor y respiratorio porcino de distinto origen y su relevancia para el desarrollo de vacunas eficaces

AGL2008-05708-C02-02  
IP CReSA: Laila Darwich  
Awarded: 2008  
Duration: 3 years  
End: 31/12/2011

### Nuevas estrategias vacunales frente al virus de la peste porcina clásica. Estudio de mecanismos implicados en la inmunopatogenicidad viral

BIO2008-04487-C03-03  
IP CReSA: Mariano Domingo  
Awarded: 2008  
Duration: 3 years  
End: 31/12/2011

### Estudio de los determinantes de la barrera de transmisión en *Oryctolagus*, *Canus* y *Gallus* mediante modelos de replicación de priones *in vitro* e *in vivo*

AGL2008-05296-C02  
IP CReSA: Enric Vidal  
Awarded: 2008  
Duration: 3 years + extension  
End: 31/12/2012

### Caracterización de la respuesta inmune inducida por cepas del virus de la gripe porcina circulantes en España. Desarrollo de vacunas basadas en VLPs quiméricas

AGL 2010- 22200-C02-01  
IP CReSA: Maria Montoya  
Awarded: 2009  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013

### Patogenicidad de enfermedades víricas porcinas

CONSOLIDER INGENIO CDS2006-00007  
Coordinator: Mariano Domingo  
Awarded: 2006  
Duration: 5 years + extension  
End: 21/12/2011

### Epidemiología espacial de la tuberculosis bovina en animales domésticos en España: estudio de la persistencia y de nuevas infecciones. Evaluación de la vigilancia

AGL 2010-21098  
IP CReSA: Alberto Allepuz  
Awarded: 2009  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013

### Neosporosis bovina: respuesta inmune humoral y celular en gestaciones puras y cruzadas de vacas lecheras crónicamente infectadas a lo largo de la gestación

AGL 2010-21273-C03-02  
IP CReSA: Sonia Almería  
Awarded: 2009  
Duration: 1 year  
Start: 01/01/2011  
End: 31/12/2011

### Evaluación de consumos de antimicrobianos como factores de riesgo relacionados con la aparición de resistencia a cefalosporinas en animales destinados al consumo

AGL2011-28836  
IP: Lourdes Garcia Migura  
Awarded: 2011  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013



Most of the research projects in course at the CReSA during 2011 were funded by the National Research Plan (MICINN).



## Seventh Framework Programme (7FP) projects

### Strategies for the eradication of bovine tuberculosis (TB-STEP)

KBBE-2007-212414  
Contract Type: Small or medium-scale focused research project (participation associated with UCM)  
Start: 1/10/2008  
Duration: 39 months  
End: 31/12/2011

### Improving Campylobacter control measures in primary production of poultry (CamCon)

FP7-KBBE-2009-3-244547  
Contract Type: SMS focused research project  
IP CReSA: Marta Cerdà  
Start: 01/01/2010  
Duration: 4 years

### The Network of Animal Infectiology Facilities (NADIR)

FP7-INFRASTRUCTURES-2008-1, 228394  
IP CReSA: Mariano Domingo  
Start: 1/05/2009  
Duration: 4 years

### Porcine reproductive and respiratory syndrome (PRRS): new generation, efficient and safe vaccine, new control strategies (Porrskon)

FP7-KBBE-2009-3-245141  
IP CReSA: Enric Mateu  
Contract Type: Small or medium-scale focused research project.  
Start: 01/05/2010  
Duration: 4 years

### Biology and control of vector-borne infections in Europe Emerging Diseases in a changing European Environment – Next (EDENext)

FP7-HEALTH-2010.2.3.3-1  
IP CReSA: Nonito Pagès  
Start: 01/01/2011  
Duration: 4 years



*CReSA participated in 5 7FP projects of the European Union in 2011.*

## COST Actions

### EuroPRRSnet: A European Network for Understanding and Combating porcine reproductive and respiratory syndrome in Europe

COST EuroPRRSnet  
IP CReSA: Enric Mateu  
Awarded: 2009

### Array technologies for BSL3 and BSL4 Pathogens. COST B28

IP CReSA: Francesc Xavier Abad/  
Ayub Darji  
Awarded: 2007



*CReSA participated in 2 COST actions, allowing the European*

## Recercaixa

### Els mosquits autòctons i el mosquit tigre poden transmetre noves malalties emergents a Catalunya? El cas del Chikungunya i la febre del Nil Occidental

AGAUR-RECERCAIXA-NP074572  
IP CReSA: Nonito Pagès

Duration: 2 years  
Start: 17/01/2012  
End: 16/01/2014



## SGR Research Groups

### Immunologia veterinària

SGR2009-EM042412 (funded)  
IP: Enric Mateu

### Patogènia d'infeccions víriques

SGR2009-JS042702 (funded)  
IP: Joaquim Segalés

### Patogènia d'infeccions bacterianes

SGR 2009-VA042377 (non-funded)  
IP: Virginia Aragón

### Factors affecting fertility and gestation maintenance in dairy cattle

SGR 816  
IP (UdL): Fernando López-Gatius  
IP CReSA: Sonia Almería

## INIA projects

### **Epidemiología, control y aspectos entomológicos de la Lengua Azul (BTV) en rumiantes silvestres en España**

FAU2008-00019-C03-01  
IP CReSA: Jordi Casal  
Awarded: 2008  
Duration: 3 years  
End: 14/12/2011

### **Epidemiología de *Salmonella* y *Campylobacter* en granjas avícolas de cría al aire libre en relación con la proximidad de colonias de gaviotas**

FAU2008-00012-C02-01  
IP CReSA: Marta Cerdà  
Awarded: 2008  
Duration: 3 years + extention  
End: 14/12/2012

### **Epidemiología de *Campylobacter* en granjas de pollos de engorde en España: prevalencia, subtipos existentes, factores de riesgo y dinámica de la infección en granjas**

RTA-2009-00117  
IP CReSA: Marta Cerdà  
Awarded: 2009  
Duration: 3 years  
End: 19/10/2012

### **Nuevas formulaciones vacunales para prevenir la influenza aviar y porcina. Desarrollo de una potencial vacuna universal producida a bajo coste**

RTA 2010-00084-C02-01  
IP CReSA: Ayub Darji  
Awarded: 2010  
Duration: 3 years  
End: 14/12/2013

### **Efecto del extrusionado sobre la digestión de diferentes materias primas, la microbiota intestinal y la resistencia a patologías entéricas microbianas en aves y cerdos**

RTA 2010-0088-C02-02  
IP CReSA: Ignacio Badiola  
Awarded: 2010  
Duration: 3 years  
End 02/12/2013

### **Dinámica viral en diferentes especies aviares: mecanismos moleculares de transmisión y patogenicidad**

RTA 2011-00111-C03-01  
IP CReSA: Natàlia Majó  
Awarded: 2011  
Duration: 3 years

### **Evaluación de la aplicabilidad de las estrategias de vacunación en masa para el control del síndrome reproductivo y respiratorio porcino. Establecimiento de un modelo de evaluación basado en la transmisión por contacto**

RTA 2011-00119-00-0  
IP: Enric Mateu  
Awarded: 2011  
Duration: 3 years

## Projects of the ISCIII

### **Dengue y Chikungunya en Europa y otras enfermedades víricas transmitidas por vector reservorio**

FIS2010-PI10/01923  
IP CReSA: Nonito Pagès  
Duration: 3 years  
End: 31/12/2013

### *ISCIII special call for pandemic H1N1:*

### **Análisis de la virulencia del virus gripe A(H1N1)v pandémico**

MICINN-Instituto Carlos III  
GR09/0023  
IP CReSA: Maria Montoya  
Duration: 3 years  
End: 31/10/2012

### **Estudio comparativo de la respuesta inmune frente al virus gripal pandémico A(H1N1)v en enfermos graves y leves (Inmunoflu)**

MICINN-Instituto Carlos III  
GR09/0021  
IP CReSA: Maria Montoya  
Duration: 3 years  
End: 31/10/2012

### **Antigenicidad y resistencia a fármacos del nuevo virus de la gripe tipo A (H1N1)v: caracterización y evolución a nivel molecular**

MICINN-Instituto Carlos III  
GR09/0039  
IP CReSA: Maria Montoya  
Duration: 3 years  
End: 31/10/2012

### **Nuevos procedimientos para el diagnóstico y caracterización del virus A (H1N1)v pandémico, esenciales para mejorar la capacidad de la red RELEG, a desarrollar en el laboratorio coordinador de la misma**

MICINN-Instituto Carlos III  
GR09/0040  
IP CReSA: Maria Montoya  
Duration: 3 years  
End: 31/10/2012



## Other projects

**Programa anual de activitats de la Unitat de Comunicació el CReSA; un acercamiento a la societat**

FECYT  
FCT-11-2575  
IP CReSA: Elisabet Rodríguez  
Awarded: 2011  
Duration: 1 year  
End: 31/07/2012

**Red iberoamericana para el control de los riesgos sanitarios del cerdo criado a nivel intensivo y extensivo. Implicaciones para el consumidor**  
CYTED-P108AC0462  
IP CReSA: Joaquim Segalés  
2010-2013

**Demostración de la hipótesis dinámica de la infección tuberculosa latente**

CRS08-002  
IP CReSA: Mariano Domingo  
Awarded: 2009  
Duration: 3 years  
End: 31/12/2011

*Members at 31/12/2011*



*CReSA participates in projects coordinated with other institutions; and also in projects of transfer of technology and knowledge.*

## Services for DAAM

**Pla de vigilància del virus del Nil Occidental a zones considerades de risc**

CReSA 13017  
IP CReSA: Anna Alba

**Vigilància d'influença aviària i malaltia de Newcastle en aus silvestres a Catalunya**

CReSA 13030  
IP CReSA: Natalia Majó

**Assessorament en el control de tuberculosi en el boví i el cabrum**

CReSA 13011  
IP CReSA: Bernat Pérez

**Vigilància entomològica de la Llengua Blava**

CReSA 13016  
IP CReSA: Nitu Pagès

**Prestació de Serveis d'anàlisis virològics**

CReSA 13032  
IP CReSA: Rosa Rosell

**Estudi problemes patològics en granges (reaccions adverses vacunes Llengua Blava)**

CReSA 09015  
IP CReSA: Joan Pujols

**Plans d'emergència**

CReSA 08009  
IP CReSA: Anna Alba

**Acreditació ENAC**

CReSA 09016  
IP CReSA: Montserrat Ordóñez

**Encuesta epidemiológica de *Besnoitia besnoiti* a les comarques del Pirineu català**

CReSA 09027  
IP CReSA: Jordi Casal



*In 2011 the CReSA executed 9 services for the Department of Agriculture, Livestock, Fisheries, Food and Natural Environment (DAAM) of Generalitat de Catalunya.*



## Collaboration with the government departments of the Generalitat de Catalunya

In parallel to scientific interest, CReSA researchers perform studies that have important implications for consumers, producers and regulatory institutions. For this reason, the CReSA carries out different initiatives for the government departments of the Generalitat de Catalunya with competencies in animal and public health, participating in the creation and execution of health programmes.

# Summary of the scientific activity

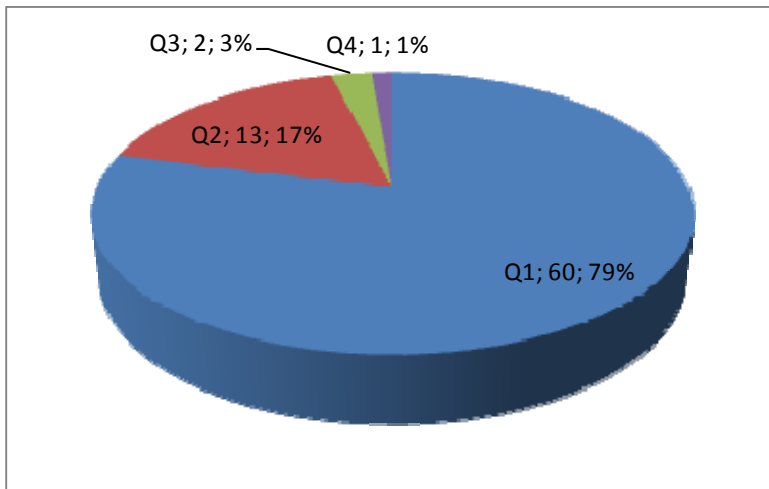
## Summary of scientific activity 2001-2011

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Peer reviewed papers (ISI citation index)	19	27	17	39	35	58	68	48	72	60	76
Technical articles	8	13	8	8	10	15	20	20	16	6	5
Reviews (among above-cited figures)	4	6	2	6	4	6	3	9	7	7	4
Books or monographs	0	2	0	0	1	1	2	0	0	0	1
Book chapters	3	5	0	1	2	3	7	0	1	7	2
Patents and utility models applications	0	0	0	0	1	1	1	1	0	0	1
Doctoral theses	0	1	0	5	4	5	12	9	5	3	4
Master Research studies	0	0	0	3	10	9	15	12	9	7	5
Presentations at congresses	36	67	36	71	40	50	79	139	122	78	103
Presentations at international congresses (among the above)	13	42	18	46	20	40	57	115	83	60	88

## Summary of Peer reviewed papers 2011

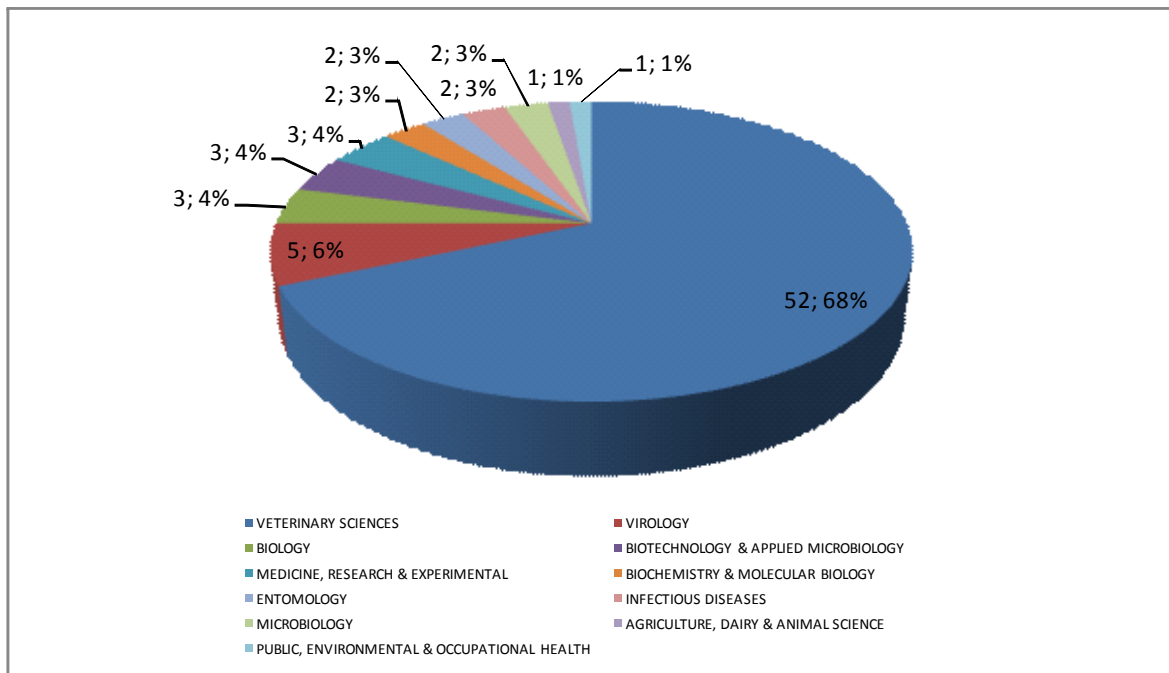
PEER REVIEWED PAPERS	TOTAL	EPIDEM	BACPAR	EXOTIQUES	ENDEMOVIR	OTHER
Number of publications	76	12	12	19	27	6
Average impact index	2,81	2,90	2,82	2,80	3,01	2,13
Publications in Quartile 1	78,9% (60/76)	100% (12/12)	75% (9/12)	73,7% (14/19)	81,5% (22/27)	50% (3/6)
Publications in Veterinary Sciences category	68,4% (52/76)	66,7% (8/12)	66,7% (8/12)	42,1% (8/19)	81,5% (22/27)	100% (6/6)

## Quartiles



*78,9% (60/76) of the scientific publications of the CReSA in 2011 were placed in the first quartile.*

## Categories



*68,4% (52/76) of the scientific publications of the CReSA in 2011 were placed in the Veterinary Sciences category.*



Research lines

03

# Research subprograms

## Model based on research subprograms

The Cooperative Agro-Alimentary Research System of Catalonia is the instrument for the design, coordination, and development of research policy in Catalonia in Agro-Food, and is headed by IRTA, a public company of the Government of Catalonia with research centers in different fields, either independently, or in collaboration with Universities and other Research Bodies (CSIC) and Administrations. CReSA is one of these mixed centers, depending on the IRTA and UAB, with the mandate of developing research activities in the field of Animal Health.

The Cooperative Agro-Alimentary Research Sys-

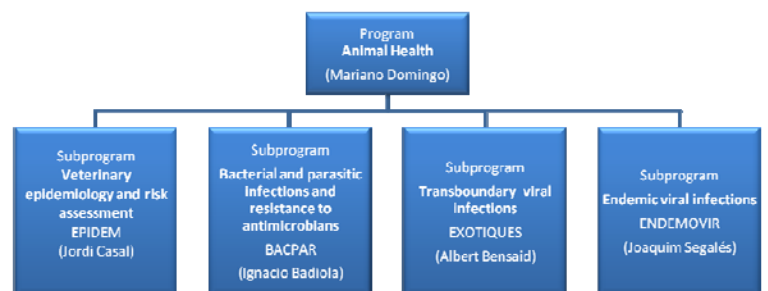
tem of Catalonia is structured around five large areas: Vegetal Production, Global Change and Environment, Alimentary Enterprises, Agro-Alimentary Economy and Animal Production.

Within the Area of Animal Production, four programs have been established:

- Genetics and improvement
- Animal nutrition, health and welfare
- Aquaculture
- Animal Health

The CReSA is responsible for the design and execution of the Animal Health Program, under the scientific direction of CReSA's director, Mariano Domin-

go. The classification of the research activities and subprograms carried out by the CReSA was recently reorganised.



*Coordinators of the CReSA Research Subprograms (from left to right: Dr Ignacio Badiola Sáiz, Dr Albert Bensaid, Dr Joaquim Segalés Coma and Dr Jordi Casal Fàbrega)*





# EPIDEM subprogram

# Veterinary epidemiology and risk assessment

Coordinator: Jordi Casal Fàbrega  
jordi.casal@cresa.uab.cat

## Objectives

The veterinary epidemiology and risk analysis subprogram deals with epidemiological studies (both descriptive and analytical), modelling and risk analysis, as well as scientific advice in the design, implementation and evaluation of surveillance and con-

trol programs for several diseases. The objective is contributing to scientific advances in the study of epidemics and disease control, through basic research projects and field studies, modelling and risk analysis of introduction of diseases in ani-

mal populations, to provide support to the competent authorities in the design, implementation and evaluation of surveillance and control programs for diseases.



## Research lines

### VETERINARY EPIDEMIOLOGY AND RISKS ASSESSMENT (EPIDEM)

#### Coordinator

Jordi Casal Fàbrega

Main focus areas comprise:

- Epidemiological studies of different diseases (bovine tuberculosis, swine influenza, cysticercosis ...).
- Modelling and risk analysis of several diseases (bluetongue, classical swine fever, avian influenza).
- Evaluation of surveillance of West Nile and avian influenza

#### Researchers

Jordi Casal Fàbrega  
Anna Alba Casals  
Alberto Allepuz Palau  
Sebastián Napp Avelli  
Maria José Vilar Ares

#### PhD students

Ariadna García Sáenz  
Meritxell Simon Gifré  
Gerard Martín Valls  
Sintayehu Guta Debela

*Researchers and PhD students of the EPIDEM research line.*



# EPIDEM subprogram

# Main results

## Epidemiology of bovine tuberculosis in Spain

### **Spatial epidemiology of bovine tuberculosis in domestic animals in Spain: study of the persistence and of new infections. Evaluation of the sensitivity of possible surveillance alternatives**

IP CReSA: Alberto Allepuz

The European Union (EU) establishes the compulsory reporting of bovine tuberculosis (BTB) cases and defines its eradication as the target. In Spain, the eradication campaigns have allowed important progresses, but every year a considerable number of new positive or re-infected farms still appear and, in some zones, BTB

persists in the herds without a clear knowledge about the epidemiologic circumstances that lead to the reintroduction or to the persistence of the infection.

The aim of the project is to obtain an understanding of the epidemiology of BTB by the analysis of the circumstances that make its eradication difficult.

First of all, the space-time analysis of the disease will allow the identification of zones of high BTB risk. Secondly, a study of the possible causes of appearance of new positive farms and of the persistence of the positive ones will be performed. This

part of the study will consist of two parts: a) analysis of epidemiologic available questionnaires of the new cases and analysis of the movements of animals by means of network analysis, b) case-control study matched by size, type of farm and zone, to determine factors related to BTB persistence in infected farms. Finally, possible alternative strategies to the current surveillance system implemented in Spain will be evaluated by means of a sensitivity analysis.

## Epidemiology of Bluetongue in Spain

### **Epidemiologia, control i aspectes entomològics de la llengua blava (VLA) en rumugants a Espanya**

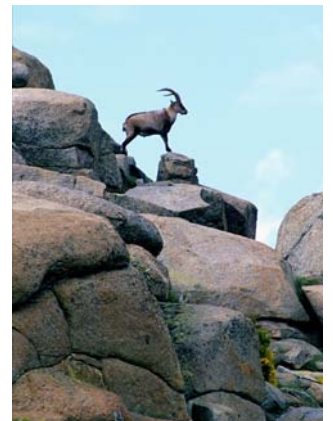
IP CReSA: Jordi Casal

The objectives of the project are: 1) to determine the level of relation between the domestic and wild cycles of Bluetongue virus (BTV) infection in Spain; 2) to evaluate the efficiency of inactivated commercial vaccines on different species of wild ungulate: red deer, mouflon, fallow deer and wild goat; 3) to determine the pathogenesis

of BTV-1 and BTV-8 infection on different species of wild ungulate: red deer, mouflon, and wild goat; 4) to develop and validate sensitive, specific and economic diagnosis methods for the study of the seroprevalence against BTV in wild ruminants in Spain; 5) to establish the general lines for producing an integral programme against BTV in wild ungulate populations in Spain. 6) to make a seroepidemiologic study of epizootic hemorrhagic disease in the population of wild ruminants in Spain (in order to disprove

its existence) and determine the risk of epizootic hemorrhagic disease and exotic serotypes of bluetongue being introduced to Spain from Morocco.

In this second year, *Culicoides* have been captured in the different study zones, blood and spleen samples have been taken from wild animals and experimental infections have been made using serotypes 1 to 8 in wild goats.



**Peer reviewed papers (ISI Citation Index)**

- Allepuz A, Casal J, Napp S, Saez M, Alba A, Vilar M, Domingo M, González MA, Duran-Ferrer M, Vicente J, Alvarez J, Muñoz M, Saez JL. **Analysis of the spatial variation of Bovine tuberculosis disease risk in Spain (2006-2009).** Prev Vet Med. 2011 Jun 1;100(1):44-52.
- García-Bocanegra I, Astorga RJ, Napp S, Huerta B, Carbonero A, Perea A, Arenas A. **Factors affecting the seroprevalence of lagovirus infection in wild rabbits (*Oryctolagus cuniculus*) in Southern Spain.** Vet J. 2011 Jul;189(1):89-94.
- García-Bocanegra I, Jaén-Téllez JA, Napp S, Arenas-Montes A, Fernández-Morente M, Fernández-Molera V, Arenas A. **West Nile Fever outbreak in horses and humans, Spain, 2010.** Emerg Infect Dis. 2011 Dec;17(12):2397-9.
- García-Bocanegra I, Busquets N, Napp S, Alba A, Zorrilla I, Villalba R, Arenas A. **Serosurvey of West Nile virus and other flaviviruses of the Japanese encephalitis antigenic complex in birds from Andalusia, southern Spain.** Vector Borne Zoonotic Dis. 2011 Aug;11(8):1107-13.
- García-Saenz A, McCarter P, Baylis M. **The influence of host number on the attraction of biting midges, *Culicoides* spp., to light traps.** Med Vet Entomol. 2011 Mar;25(1):113-5.
- Madani H., Casal J., Alba A., Allepuz A., Cetre-Sossah C., Napp S. **Investigation of three diseases caused by Orbiviruses in Algeria.** Emerging Infect. Dis. 2011 Dec;17(12):2325-7.
- Marco I, Cabezón O, Rosell R, Fernández-Sirera L, Allepuz A, Lavín S. **Retrospective study of pestivirus infection in Pyrenean chamois (*Rupicapra pyrenaica*) and other ungulates in the Pyrenees (NE Spain).** Vet Microbiol. 2011 Apr 21;149(1-2):17-22.
- Molina-López RA., Casal J., Darwich L. **Causes of Morbidity in Wild Raptor Populations Admitted at a Wildlife Rehabilitation Centre in Spain from 1995-2007: A Long Term Retrospective Study.** PLoS ONE. 2011;6(9):e24603.
- Napp S, Allepuz A, García-Bocanegra I, Alba A, Vilar MJ, Casal J. **Quantitative assessment of the probability of bluetongue virus transmission by bovine semen and effectiveness of preventive measures.** Theriogenology. 2011 Mar 15;75(5):920-32.
- Napp S, Gubbins S, Calistri P, Allepuz A, Alba A, García-Bocanegra I, Giovannini A, Casal J. **Quantitative assessment of the probability of bluetongue virus overwintering by horizontal transmission: application to Germany.** Vet Res. 2011 Jan 11;42(1):4.
- Picado A., Speybroeck N., Kivaria F., Moshia RM., Sumaye RD., Casal J., Berkvens D. **Descriptive and spatiotemporal analyses of Foot and Mouth Disease in Tanzania from 2001 to 2006.** Transbound Emerg Dis. 2011 Feb;58(1):44-52.
- Simon-Grifé M., Martín-Valls GE., Vilar MJ., García-Bocanegra I., Mora M., Martín M., Mateu E., Casal J. **Seroprevalence and risk factors of swine influenza in Spain.** Vet. Microbiol. 2011 Apr 21;149(1-2):56-63.

# Bacterial and parasitic infections and resistance to antimicrobians

Coordinator: Ignacio Badiola Sáiz

Ignacio.badiola@cresa.uab.cat

## Objectives

The goals of this Subprogram are the study of bacteria-host interaction under pathological and physiological conditions, with special interest on virulence markers of bacteria, the immune response after natural infection or vaccination, the development of bacterial vaccines and antigen delivery/presentation, mainly by mu-

cosal route, the intestinal microbiota and its role on gut health, the study of bacteria transmitted from domestic or wild animals to humans and the surveillance of antimicrobial resistances. Furthermore, this Subprogramme includes the study of endoparasitic diseases.

The main objective is to generate knowledge on host/

microbe interactions to develop methods to improve the health of animals and the economical balance of farms, and the safety of consumers. Main focus areas comprise:

- Intestinal and respiratory bacterial diseases of porcine, fowl and rabbit.
- Bacterial zoonoses and endoparasitic diseases.



## Research lines

### MICROBIOTA AND INTESTINAL HEALTH (BACTEDIGES)

#### Coordinator

Ignacio Badiola Sáiz

The goal of this line is the study of the intestinal microbiota components related to health/disease of the digestive system and the study of the major bacterial disorders at the intestinal level of pig, poultry and rabbit. The ban of the antimicrobial growth promoters has made necessary to improve the knowledge of the intestinal microbiota components in order to assess properly the positive effects of different feed raw materials and the addition of prebiotics, probiotics or antimicrobials at therapeutic doses on the health of animals. A better knowledge of the intestinal microbiota could allow us designing new probiotics, which

can serve to reduce the risk of digestive disorders at different critical phases (ie. At weaning, avoiding the colonization of different pathogens or returning to normal situations after intestinal dysbiosis). The stimulation of the immune system associated to the intestinal mucosa is another objective of this line.

#### Researchers

Ignacio Badiola Sáiz  
Ana Pérez de Rozas Ruiz de Gauna

#### Laboratory technicians

Núria Aloy Escudero  
Judith González Oliver

#### PhD students

Joseane Dos Santos

*Researchers and PhD students of the BACTEDIGES research line.*



## RESPIRATORY BACTERIAL INFECTIONS (BACTERESP)

### Coordinator

Virginia Aragón Fernández

This research line focuses on the pathogenesis of respiratory diseases caused by bacteria and their epidemiology in farming systems. The final goal of this research is the understanding of respiratory infections in order to develop new tools for diagnosis, molecular epidemiology and control of these bacterial pathogens. Interactions between the pathogens and the host are also a main interest of this line.

This research line includes basic research activities and services to the industry within the field of porcine respiratory pathogens; specifically, in epidemiological aspects, infection models, pathology and control of the diseases. In the last 4 years, activities have been focused on *Haemophilus parasuis*, *Mycoplasma hyopneumo-*

*niae*, *Pasteurella multocida*, *Actinobacillus pleuropneumoniae* and *Streptococcus suis*, important porcine pathogens.

### Researchers

Virginia Aragón Fernández  
Albert Moisés Bensaid  
Sonia Pina Pedrero  
Alex Olvera Van der Stoep  
Marina Sibila Vidal

### Laboratory technicians

Nuria Galofré Milà  
Marta Pérez Simó  
Eva Huerta Medina

### PhD students

Mar Costa Hurtado  
Verónica Martínez Moliner  
Paula Manrique Ramírez



Researchers and PhD students of the BACTERESP research line.

## ENDOPARASITIC INFECTIONS (ENDOPAR)

### Coordinator

Sonia Almería de la Merced

This research line studies protozoa parasitic infections, with special emphasis on *Neospora caninum* and *Toxoplasma gondii*, as cause of reproductive failure and abortion in domestic and wildlife animals. The analysis of epidemiological, immunological and pathogenesis aspects of the diseases, together with the subsequent control measures applied at farm and individual level, especially in bovine neosporosis to reduce the economical losses related to these parasites, are the main goals of this research line. Since, toxoplasmosis is also a zoonotic food borne infection, the analysis of the role of

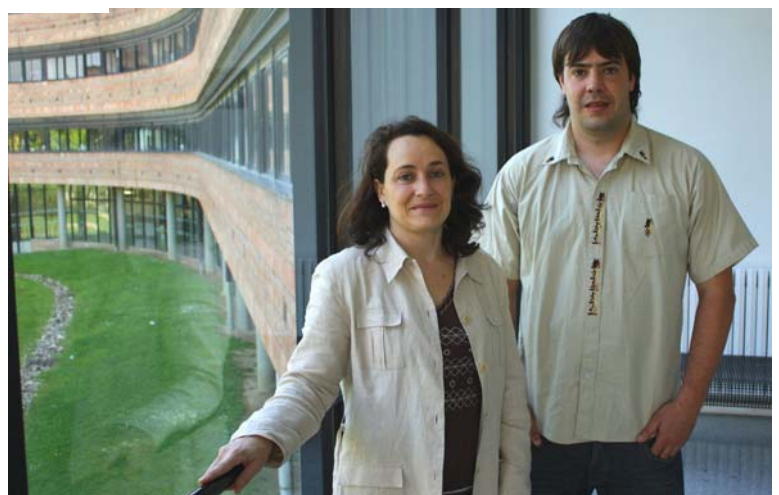
the different species that could be reservoirs for human infection has been a main focus of the research line on this parasite.

The study of the role of wildlife species in the sylvatic cycle of both parasites is also a main aspect of the research line, since in Spain few studies have focused on wild animals as reservoirs of these

pathogens. Improve the control and diagnosis of *T. gondii* and *N. caninum* infection in domestic and wildlife species, through the analysis of the epidemiology, immunology and pathogenesis of both protozoa are the principal objectives of this line.

### Researcher

Sonia Almería de la Merced



Researcher and PhD student of the ENDO-PAR research line.

## ZOONOTIC BACTERIAL INFECTIONS AND ANTIMICROBIAL RESISTANCE (BACTEZOON)

### Coordinator

Marta Cerdà Cuéllar

This research line is focused on the study of bacteria and antimicrobial resistance transmitted from domestic or wild animals to humans. In order to prevent zoonotic diseases from occurring, it is important to identify which animals and foodstuffs are the main sources of the infections. Also, it is important to identify and monitor the trends of antimicrobial resistance. The overall generated knowledge will allow improving control measures in the food production chain and to protect human health.

Hence, in this research line the studies are focused on one side, on the two most important zoonotic bacteria

which cause acute bacterial enteritis in humans: *Campylobacter* and *Salmonella*. Since the main suspected food borne source of these infections is poultry meat, some of the ongoing projects are focused on the avian reservoirs. Also, in Spain very few research has focused on wild animals as reservoirs of these enteropathogens. Thus, part of the research is also focused in wild birds as reservoirs of *Campylobacter*, *Salmonella* and of antimicrobial resistance.

Another zoonosis of veterinary and public health importance is tuberculosis. At CRESA, a research program and Generalitat's diagnostic service is being conducted, developing systems to monitor, control and eradicate tuberculosis in cattle, goats and wild reservoirs.

### Researchers

Marta Cerdà Cuéllar  
Bernat Pérez de Val  
Lourdes García Migura

### Laboratory technicians

Maite Martín Fernández  
Zoraida Cervera Muñoz  
Teresa Ayats Murillo

### PhD students

Noelia Antillés Silva  
Saulo Urdaneta



Researchers and PhD students of the BACTEZOON research line.

### Vaccine candidates against *Haemophilus parasuis*

#### Selección de candidatos vacunales para bloquear los pasos iniciales de la infección por *Haemophilus parasuis*

IP CReSA: Virginia Aragón

*Haemophilus parasuis* is a colonizer of the upper respiratory tract of pigs, but also a respiratory pathogen, since some strains can spread to the lung or invade systemic sites to produce Glässer's disease. The control of the disease is achieved mainly by antibiotic treatment because the commercial bacterines have a limited efficacy. However, the need for an effective vaccine is clear if we want to reduce the use of antibiotics in animal production. Our hypothesis is that dif-

ferences between virulent and non-virulent strains in colonization and early invasion can be used to eliminate specifically the virulent strains, and therefore disease by *H. parasuis*. Thus, we will study the differential gene expression of virulent and non-virulent strains during colonization of the nasal mucosa, and the expression of bacterial factors necessary for survival in lung and invasion of the circulating blood (the latter features are specific of virulent strains). In order to achieve our goal, we will perform experimental infections of piglets with virulent and non-virulent *H. parasuis* strains and we will study how the interaction with the host induces changes in gene ex-

pression. On the other hand, we and others have observed in previous studies that virulent strains of *H. parasuis* can produce capsule, especially after interaction with host factors, such as alveolar macrophages. Therefore, in this project we will study the capacity of the capsule to hide selected antigens; i.e., determine if the capsule can inhibit antibody opsonisation and circumvent the immune response. Finally, selected candidates will be examined in a vaccination trial.



### Association between consumption of antimicrobials and occurrence of resistance

#### Evaluación de consumos de antimicrobianos como factores de riesgo relacionados con la aparición de resistencia a cefalosporinas en animales destinados al consumo

IP CReSA: Lourdes García

Spain is the second producer of pork products for human consumption in the European Union. Although cephalosporins are rarely used in pig farms, ceftiofur and cefquinome, a third and a fourth generation cepha-

losporins respectively, are licensed for treatment of systemic bacterial infections. The worrisome of extended spectrum cephalosporinases (ESC) producing *Escherichia coli* and *Salmonella enterica* entering the food chain have raised the debate on the use of these type of antimicrobials for animal husbandry. Since the genes coding resistance to cephalosporins are generally associated to multi-drug resistant plasmids, selection of ESC producing *E. coli* and *S. enterica* might be

driven by the use of unrelated compounds, such as sulphonamides, tetracycline or  $\beta$ -lactams antimicrobials commonly used in the pork industry. This study intends to investigate the presence of ESC producing *E. coli* and *S. enterica* in fattening pigs (fattening units and farrow-to-finish farms), and evaluate the possible association between consumption of different antimicrobials and occurrence of ESC producing *E. coli* and *S. enterica*.

## Strategies for the eradication of bovine tuberculosis

### Strategies for the eradication of bovine tuberculosis (TB-STEP)

IP CReSA: Mariano Domingo

The overall objective of the project is to design new strategies to fight against TB in livestock and wildlife, such as new diagnostic tools or vaccines, in order to include these improvements in the eradication programmes.

The CReSA research within the project is focused on Work Package 1: Vaccination of domestic animals (cattle and goats). Specifically, we are involved in task 1.3 on the development of diffe-

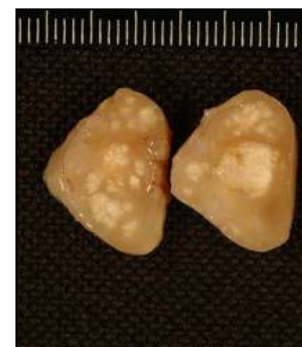
rential diagnosis and task 1.4 whose main goal is to evaluate the safety and efficacy of BCG-based vaccines in domestic goats that are experimentally infected with *Mycobacterium caprae*.

We satisfactorily tested two peptide cocktails: ESAT-6/CFP-10 and RV3615c that could be used as DIVA reagents to differentiate infected animals from vaccinated/protected animals.

A significant protection in terms of reduction of pathology and bacterial load in target tissues was found using BCG vaccine. An improvement of protection was

achieved by boosting BCG-primed goats with recombinant adenoviral vectors expressing mycobacterial antigens.

In addition, the multi-detector computed tomography was assessed as a new high sensitive method for measuring the degree of pathology and protection conferred by the vaccination.



## Immune responses against Neosporosis

### Neosporosis bovina: respuesta inmune humoral y celular en gestaciones puras y cruzadas de vacas lecheras crónicamente infectadas a lo largo de la gestación

IP CReSA: Sonia Almería

The research line has continued the analysis of the pathogenesis and immune responses associated to *Neospora caninum* infection in cattle. Such analysis was performed in both, chronically infected animals in field conditions (in collaboration with the Departament of Producció Animal from the Universitat de Lleida) and in experimentally infected cattle (in collaboration with Dr. JP. Dubey, in the United States Department of Agri-

culture, ARS, Beltsville). Another aspect has been the analysis of the prevalence of *Toxoplasma gondii* and *N. caninum* infection levels in different animal species, this year with special focus on wild birds.

The main area of study has been the comparison of the humoral (total antibodies and *N. caninum*-specific isotypes IgG1 and IgG2 levels) and cellular immune responses (Peripheral blood leucocyte subpopulations and cytokine gene expression) in naturally infected animals versus non-infected animals and immune responses in crossbred gestations of dairy and beef cattle with those observed in pure dairy or

beef cattle. Crossbred gestations of seropositive *N. caninum* animals in dairy cattle have significantly lower abortion rates than pure dairy cattle and has been established as an appropriate control measure of bovine neosporosis in high producing dairy herds.



## Epidemiology of *Salmonella* and *Campylobacter* in wild and domestic birds

### Epidemiología de *Salmonella* y *Campylobacter* en granjas avícolas de cría al aire libre en relación con la proximidad de colonias de gaviotas

IP CRSA: Marta Cerdà

There is a lack of knowledge on the role of outdoor farming systems, such as free-range and backyard poultry, as reservoirs and transmitters of *Salmonella* spp. and *Campylobacter* spp., as well as antimicrobial resistances. On the other hand, among wild birds, seagulls have the greatest potential to transmit enteric infections due to their large numbers and their feeding habits. However, in Spain the role of these birds (wild and domestic) in the transmission of zoonotic bacteria and the spread of antimicrobial resistance is unknown. Therefore, this project aims to study the prevalence, antimicrobial resistance and subtype distribution of *Salmonella* and *Campylobacter* in both outdoor farming systems and wild birds, particularly seagulls.

A three year sampling of seagull colonies and of poultry farms (both backyard and free-range) has been performed. Only two poultry farms have been *Salmonella* positive, while the prevalence of *Campylobacter* in those farms has been over

80%; both *C. jejuni* and *C. coli* have been isolated.

Seagull colonies sampled included those in the Medes Islands, Ebro Delta, Columbretes Islands, Ons Island, Dragonera Island and the Canary Islands for yellow-legged gull (*Larus michahellis*); Ebro Delta and Alboran Island for Audouin's gull (*Larus audouinii*). Both *Salmonella* and *Campylobacter* have been isolated from both seagull species. Prevalence in *L. michahellis* ranged from 0% to 5% for *Campylobacter*, and 7% to 75% for *Salmonella*; in *L. audouinii* colonies, prevalence ranged from 2% to 31% for *Campylobacter* and 0% to 24% for *Salmonella*. A high diversity of *Salmonella* serotypes has been isolated.

Results from the antimicrobial susceptibility studies in seagull isolates demonstrate a high proportion of *Salmonella* showing resistance to tetracycline, streptomycin, amoxicillin, ampicillin, or nalidixic acid, and at a lower frequency, resistance to fluoroquinolones has also been detected. For *Campylobacter* isolates from seagulls, resistance to tetracycline is the most remarkable resistance found. With regard to the *Campylobacter* isolates from free-range poultry, the main resistances detected were to fluoroquinolones and tetracycline, and to a

lesser extent to erythromycin; most isolates from almost all farms were resistant to at least one of the 7 studied antimicrobials. Genotyping of both *Salmonella* and *Campylobacter* isolates are currently in progress.



## Improving *Campylobacter* control in poultry

### CamCon. Improving *Campylobacter* control measures in primary production of poultry

IP CReSA: Marta Cerdà

Most human enteric infections originate from zoonotic bacteria, through the ingestion of contaminated food products. Specifically, domestic poultry and their products contaminated with *Campylobacter* spp. are the main source of these infections and it is well known that poultry farms have a high prevalence of this enteric bacteria.

The need to reduce levels of *Campylobacter* in broilers is recognized by the European Food Safety Authority (EFSA), since intervention during primary production is likely to be the most cost-effective way of controlling this important public health problem. However, in order to apply suitable and effective control measures, there

is a need for a better understanding of the epidemiology of *Campylobacter* in broilers.

Therefore, in this project we are studying *Campylobacter* prevalence and associated risk factors in broilers. *Campylobacter* status on all flocks from 20 farms slaughtered over a two-year period is being collected. Sampling started on summer 2011. Over 65 flocks have already been analyzed and a high prevalence (around 80%) has been found. To identify risk factors for flock colonization a questionnaire has been prepared for these 20 farms.

Also, the infection dynamics of *Campylobacter* is being studied in detail in 5 farms, including the assessment on how the environment inside and outside the houses can affect the colonization of birds. Additionally, to identify differences in broiler production across Europe, a standardized questionnaire

was designed and sent out to 200 farms. Data included are on environment, farm management practices, house construction (including aspects likely to relate to biosecurity), production type, bird breed, water source, proximity to other livestock, etc. Data has been analyzed and compiled with that of the rest of the participating countries and a report has been elaborated (Questionnaire survey among broiler producers in six European countries).



## Epidemiology of *Campylobacter* in poultry

### Epidemiología de *Campylobacter* en granjas de pollos de engorde en España: prevalencia, subtipos existentes, factores de riesgo y dinámica de la infección en granjas

IP CReSA: Marta Cerdà

*Campylobacteriosis* has become the most common cause of acute bacterial enteritis in many European countries. Many sources of this infection are reported but the main suspected food borne source is poultry meat. Thus, the EU has recogni-

sed the need to reduce levels of *Campylobacter* spp. in conventional broiler production. However, to control this important public health problem, the design of effective intervention strategies will need to be based on a better understanding of the epidemiology of *Campylobacter* in broilers.

Therefore, the aim of this project is to study *Campylobacter* prevalence and associated risk factors in broilers on a national level. A stratified sampling by regions ac-

ording to the number of broiler holdings is ongoing, with a detection and enumeration of *Campylobacter* from caecal and carcass samples. Sampling will be finished during 2012.

The infection dynamics in flocks from a farm is also being examined in detail during one year. Several flocks have already been sampled, and have become colonized at varying time points. In recent winter months flocks have become colonized later in the cycle.

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# Transboundary viral infections

Coordinator: Albert Moisés Bensaid  
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## Objectives

Transboundary (exotic) diseases are under international regulatory control and either do not exist in some countries (Spain in particular) or affect these countries sporadically.

The subprogram is inscribed in a regional, national and international geopolitical context (including the EU and the Mediterranean basin) where it acts not only with national/regional public agencies but also with the private sector. Most of the diseases studied within this subprogram are those subjected to compulsory declaration to the World Organization for Animal Health (OIE).

The subprogram is justified by a potential risk of (re) introduction of several viral-borne diseases to EU Member States and surrounding countries. The risk of these

diseases becoming endemic in Catalonia is a concern for the local government. Socio economic repercussions will not only affect local livestock but also public health in general and in particular the tourism industry (West Nile Fever, Rift Valley Fever, Chikungunya and some pathogenic Avian Influenza Virus).

The CReSA possesses a unique BSL3 facility, which ensures: rapid processing of field samples for serological, molecular diagnosis and virus isolation; speciation of mosquitoes and experiments with viral competence and transmission; experimental reproduction of diseases in rodents, birds and large animals (pigs and ruminants); and monitoring of host immune responses.

The research core of the subprogram is mainly focused on understanding patho-

genicity, improving diagnoses and vaccines of viral infections and investigating the biology and molecular genetic of vectors. In addition, scientists on the subprogram participate in regional or national surveys.



## Lines of research

### ARBOVIRUSES AND VECTORS (ARTROPOVIR)

#### Coordinator

Nonito Pagès Martínez

Arthropod-borne viruses (arboviruses) are the causative agents of some of the most important emerging and re-emerging infectious diseases and are responsible for significant global veterinary and public health problems. Zoonotic and non-zoonotic arboviral diseases have expanded their geographical distribution on recent decades threatening the European region.

ArtropoVir research line is focused on an integrated and multidisciplinary research on arthropod vectors and the arboviruses they transmit, engaging entomologists, molecular biologists, virologists and immunologists. This line is involved in both research and surveillance activities dealing with different arboviral diseases as Bluetongue,

West Nile, Rift Valley or Chikungunya. Current surveillance activities are based on virological and entomological surveillance programs for arboviruses performed in Catalonia (NE Spain). Currently funded research projects includes national (FIS, AGL, INIA) and international (FP6, FP7) competitive research projects and networks, focused on: i) the establishment of animal models and vector competence to deeply understand the interactions between vector-pathogen-host in arboviral diseases, ii) development and validation of viral diagnostics, including detection of new circulating arboviruses, iii) arthropod genetic studies, typing and genomics, and iv) development of new vaccines, although the group is also performing safety and efficacy tests for the European register of vaccines targeting arboviruses as Bluetongue virus.

Overall, the studies performed shed new data to

improve our preparedness against arthropod borne viral diseases. Moreover, it is also intended to know whether autochthonous and recently introduced exotic arthropods pose a threat to transmission of arbovirus that are likely to be introduced in our country.

#### Researchers

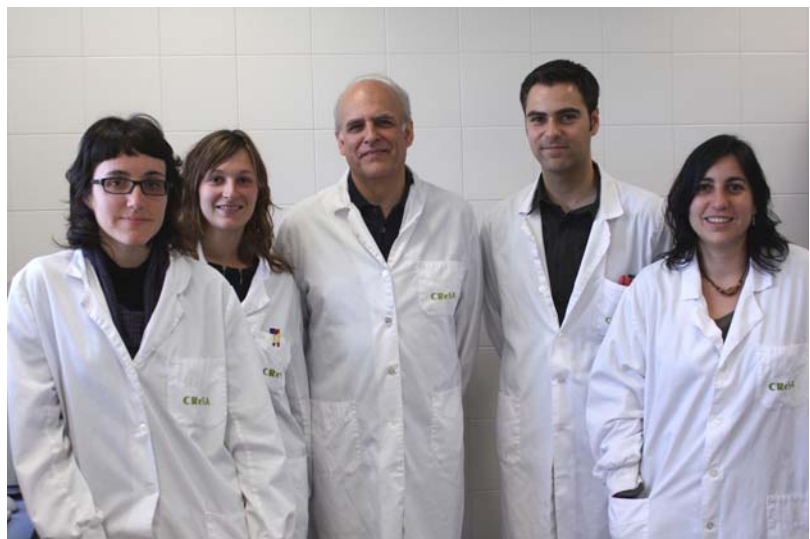
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*Researchers and PhD students of the ARTROPOVIRI line of research.*

## **PATHOGENESIS AND PROFILAXIS OF ASF VIRUS INFECTIONS (ASF VIRUS)**

### **Coordinator**

Fernando Rodríguez González

African swine fever (ASF) is a highly infectious disease affecting domestic pigs, which has to be immediately reported to the OIE. ASF virus (ASFV) remains endemic in Sardinia and in many Sub-Saharan countries, where it causes tremendous economical losses. The recent reintroduction of the virus in Georgia from Eastern Africa and its spreading toward Russian countries has opened new concerns about the risk of ASFV re-entrance to Europe and Asian countries, including China, the major swine producer and consumer in the world. The situation becomes aggravated by the fact there is no vaccine available against ASFV, therefore limiting the control measures to an efficient and rapid diagnosis of the disease and culling of the infected animals.

The general objective of this research was to understand the immune response against ASFV and to develop DNA vaccines to protect pigs against the disease. Large part of results are still to be published, and there is a patent submitted, based on some immunological properties of ASFV antigens. The main objectives in future projects:

i) The exhaustive characterization of ASFV antigens aiming to optimize the final vaccine antigenic composition.  
ii) To characterize the immunological mechanisms involved in protection against ASFV.

Finally, and thanks to international cooperation programs such as EPIZONE, NADIR or EMIDA, this line of research is ready to start a new and exciting scientific moment in collaboration with multidisciplinary teams from many different countries.

### **Researchers**

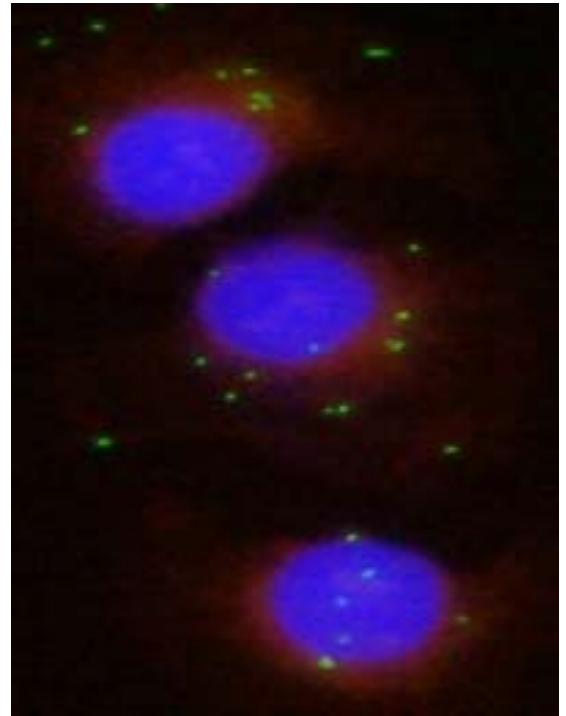
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## **PATHOGENESIS AND PROFILAXIS OF PESTIVIRUS INFECTIONS (PESTIVIRUS)**

### **Coordinator**

Lilianne Ganges Espinosa

The main objective of this research line is focused on CSFV, a pestivirus which infects pigs and produces one of the most devastating diseases of the pig industry on a worldwide scale with serious repercussions in many countries that rely on a rural economy. With this aim, we made studies of the viral pathogenesis and immunological mechanisms involved in protection. Since current commercial vaccines need to be improved, we aim to generate information for the development of new vaccines and

diagnosis methods to control the disease. It seems important to consider other diseases caused by pestiviruses such as Bovine Viral Diarrhoea and Border disease which infect pigs and cause severe economic losses in ruminants, emphasising a differential diagnostic with CSFV. Simultaneously, experimental infections are conducted with these agents in domestic ruminants and wild ruminants.

The DAAM Virological Diagnosis laboratory was established at the CRESA in 2007. This laboratory participates in field diagnosis in the regional CSF survey programme, providing techniques for differentiation of CSFV from other pestiviruses,

in collaboration with the National Reference Laboratory and the World Reference Centre for CSFV.

### **Researchers**

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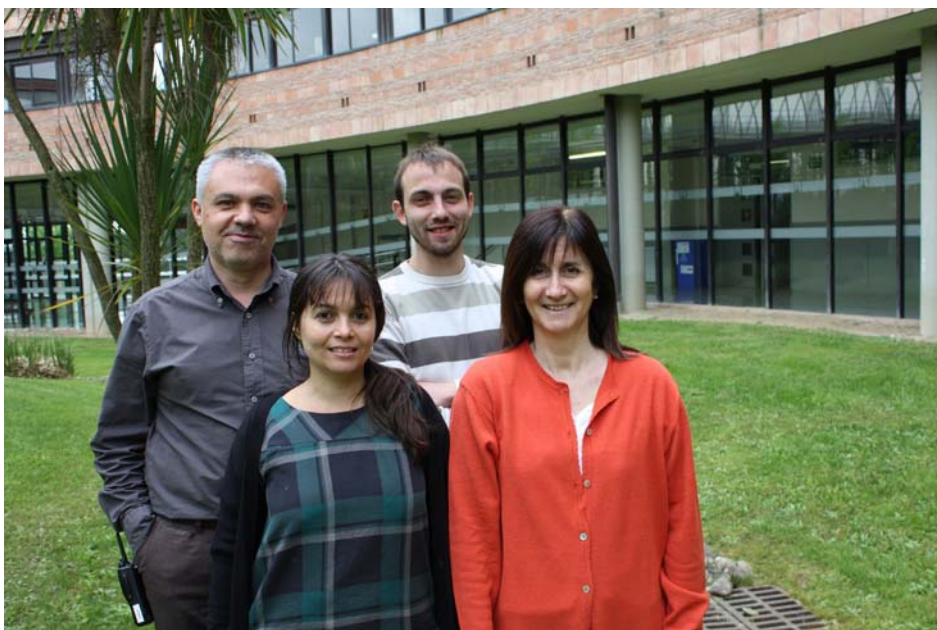
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**PATHOGENESIS, DIAGNOSIS, EPIDEMIOLOGY AND CONTROL OF AVIAN VIRAL INFECTIONS (VIRUSAVIAR)**

**Coordinator**

Natàlia Majó Masferrer

The main objective of this line is to investigate different aspects of some of the most important viral infections of poultry, including avian influenza, infectious bursal disease, avian infectious bronchitis, etc. Regarding avian influenza virus infection, evaluation of the host innate immunity in the protection and pathogenesis of this infection, as well as the molecular factors that are relevant for the transmission and pathogenicity of AIV in birds are objectives of

this research line. Moreover, this research line works on the pathogenesis, epidemiology and control of endemic avian viral infections, such as infectious bursal disease or infectious bronchitis. Its activity is characterized by a deep contact with the poultry productive sector, trying to help facing major pathological problems.

Therefore, besides basic research, this research line is aimed at the development and transfer of diagnostic techniques on the subject as well as epidemiological monitoring of the major viral diseases affecting flocks.

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# Main results

## Control of vector borne infections

### Biology and control of vector borne infection in Europe (EDENext)

IP CReSA: Nonito Pagès

Knowledge on vectors generated under this project is expected to deliver a better understanding of the biology of vectors relevant to human and veterinary diseases. This new knowledge in turn should help (i) to predict the emergence and spread of new vector-borne diseases, and (ii) to assess the efficacy of different interventions and develop new interventions to interrupt or limit the spread of vector-borne diseases with the goal of protecting European citizens from these threats.

A major impact is also ex-

pected on strengthen the European research capacity in this field.

To focus the project objectives and produce specific results regarding vector borne diseases (VBD) in Europe, a range of relevant diseases have been selected. The selection criteria used are (i) diseases with insufficient epidemiological knowledge or control measures to produce efficient intervention programmes, and (ii) priority diseases for European public-health agencies. Selected diseases for each vector group are:

- Tick-borne diseases (TBD): Crimean-Congo haemorrhagic fever and newly emerging diseases, mainly borne by *Ixodes ricinus*, caused by

different bacteria.

- Mosquito-borne diseases (MBD): West Nile (WN) and Chikungunya

- Sandfly-borne diseases (PBD): Leishmaniasis and Phlebovirus infections

- Culicoides-borne diseases (CBD): Bluetongue and other CBD as epizootic hemorrhagic disease, African horse sickness and horse encephalosis.

- Rodent- and insectivore-borne diseases (rainbo): Hantavirus (Bunyaviridae) infections.



## Dengue and Chikungunya in Europe

### Dengue and Chikungunya in Europe and other viral diseases transmitted by vector and reservoir

IP CReSA: Nonito Pagès

The project aim is to generate the knowledge and tools to improve the preparedness of Spain and other countries towards the eventual reintroduction of Dengue and Chikungunya diseases in Europe. The project is split into two projects (virus-human interactions and virus-vector interactions).

Virus-human interactions project seeks to improve available diagnostic techniques for pathogen detection, development of clinical questionnaires for epidemiological screening and improve clinical detection and early diagnosis in patients for these diseases through the improvement of different protocols at hospital.

Virus-vector interactions project seeks the development and standardization of an arboviral transmission model based on the use of

*Aedes spp* mosquitoes and mice to analyze the competence and vectorial capacity of different mosquitoes for selected arboviruses. This will provide an important tool to assay the transmission risk of different Chikungunya strains for Spanish *Aedes albopictus* populations simulating different scenarios of viral strain, viraemia and climatological conditions.

**Can autochthonous mosquitoes and the tiger mosquito transmit new emergent diseases in Catalonia? The case of Chikungunya and West Nile**

IP: Nonito Pagès

An increasing incidence of emergent diseases transmitted by mosquitoes is ongoing in several developed countries. In particular, the European Union has already suffered several outbreaks and epidemics of two diseases that are the study issue of research project:

West Nile disease (WND) and Chikungunya (CHIK). The project expects to achieve three specific objectives:

To perform a study to determine genetic variability and population structure of Catalan *Cx. pipiens* and *Ae. albopictus* mosquito populations. The genetic background of a population can modulate its

ability to be infected with a specific pathogen (vector competence) and its insecticide resistance.

To perform insecticide bioassay tests to determine the resistance of mosquito populations towards different insecticide products. Detect if insecticide resistance could be associated to particular populations and genetic strains, to select the most appropriate insecticide product to fight against a mosquito population from a particular area in case of outbreak.

To perform vector competence studies with West Nile Virus (WNV, lineage I and II) and Chikungunya virus (CHIKV, mutated and non mutated strain) under Biosafety Level 3 measures (BSL3). After infecting the mosquitoes through an artificial feeding using viraemic blood, they will be maintained during the extrinsic incubation

period until sacrifice, to detect the virus by quantifying viral RNA by real time RT-PCR, and viral titration in a cellular system.

The Recercaixa project results will allow us to ascertain whether certain populations of mosquitoes can be competent or resistant against these viral diseases and their sensibility towards insecticides to properly control them in case of outbreak.



Recercaixa Meeting: researchers awarded in 2011.

## New vaccines against avian and swine influenza

### **Nuevas formulaciones vacunales para prevenir la influenza aviar y porcina. Desarrollo de una potencial vacuna universal producida a bajo coste**

IP CRESA: Ayub Darji

The influenza virus is one of the greatest threats of infectious origin to the human population. Likewise, this virus generates relevant losses in swine livestock and the pig is, per se, a reservoir for the virus and is a key component for transmission from birds to humans, resulting in highly pathogenic pandemics. Limitations in the annual production of the vaccine in eggs and the possibility of simultaneously combining seasonal and pandemic vaccines has alternatively focused on vaccines based on cell cultures. However, high production costs and relatively inefficient systems make application to

animal health difficult. This project presents different strategies for obtaining new and more economic, immunologically effective, easily upscaled and possibly more universal vaccines than existing ones. This will be carried out by different developments, with a first utility to be applied to pig livestock but with a potential future application in humans. Baculovirus vectors combined with insect larvae as biofactories will be used to reduce production costs. Two adjuvant molecules fused with the vaccine antigens will be used to enhance effectiveness by either driving antigens to antigen presenting cells or stimulating innate and adaptive immune responses. For vaccine universality, the antigens selected are derived from the ectodomain of protein M2 of the virus, as well as peptides representing HA protein re-

gions relevant in the virus binding to cellular receptors with a high degree of antigenic preservation. The development of this project could lead to entirely new experimental vaccine formulations that are ready to be tested in clinical animal phases, and constituting the basis for future vaccines against influenza with applications to swine livestock and potentially in human health.



# ENDEMOVIR subprogram

## Endemic viral infections

Coordinator: Joaquim Segalés Coma  
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### Objectives

The subprogram on endemic viral infections (ENDEMOVIR) comprises activities on research and technology transfer in relation to viral diseases and infections found endemically

in herds (excluding the zoonotic ones). Their importance relies on the economical losses associated to their infection. The concept of endemics implies a long-standing presence of the disease (i.e,

blue tongue, even it can persist in a territory for a number of years, is still considered an exotic disease).

### Lines of research

#### Immunopathogenesis and protection against PRRSV (IMMUNOPRRS)

##### Coordinator

Enric Mateu de Pozo

This research line is aimed to identify the major factors involved in the immunopathogenesis of porcine reproductive and respiratory syndrome virus (PRRSV) infection development as well as to determine the relevant immunological correlates with protection against this virus. The long-term objective is to gain knowledge for the rationale development of new and better vaccines against PRRSV.

##### Researchers

Enric Mateu de Pozo  
M. Eugenia de la Torre Martínez  
Marga Martín Castillo  
Laila Darwich Soliva  
Iván Díaz Luque

##### Laboratory technicians

Núria Navarro Toro  
Esmeralda Cano Carrasco

##### PhD students

Mariona Gimeno Terradellas  
Liudmila Kuzemtseva

*Researchers and PhD students of the IMMUNOPRRS line of research.*



## **PATHOGENESIS, EPIDEMIOLOGY AND CONTROL OF INFECTIONS CAUSED BY SSDNA VIRUSES (SSDNAVIRUS)**

### **Coordinator**

Tuija Kekarainen

This research line includes the study of epidemiology, pathogenesis and diagnosis of infections caused by ssDNA viruses in pigs, namely Porcine circoviruses (PCV) and Torque teno sus viruses (TTSuV). One of the main objectives of this research line is to generate knowledge about epidemiology, pathogenesis and immune mechanisms for protection against PCV2 in a postweaning multisystemic wasting syndrome (PMWS) and sub-clinical infection contexts. Besides, the study of safety and efficacy of PCV2 vaccines is another important objective of this research line.

The main objective of TTSuV research is to improve knowledge of these viral infections in the epidemiological and pathogenesis point of view. Specific objectives have been changing over time due to the new knowledge generated by us and others in regards the general aim.

### **Researchers**

Tuija Kekarainen  
Joaquim Segalés Coma

### **Laboratory technicians**

Alexandra Jiménez Melsió  
Anna Llorens Segalés  
Mónica Pérez Maillo

### **PhD students**

Mario Aramouni  
Laura Martínez Guinó  
Emanuela Pileri



*Researchers and PhD students of the SSDNAVIRUS line of research.*

## **ROLE OF MICRO-RNAs ON VIRAL INFECTIONS OF PIGS (MICRO-RNA)**

### **Coordinator**

José Ignacio Núñez Garrote

This research line is in collaboration with The Animal Genetics Department in CRAG (UAB). miRNAs are a group of small (~18–25 nt) non-coding RNAs regulating gene expression at post-transcriptional level through messenger RNA (mRNA) degradation or translation inhibition of target genes. These small non-coding RNAs can also contribute to the repertoire of host-pathogen interactions during viral infection. miRNAs play a central role in several viral infections and in their pat-

hogenesis including the regulation of both viral and host gene expression by DNA virus encoded miRNAs, and the regulation of viral gene expression by host encoded miRNAs. The aims of this line are the molecular characterization of new miRNA encoded by swine viral pathogens and by the porcine genome during infection. The specific objectives are to determine the identity, abundance and functionality of microRNA genes expressed in different diseases. 1) In vitro and in vivo control and challenged samples with Aujeszky's disease virus (ADV); porcine circovirus type 2 (PCV2), and African swine fever virus (ASFV). 2) Field porcine samples infected with PCV2. Altogether will insight into the

understanding of both the host-pathogen interactions and the viral tropism or latency, allowing developing novel biomarkers and therapeutics.

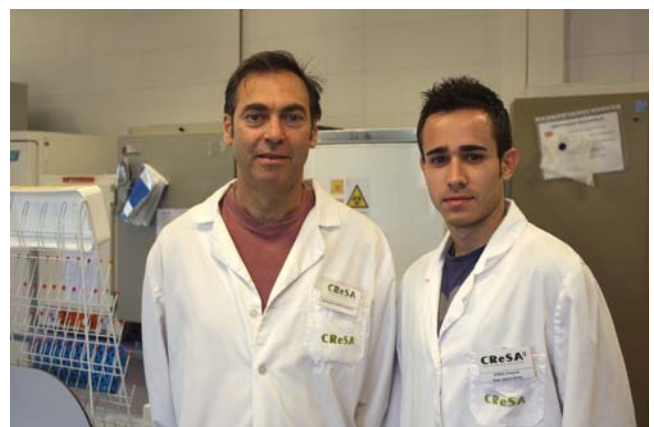
### **Researchers**

José Ignacio Núñez Garrote

### **PhD students**

Fernando Núñez Hernández

*Researcher and PhD student of the MICRO-RNA line of research .*



## **IMMUNOLOGY AND DEVELOPMENT OF VACCINES TO CONTROL SWINE INFLUENZA VIRUS (INFLUPORCINA)**

### **Coordinator**

María Montoya González

The main goal of this line is to study the pig immune mechanisms in front of viral infections and more specifically infection with swine influenza virus. It is also aimed at the development of new vaccine vectors that could be used to control this particular infection. Swine influenza virus (SIV) causes a relevant respiratory disease in swine which has often been neglected due to the impact of other porcine pathogens, until the emergence of the novel swine-origin Influenza A (H1N1) virus in 2009.

The fact that porcine influenza is considered a zoonosis, as SIV can infect

humans, and importantly, that swine may act as an intermediate reservoir for avian influenza to colonize humans illustrates its relevance and the need to develop efficient tools to control this disease. Influenza virus has been extensively used as a model in basic immunology studies, and a great deal is known about the immune factors involved in the development of protective immune responses against influenza virus in mouse and in humans. However, the understanding of the immune response against the virus in pigs is very limited. Additionally, the emergence of the pandemic Influenza A (H1N1) virus in 2009 gave us the opportunity to collaborate in the research of human influenza virus in the ferret model. Finally, development of new vaccine strategies against porcine infectious diseases is a very important

field of research for livestock industry. There is a real need to generate new cost-effective, safe vaccines able to serologically differentiate vaccinated animals from infected ones (the so called DIVA vaccines).

Therefore, this line of research has two specific objectives:

- To investigate the mechanisms of protective immunity to viral infections, e.g. swine influenza virus.
- To develop new vaccines against swine influenza virus.

### **Researchers**

María Montoya González

### **Laboratory technicians**

Lorena Córdoba Muñoz

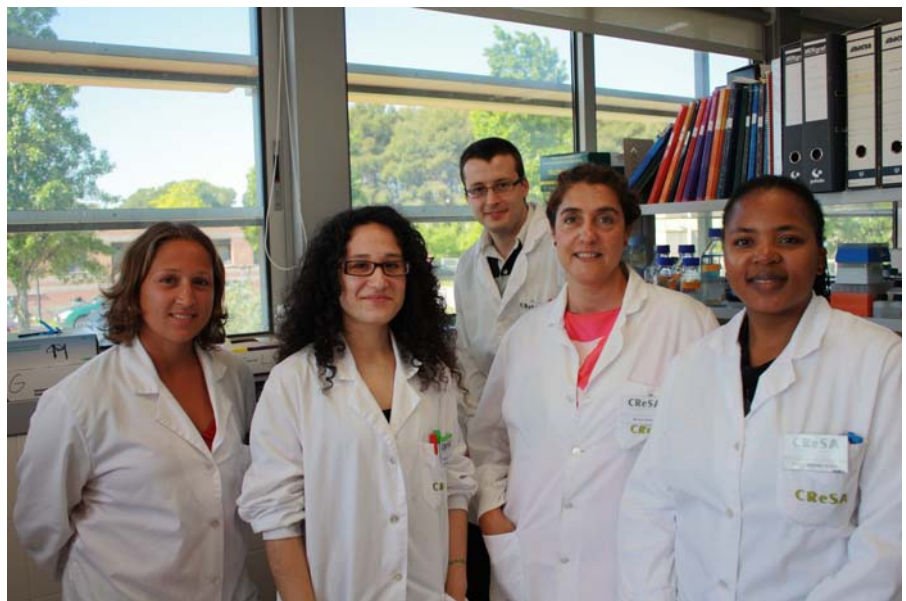
### **PhD students**

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Pamela Martínez Orellana

Tufária Mussà

Maximiliano Baratelli



*Researchers and PhD students of the INFLUPORCINA line of research.*

# Main results

## Development of vaccines against PRRS

### **Porcine reproductive and respiratory syndrome (PRRS): new generation, efficient and safe vaccine, new control strategies (Porrscon)**

IP CReSA: Enric Mateu

Porcine reproductive and respiratory syndrome virus (PRRSV) is the major cause of reproductive and respiratory problems in pigs worldwide. Controlling this disease is a top priority in pig producing countries. Due to mutations at a high frequency, new variants of the virus appear that are no longer effectively controlled by the commercial vaccines. In addition, highly virulent variants emerge, leading to high losses. With regard to animal welfare and agricultural economics, there is an urgent need to control PRRS. Furthermore, the abusive use of antibiotics to control

PRRSV-associated respiratory problems may lead to resistance that may endanger public health.

PoRRSCon is an initiative of 14 partners originating from Europe and Asia with strong expertise in virology and immunology. They are doing frontline research on PRRSV and/or vaccine development. Two of these partners are leading European pharmaceutical companies that will guide the consortium in the direction of exploitable results. By joining their strengths, they have an ideal position to be successful in one of the most difficult challenges in pig health, controlling PRRS.

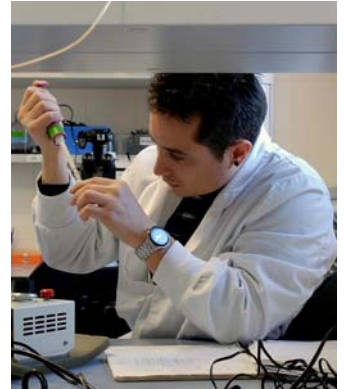
To reach this final goal, the following objectives are forwarded:

- characterize genetically and antigenically current PRRSV isolates in Europe and Asia

- have a better understanding of the complex pathogenesis of PRRSV infections, immune response against PRRSV and immune modulation by PRRSV
- define the genetic base of PRRSV virulence
- identify PRRSV proteins and domains on these viral proteins that are involved in the induction of the immunity against PRRSV and in the immune modulation of PRRSV

- develop new generation, efficacious and safe marker vaccines that can be adapted to temporary changes and geographical differences
- develop DIVA assays that allow to differentiate infected from vaccinated animals.

At the end, it will be possible to set up a control strategy by combining marker vaccines with DIVA assays.



## Study of viral microRNA in pigs

### **Identificación y caracterización de microRNAs víricos que afectan al porcino**

IP CReSA: Jose Ignacio Núñez  
MicroRNAs (miRNAs) are emerging as key regulators of almost all kind of biological events. These small nucleic acids (21-25 nucleotides in length) exert their regulatory effects by specifically targeting homologous sequences in a given mRNA. The recent demonstration of the existence of viral-encoded miRNAs has opened a new research avenue that has allowed, so far,

demonstrating their potential role as regulators of the interaction between the virus and the infected cell. In this project, and during the last year, we have carried out the first study on miRNA gene expression in pigs infected with porcine circovirus type 2 (PCV2) using a deep sequencing approach. Several porcine candidate miRNAs that can be differentially expressed in response to infection with PCV2 have been identified. On the other hand, massive sequencing has failed to identify any miRNA encoded

by PCV2. In order to identify the role of miRNAs in African swine fever virus (ASFV) infection, we have used a similar deep sequencing approach. We have conducted an experimental infection for identifying different pattern of expression of miRNAs in spleen and submandibular lymph node of pigs infected and non infected with two strains (attenuated and virulent) of ASFV. Besides, ASFV is a candidate to explore if expresses miRNAs.



## Immunological studies of swine influenza virus

### **Caracterización de la respuesta inmune inducida por cepas del virus de la gripe porcina circulantes en España. Desarrollo de vacunas basadas en VLPs quiméricas** IP CRESA: María Montoya

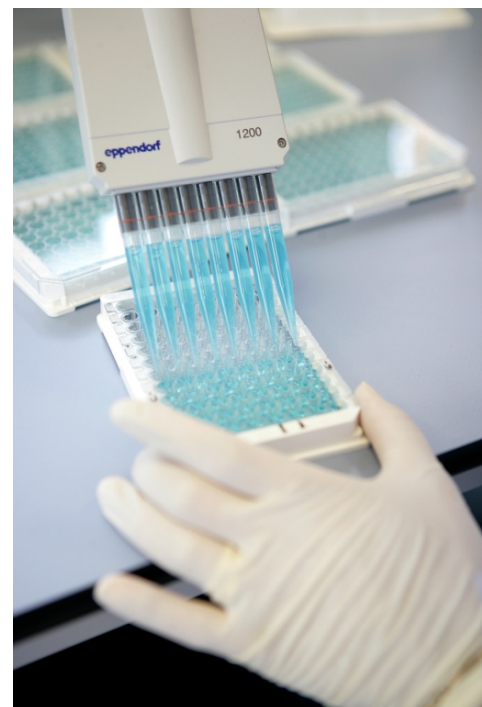
Swine influenza virus (SIV) causes a relevant respiratory disease in swine which has often been neglected due to the impact of other porcine pathogens, until the emergence of the novel swine-origin Influenza A (H1N1) virus two years ago. The fact that porcine influenza is considered a zoonosis, as SIV can infect humans, and importantly, that swine may act as an intermediate reservoir for avian influenza to colonize humans illustrates its relevance and the need to develop efficient tools to control this disease. Influenza virus has been extensively used as a model in basic immunology studies, and a great deal is known about the immune factors involved in the development of protective immune responses against influenza virus in mouse and in humans. However, the understanding of the immune response against the virus in pigs is very limited. For example, no antigenic epitopes have been defined for SIV in the porcine model.

Development of new vaccine strategies against porcine infectious diseases is a very important field of research for livestock industry. There is a real need to generate new cost-effective, safe vac-

cines able to serologically differentiate vaccinated animals from infected ones (the so called DIVA vaccines). In the past years new antigens have been described (synthetic peptides and recombinant proteins) which are potentially protective against different livestock relevant pathogens. However, although these antigens may provide an efficient protection in some cases, it is widely accepted that these kind of antigens are poorly immunogenic by themselves. Therefore, strategies conceived to enhance the efficacy of subunit vaccines based on those antigens, such as their incorporation in VLPs for multimeric presentation, are very relevant if field applications are considered.

Results obtained during the last three years as part of previous coordinated projects have shown that VLPs derived from the calicivirus rabbit haemorrhagic disease virus RHDV constitute an excellent vaccine delivery system, capable of inducing protective anti-viral immunity against inserted immunogenic model epitopes in the absence of adjuvant. Eventually, RHDV VLP-based vaccines could act as efficient DIVA vaccines for SIV, as well as other livestock pathogens. However, further work is required to achieve the development of new strategies to control SIV. Therefore, the objectives of this project are: i) studying the immunological mechanisms against SIV and the interaction of different

isolates of SIV with cells from the porcine immune system (i.e. dendritic cells); ii) identifying and characterizing new SIV antigenic epitopes, to be used as potential candidates to be included in new vaccine formulations for swine; iii) improving the potential of RHDV VLPs as platforms for antigen delivery by performing an exhaustive structural and immunogenic analysis of RHDV VLPs, aimed at defining optimized insertion sites for foreign B and T cell epitopes, and iv) characterizing the immune response induced by the new chimeric VLPs generated.



## Influenza pandemic virus: coordinated studies

### **Estudio comparativo de la respuesta inmune frente al virus gripal pandémico A (H1N1)v en enfermos graves y leves (Inmunoflu)**

IP: Jesús Bermejo

IP CReSA: María Montoya González

The emergence of the first influenza pandemic of the XXI century implies new challenges for the Health Systems worldwide, and also for the scientific community. The great majority of new variant(nv)H1N1 infections are mild and self-limiting in nature. Nevertheless, a small percentage of the patients require hospitalization and specialized attention in Intensive Care Units (ICUs). The role of host immune responses in clearance of nvH1N1 or the role, if any, of host immune responses in contributing to severe respiratory pathogenesis of nvH1N1 infections is not known at this time. It has

previously been identified specific host immune response chemokine and cytokine signatures in severe and mild SARS CoV, H5N1 and Respiratory Syncytial Virus infections. In these studies, early host immune responses are characterized by the expression of systemic levels of chemokines, such as CXCL10, indicative of innate anti viral responses. Severe and mild SARS and RSV illness could further be defined by chemokine and cytokine signatures involved in the development of adaptive immunity. Interestingly, de Jong et al. have demonstrated that “hypercytokinemia” of specific chemokines and cytokines is associated with severe and often fatal cases of human H5N1 infections. To determine if host immune responses play a potential role in the evolution of mild or severe nvH1N1 illness we will perform an analysis of systemic chemokine (CXC & CC) and

cytokine (Th0, Th1, Th2, Th17) levels, an analysis of gene expression profiles linked to inflammation and immunity, along with an analysis of antibodies responses in severe and mild nvH1N1 patients. To determine if the host response could potentially participate in the pathogenesis of this disease could contribute to the design of better treatment approaches, and to prevent the development of severe forms of this disease.



### **Antigenicidad y resistencia a fármacos del nuevo virus de la gripe tipo A(H1N1)v: caracterización y evolución a nivel molecular**

IP: José Antonio Melero

IP CReSA: María Montoya

In April 2009 a new influenza virus subtype, named type A (H1N1) virus, with a genetic composition not found before in influenza viruses, started to circulate among humans and has spread now to pandemic level. Although most of the infections caused so far by the new virus have been mild, the extreme plasticity of influenza viruses

to incorporate genetic changes and to overcome immune/pharmacologic barriers make uncertain the future of this pandemic and has risen great concern at the Public Health level. Therefore, this project intends to carry out “in vitro” studies, but also studies in animal models, oriented to understand the antigenic properties of the new virus, to identify and characterized key epitopes involved in neutralization and their evolution. This will be done in comparison with the H1N1 viruses of seasonal epidemics in recent years. In addition, the mutations and

mechanisms of resistance to the commonly used anti-influenza drugs, oseltamivir and zanamivir, will be addressed in this project. All this knowledge will be highly relevant to evaluate the changes that the new virus may accumulate in the future, facilitating the surveillance activities of the pandemic. Finally, the results derived from this project may have a major impact on the evaluation of future vaccines and on the prophylactic/therapeutic measures to take against the new virus.

**Nuevos procedimientos para el diagnóstico y caracterización del virus A(H1N1)v pandémico, esenciales para mejorar la capacidad de la red RELEG, a desarrollar en el laboratorio coordinador de la misma**

IP: Pilar Pérez Breña

IP CReSA: María Montoya

There has been an unprecedented number of episodes of human infection by animal viruses recorded in recent years, not only in terms of detected cases but also the diversity of origins and characteristics of the causal viruses. The latest of these was produced by a flu of porcine origin and is now categorised as a pandemic, even though, to date, most of the infections have been minor.

Over the same years, a network of laboratories has been developed in Spain to

survey this influenza (RELEG), which has played an essential role in viral diagnoses and hence our understanding of the present pandemic.

The objectives proposed by the RELEG are being met, and the project is currently at a crucial stage involving the incorporation of new laboratories to encourage improvements and expand the technological capacity of the network.

Therefore, the coordinating laboratory of the RELEG (the CNM's Laboratorio de Virus Respiratorios y Gripe) is proposing a coordinated project for in-depth phylogenetic analysis of a group of viruses selected from the AH1N1 isolated in the current pandemic in comparison with another selection of contemporary seasonal AH1N1 viruses. The study will be completed by seeking mutations that generate resistances to

anti-viruses and some essays to evaluate the virulence and transmissibility of the selected viruses, in collaboration with other groups participating in the project, and which have recognised experience in this area.

The results of this project will revert to the RELEG through technology transfer to its laboratories, and shall be used to promote and support the most scientific aspects of the network's meetings. It is hoped that this will also stimulate projects initiated as a consequence of the activity between laboratories forming part of the network and others that do not.



**Análisis de la virulencia del virus gripe A(H1N1)v pandémico**

IP: Amelia Nieto Martín

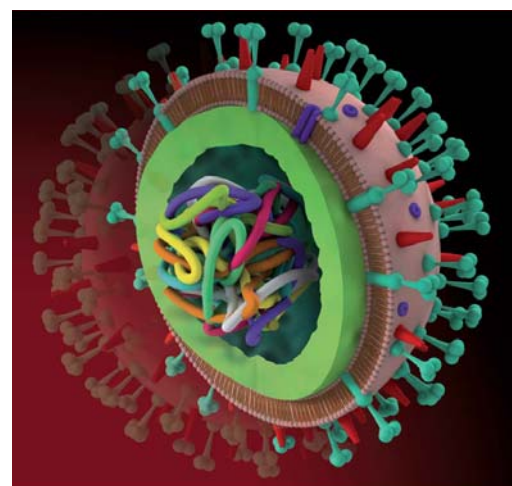
IP CReSA: María Montoya

Since April 2009, a new influenza A H1N1 virus of porcine origin has produced worldwide outbreaks and has led the World Health Organization (WHO) to declare a pandemic situation. Although many severe cases are associated to underlying pathologies in the patients or to belonging to high-risk groups, the age group affected by the pandemic virus is generally below 50 years of age. In addition, a small proportion of severe cases and deaths have occurred among young and apparently healthy patients.

This observation would suggest the hypothesis that, among the diverse pandemic viruses that circulate in humans, some strains may show increased levels of virulence. To test such hypothesis we propose the isolation of viruses from patients that show severe infections but are not known to have previous high risk health conditions and to analyse such virus strains in vitro and in vivo to determine whether they contain specific virulence traits.

To this end, we propose the determination of their complete genome sequence and comparison of this to other pandemic strains, as well as the measurement of the pattern of in vitro replication and its interaction with the host factors known to play a

role in virulence. In those viruses with appropriate properties, we propose the study of their virulence and tropism during the infection of animal models. As controls, we propose the use of pandemic viruses isolated from mild infections as well as seasonal influenza viruses.



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Other projects and networks

04

# European networks

## Animal Infectiology Facilities

### NADIR: The Network of Animal Infectiology Facilities

IP CRISA: Mariano Domingo

Europe possesses several experimental facilities of level 3 biosafety, which is required to study the vast majority of zoonoses, emerging diseases and a number of other infectious animal diseases. Nevertheless, most of these are loosely connected, leading to redundancy.

NADIR's strategic aim is to realise its potential for European leadership in animal infectiology by bringing together 14 BSL3 animal experiment infrastructures and organising the facilities in order to optimize their investigation and diagnostic/validation tools, achieve economies of scale and use the saved resources to modernise existing facilities in a coordinated manner.

To achieve these goals, NADIR will:

- internally, to upgrade the collaboration between the partners by setting up an Internet based joint workspace, strengthening the sharing of knowledge, best practices and ethical considerations, commonly managing biological resources, organising transnational access to the infrastructures involved, and jointly executing research activities designed to improve the services provided by these facilities;
- externally, to enhance access to the network's infrastructures by setting up an electronic portal presenting all the infrastructures and services offered by the network in a unified way, providing access by non-member institutions to these infrastructures, coordinating actions with other relevant initiatives, and jointly present-

ing safety and ethical recommendations.

NADIR is organised around four types of activity:

- three networking activities, consisting of internal and external communication, knowledge and best practices sharing, and joint management of biological resources;
- three research activities, made up of characterising animal lines, improving infection monitoring tools, and developing new infection models for emerging diseases;
- as many transnational access activities as infrastructures involved in the network;
- one project management work package.



### Partners

- INRA - Institut National de la Recherche Agronomique (France)
- AU - Arhus Universitet (Denmark)
- AFSSA - Agence française de sécurité sanitaire des aliments (France)
- CRISA - Centre de Recerca en Sanitat Animal (Spain)
- FLI - Friedrich-Loeffler-Institut (Germany)
- IAH - Institute for Animal Health (United Kingdom)
- INIA - Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (Spain)
- KVI - Kimron Veterinary Institute (Israel)
- MRI - Moredun Research Institute (United Kingdom)
- VET - Veterinærinstituttet (Denmark)
- AS VESO - Veterinærmedisinsk oppdragscenter (Norway)
- VLA - Veterinary Laboratories Agency (United Kingdom)
- UR CVI - Central Veterinary Institute of Wageningen (Netherlands)
- PTP - Parco Tecnologico Padano (Italia)
- UNOTT - University of Nottingham (United Kingdom)

## Diagnostics of "Imported" Viral Diseases

### European Network for Diagnostics of "Imported" Viral Diseases (ENIVD)

IP CRSA: Núria Busquets

Considerable attention has recently been directed to emerging and re-emerging infections in national and international discussions. Infectious diseases are a continuing menace to all people, regardless of age, gender, lifestyle, ethnic background, and socio-economic status. They cause suffering and death, and impose an enormous financial burden on society.

Numerous viral outbreaks in the last few years like Ebola in Kikwit/Zaire, Côte d'Ivoire, and Liberia in 1996/97 and Nipha Virus in Malaysia in 1998 led to the building of the European Network for Diagnostics of "Imported"

Viral Diseases (ENIVD). After several meetings scientists from university medical centres, country health departments, and hospitals all over Europe have raised this network and agreed to collaborate on a few major tasks for the future, fixed in a manifest signed by all members and their institutions.

The ENIVD members meet regularly together with representatives from EC and WHO to exchange and gather information working on the improvement of the collaboration and diagnostics for "imported" viral diseases in Europe. Sharing the duties and strengthen the collaboration in the EC will help to enhance the emergency preparedness in all participating countries to the benefit for these citizens.



*The ENIVD members meeting.*

## Understanding and Combating PRRS

### EuroPPRSnet: COST Action FA902: Understanding and combating porcine reproductive and respiratory syndrome in Europe

IP CRSA: Enric Mateu

EuroPPRSnet is a European Network for Understanding and Combating Porcine reproductive and respiratory syndrome in Europe. This network is funded by the European COST office (2009-2013).

The objective of EuroPPRSnet is to have concrete outcomes such as the identification of key challenges and propose potential solutions to problems to increase progress and facilitate the use of these new technologies in animal health. The aim of this initiative is to develop more effective multidisciplinary collaborative PRRS research in Europe centred on PRRSV epidemiology, immunopathology, vaccine development and diagnostics tools.

### Partners

NC229: Porcine Reproductive And Respiratory Syndrome: Mechanisms Of Disease And Methods For The Detection, Protection And Elimination of the PRRS Virus  
PoRRScon  
Epizone: Network of Excellence for Epizootic Disease Diagnosis and Control  
Fairness and Accountability in Research  
The Roslin Institute  
The University of Edinburgh



## PORCIVIR: Pathogenesis of porcine viral infections

### **PORCIVIR: patogenia de enfermedades víricas porcinas**

IP: Mariano Domingo

PORCIVIR was set up in order to achieve significant advances in the improvement of swine health and food safety. This is a multi-disciplinary project in which the most advanced research groups involved in this issue participate. This project belongs within the framework of the CONSOLIDERINGENIO 2010 Program, which is an initiative of the Ministry of Education and Science that supports high quality research that is made up of the leading consolidated groups within the Spanish science community, and which has an accredited history within the international scientific and technical community.

The general objective is the study of viral swine diseases that have economic, sanitary and public health repercussions. The PORCIVIR project is organized into three main areas:

#### **a) Immunity and pathogenesis of viral diseases with the aim of developing vaccines**

This area is focused on conducting research into those important diseases for which there is a lack of totally effective vaccines (for example, porcine reproductive and respiratory syndrome, swine circovirus type 2, and African swine fever virus). Investigation is also carried out into the use of of esta-

ablished models (e.g., classical swine fever) for the development of new vaccination methods.

#### **b) Models of infections and development of diagnostic techniques**

This section includes the development of an arsenal of reagents and methods for studying the pathogenesis of these infections and also comprises the creation of a strain bank, tissues and reagents that are useful as basic materials for these studies. The improvement of some of the existing infection models is proposed (e.g., porcine reproductive and respiratory syndrome and swine circovirus type 2 in piglets). The development of other models for swine infections of zoonotic potential (for example, hepatitis E virus, porcine calicivirus, etc.) is also being worked on.

#### **c) Epidemiology and risk analysis, including risk of transmission of swine virus to humans**

Activities undertaken to evaluate disease eradication programs, risk assessment and the impact of the introduction of exotic diseases (classical swine fever virus, foot and mouth disease virus) are proposed at this point. Moreover, steps are proposed to produce information about the epidemiological situation of several infections that could affect humans (such as hepatitis E, swine influenza or porcine calicivirus or torovirus infections).

### **Viruses studied**

The present project focuses on swine viruses of known economic or sanitary

importance: Porcine Reproductive and Respiratory Syndrome (PRRSV), Porcine Circovirus type 2 (PCV2), Swine influenza virus (SIV), African swine fever virus (ASFV), Classical swine fever virus (CSFV), Foot and mouth disease virus (FMDV) and Aujeszky's disease virus (ADV). On the other hand, it focuses on viral agents that infect pigs but whose importance is unknown although there is evidence that suggests that they could be zoonotic agents: Hepatitis E virus (HEV), Porcine caliciviruses; namely noroviruses (NV) and sapoviruses (SaV), Porcine Torque-tenovirus (TTV) and Toroviruses (ToV).



### **Participants**

The aim of this program is to undertake a broad approach to the study of porcine viral diseases by agglutinating 7 Spanish groups from four different institutions that have demonstrated expertise and competence in this area over the years (51 PhD researchers):

Centre de Recerca en Sanitat Animal (CRESA)

*Responsable: Mariano Domingo Álvarez*

Centro de Biología Molecular (CBMSO-CSIC)

*Responsable: Francisco Sobrino Castelló*

Centro Nacional de Biotecnología (CNB-CSIC)

*Responsable: Dolores Rodríguez Aguirre*

Centro de Investigación en Sanidad Animal (CISA-INIA)

*Responsable: Alejandro Brun Torre*

Departamento de Biotecnología (Biotecnología-INIA)

*Responsable: Francisco Javier Domínguez Juncal*

Departamento de Biotecnología (Biotecnología-INIA)

*Responsable: José Ángel Martínez Escribano*

Universidad Complutense de Madrid (UCM)

*Responsable: José María Castro Arganda*

## Iberoamerican network on pig meat

**Red Iberoamericana Red Iberoamericana para el desarrollo de la cadena de producción porcina a través de sistemas innovadores y sustentables en salud animal, nutrición, reproducción y sistemas de producción**

IP CReSA: Joaquim Segalés

The network is intended to improve pig meat production in Latin American countries by developing innovative and sustainable strategies in the fields of health, nutrition, reproduction and pro-

duction. More specific objectives include identification of deficiencies or inadequate practices in order to counteract the same, implementation of a program of good health practices in pig production, improved diagnosis and control of diseases, continuous education and, finally, identification of opportunities for collaboration between the participant institutions.

A summary of the pig production and consumption data has been collected from

Argentina, Chile, Costa Rica, Colombia, Cuba, Mexico, Spain, Uruguay, Dominican Republic, Venezuela and Brazil. Also, the handbook of good production practices as well as the handbook of safe pig production is being produced and editors have been assigned. Importantly, an online magazine has been designed and will presumably be operative in 2011 as a platform towards achieving the abovementioned objectives.



# Other publications

## Other publications (collaborations)

Saco Y, Fraile L, Giménez M, Alegre A, López-Jimenez R, Cortey M, Segalés J, Bassols A. **Serum acute phase proteins as biomarkers of pleuritis and cranio-ventral pulmonary consolidation in slaughter-aged pigs.** Res Vet Sci. 2011 Aug;91(1):52-7.

Savini G, Afonso A, Mellor P, Aradaib I, Yadin H, Sanaa M, Wilson W, Monaco F, Domingo M. **Epizootic haemorrhagic disease.** Res Vet Sci. 2011 Aug;91(1):1-17. Review.

Soto S, Alba A, Ganges L, Vidal E, Raga JA, Alegre F, González B, Medina P, Zorrilla I, Martínez J, Marco A, Pérez M, Pérez B, Pérez de Vargas Me-

sas A, Martínez Valverde R, Domingo M. **Post-epizootic chronic dolphin morbillivirus infection in Mediterranean striped dolphins *Stenella coeruleoalba*.** Dis Aquat Organ. 2011 Oct 6;96(3):187-94.

Soto S, González R, Alegre F, González B, Medina P, Raga JA, Marco A, Domingo M. **Epizootic of dolphin morbillivirus on the Catalan Mediterranean coast in 2007.** Vet Rec. 2011 Jul 23;169(4):101.

Tortosa R, Castells X, Vidal E, Costa C, Ruiz de Villa Mdel C, Sánchez A, Barceló A, Torres JM, Pumarola M, Ariño J. **Central nervous system gene expression changes in a trans-**

**genic mouse model for bovine spongiform encephalopathy.** Vet Res. 2011 Oct 28;42(1):109

Vilalta C, Schneider M, López-Jimenez R, Caballero JM, Gottschalk M, Fraile L. **Marbofloxacin reaches high concentration in pig tonsils in a dose-dependent fashion.** J Vet Pharmacol Ther. 2011 Feb;34(1):95-7.



**Services for the Generalitat de  
Catalunya and private companies**

**05**

# Services for Administration

From 2001 until the present the Centre de Recerca en Sanitat Animal (CRESA) has been working closely with different public institutions to improve animal and public health on a regional and national level. This collaboration takes the form of an annual services and research activities contract, or occasional contracts for specific activities. On the regional level (Catalonia), the CRESA has an annual contract with the Department of Agriculture, Livestock and Rural Affairs (DAAM) and the Department of Health (DS)

of the Catalan Government. There are also some occasional collaborations with the Catalan Food Safety Agency (ACSA), ascribed to the DS, and there is also coordination with the Department of Environment (DMAiH) for some specific activities. On the national level, the CRESA has started a collaboration with the Ministry of Environmental, Rural and Marine Affairs (Ministerio de Agricultura, Alimentación y Medio Ambiente, MARM) and has conducted some studies for other regional governments,

such as those of Andalusia and Galicia. In the framework of these contracts, the CRESA has worked in epidemiology, diagnostics, and general studies of diseases, including bovine tuberculosis (bTB), bluetongue (BT), avian influenza (AI), West Nile fever (WNF), bovine spongiform encephalopathy (BSE), Aujeszky's disease (AD), classical swine fever (CSF), Maedi-Visna, paratuberculosis, border disease, rabies, and brucellosis in cattle and small ruminants.



# Agriculture, Food and Rural Action

## Surveillance for avian influenza in wild birds in Catalonia

**Programa de vigilància d'influença aviària en aus salvatges i aus d'autoconsum a Catalunya**  
IP: Natàlia Majó, Núria Busquets

The monitoring of the avian influenza (AI) in wild birds in Catalonia in 2011 forms part of the vigilance of AI being undertaken by the European Union and is developed in coordination with the other Autonomous Communities as part of the avian influenza surveillance programme in Spain, 2011. The main objective in wild birds during 2011 was to detect Highly pathogenic avian influenza virus A/H5N1.

The implementation of the programme includes the participation of the DAAM, the Department of the Environment and Habitat (DMAiH), the CReSA, the Algete Central Veterinary Laboratory (LNR) and the Ministry of Agriculture and the Rural and Marine Environment (MARM).

In order to collect information on the AI circulating in wild birds actions were im-

plemented that involved passive surveillance. Of the total of 53 birds analysed, 48 were negative, 2 were not evaluable and 3 were positive for low pathogenic AI.

All of the positive cases were mallard ducks (*Anas platyrhynchos*) captured in August (Granollers) and September (La Llagosta and Deltebre).



## Surveillance for West Nile Virus in Catalonia

**Programa de vigilància del virus del Nil occidental a zones considerades de risc**

IP: Ana Alba, Alberto Allepuz

The aim of the surveillance programme is the early detection of the West Nile Virus (WNV) in Catalonia in the main reservoirs (birds) and animal hosts (equines), basically in the main risk areas. The programme involves the participation of the DAAM, the CReSA, the DMAiH, the Mosquito Control Services,

fauna recovery services, equine veterinary clinics and the LNR. The programme is based on different components: active and passive surveillance of wild birds and equines, monitoring of sentinels in self-consumption birds and entomologic monitoring.

In 2011, seropositivity against FNO was detected in resident in both migratory and resident wild birds. These results indicate that the

enzootic cycle of FNO has remained in Catalonia in wild birds near highly populated urban areas and that the incursion of this virus is probable in other areas.

The virus was not detected in domestic populations by serology or molecular diagnosis. On the other hand, entomological monitoring shows that *Culex modestus*, *Culex pipiens* o *Ochlerotatus caspius* are abundant in wetlands areas.

## Support to Eradication program of Bovine Tuberculosis

### Assessorament i diagnòstic per al control i eradicació de la tuberculosi bovina

*IP: Sebastián Napp, Bernat Pérez de Val*

Bovine tuberculosis (TBC) is a zoonotic disease being subjected to an eradication programme among cattle herds in Catalonia. By commission of the DAAM, the CReSA's TBC laboratory makes a diagnosis of the disease, epidemiologically surveys

it and provides expert guidance to the Department. In 2011, 36 cattle farms were affected by TBC (57% detected from intradermotuberculation test, 32% from slaughterhouses and 11% from epidemiologic surveillance). It supposes a 0,89% of annual prevalence and a 0,3% of increase in comparison to 2010.

In total, 6.996 analyses were made using the interferon- $\gamma$  test, 168 analyses using the antibody detection test by

ELISA, 1.068 macroscopic evaluations of lesions, 286 mycobacterium cultures and 286 DNA detections by PCR.

The epidemiologic surveillance, integral evaluation of the diagnostic results obtained and the specific actions to be observed in each case were discussed on a monthly basis by a mixed work group formed by researchers from the CReSA and veterinary scientists from the DAAM's Servei de Sanitat Animal.



## Entomological surveillance of Bluetongue

### Vigilància entomològica de la llengua blava

*IP: Nitu Pagès*

Bluetongue (BT) is a non contagious infectious viral disease that affects ruminants. The virus is of high antigenic variability, with as many as 24 different serotypes having been found. The transmission of the virus between susceptible hosts occurs via hematophagia by small Culicoides. There are around 1400 species of Culicoides around the world.

Since 2003, and by commission of the DAAM, the CReSA has designed and implemented the Entomologic BT Surveillance Programme in Catalonia. In 2011, the surveillance of the Culicoides species led to the conclusion that the activity of these vectors is reduced at a basal stage during the cold months of winter and then a period of higher activity begins in spring and lasts until late autumn, reaching two peaks of activity in April and September. The data obtained by the Ento-

mologic BT Surveillance Programme has led us to conclude that in Catalonia, if a BT virus enters, there is a high risk of transmission from August to November because the main vectors, *C. imicola* and the Culicoides of the *Obsoletus* complex are at their highest abundance of the year. Neither can we discard transmission in other periods, as the Culicoides of the *Obsoletus* complex are active in all periods of the year in some areas.

## Virological analysis

### Prestació de serveis d'anàlisi virològiques

IP: Rosa Rosell

The objective of the provision of virus analysis services is the diagnosis of the main viral diseases of domestic animals subjected to official control programmes by the DAAM's Servei de Sanitat

Animal.

The diseases subjected to diagnosis are: Classical Swine Fever (CSF), Swine Vesicular Disease (SVD), Bluetongue (BT) and Aujeszky's disease (AD). In the 2011 period, 14.759 samples were received and 15.047 analyses were made. These samples came from *Laboratoris de Sanitat Ramadera, Seccions Terri-*

*torial de Ramaderia i Sanitat Animal and Serveis Veterinaris Oficials de les Oficines Comarcals del DAAM.* Techniques used were: serum-neutralisation for CSF and SVD confirmation of positive/doubtful samples from Laboratoris de Sanitat Ramadera; detection of the virus by RT-PCR and PCR for CSF, SVD, AD and BT.

# Health protection

## Transmissible spongiform encephalopathies

### Diagnòstic del pla de vigilància de les Encefalopaties Espongiformes Transmissibles Animals a Catalunya

IP: Enric Vidal Barba

The PRIOCAT laboratory performs, by commission of the agency for the Protection of Health pertaining to the Health Department, an active Transmissible Spongiform Encephalopathies surveillance programme, whereby it specifically analyses samples from all of Catalonia of the central nervous sys-

tem of bovines older than 48 months and a sample of small ruminants older than 18 months destined for human consumption in order to determine the presence of prion diseases. From September 2011 bovines older than 72 months are analysed. Apart from routine tests, in cases with an initially positive result from rapid tests, confirmation tests are conducted. In 2011, 15.633 samples were analysed and only one case of TSE was confirmed, specifically an atypical pre-

sentation of classical scrapie in a goat. The laboratory has also developed a line of research financed by national and European research projects into the study of different aspects of TSE such as the determinant factors of the transmission barriers of animal prions (TSE and Scrapie) and the characterisation of the transmissibility of atypical variants of Scrapie to other species of productive interest and humans.



**PRIOCAT**  
Laboratori de Referència en Malalties Prioniques Animals de Catalunya

### Researchers

Enric Vidal Barba

### Laboratory technicians

Mariano Moreno Bustos  
María Espinar Guardado  
Marta Valle González

## Support for slaughterhouse veterinarians

### Servei de Suport a Escorxadors (SESC)

IP: Enric Vidal Barba

In 2011, the Slaughterhouse Veterinary Support Service (SESC) managed a total of 148 queries by official vets conducting inspections of slaughterhouses in Catalonia. Of these, 12 were telematic queries and the other 136 corresponded to

requests for the laboratorial analysis of samples. Of the queries received there was a notable prominence of doubts regarding lesions with a suspicion of bovine tuberculosis, followed by suspicions of cattle muscle lesions hoping to eliminate fears of Bovine cysticercosis and Marek's disease in poultry. 14 cases were published in the case histories on the SESC website in order to pro-

vide information to the users of the service. In 2011, the case history pages were visited a total of 10,316 times.



Enric Vidal Barba  
Manager of the PRIOCAT laboratory and the SESC support service



# Services for companies

At the request of the agri-food sector companies, the CReSA Field trial Group designs and/or executes laboratory and field studies of the efficacy and tolerance of pharmacological, biological and nutraceutical products. In general, the objective of these studies is to conduct:

- Necessary trials for the registration of the medication on a national and European level
- Product trials to support marketing strategies.

## Laboratory studies

These assays are necessary to demonstrate the efficacy and the tolerance of veterinary medicines. These trials are made with a limited number of animals under controlled conditions, on experimental farms or in the CReSA's biocontainment facilities under the proposed conditions of use of the medicine. The results obtained are very useful for assessing the efficacy and tolerance of veterinary medicines because of this controlled environment and the detailed monitoring of the clinical and pathological variables.

The CReSA has its own facilities for the housing of farm animals, in isolated conditions, and which are suitable for performing the assays that involve the use of medicines against infectious agents.

## Field trials

The studies conducted on the farm under real production conditions are necessary to demonstrate the efficacy and tolerance of the veterinary medicines. At the CReSA, these types of study are conducted by field specialists. The selection of a suitable farm is of crucial importance for the success of the study. The farm must be experiencing the disease that is the objective of the treatment or must be very likely to experience it when the batch of animals in the study reaches the age at which there is an outbreak of the disease (this must be documented by previous diagnostic studies of the farm). Moreover, the farm must be free of other diseases that could interfere with the assessment of the results of the assay.

The CReSA collaborates with the study sponsor by looking for the appropriate farm.

## 2011 Activities

In 2011, 31 contracts with 20 private companies and 2 public institutions were signed, with a total income of €1.922.313,85 . The different types of study are shown below:

- Diagnosis, detection and classification
- Studies with strains
- Pathological anatomy
- Trials with vaccines and/or premixes in ruminants, swine and poultry
- Development of experimental challenges
- Consultancy
- Biosecurity studies
- Risk assessment studies
- Studies of bacteriology and intestinal microbiota

## Researchers

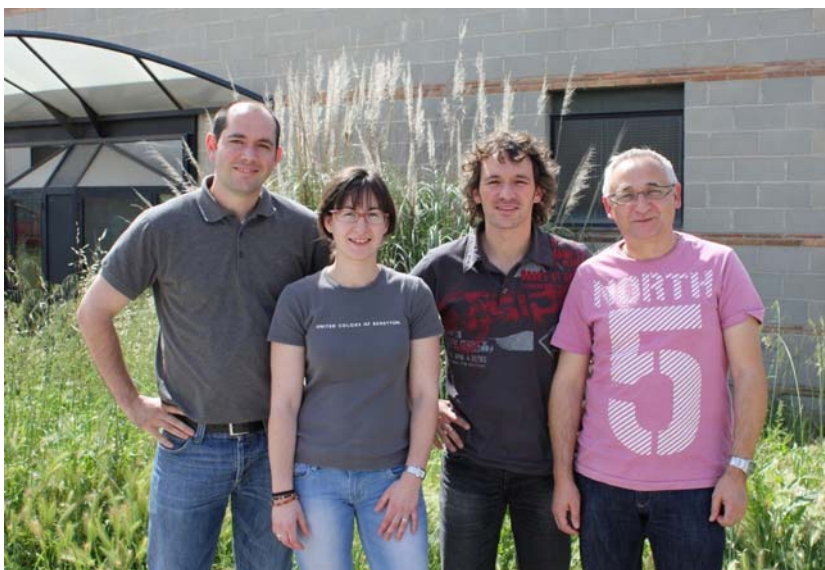
Sergio López Soria  
Miquel Nofrarías Espadamala  
Lorenzo José Fraile Sauce

## Laboratory technicians

Rosa María López Jiménez  
Diego Pérez Rodríguez

## Clients in 2011

ADISSEO FRANCE S.A.S  
ANDRÉS PINTALUBA S.A.  
APC EUROPE  
BIOIBÉRICA  
BOEHRINGER INGELHEIM VET-MEDICA GMBH  
CEVA SANTE ANIMALE S.A  
CLINOBS S.L.  
DELTALAB S.L.U.  
DS  
ELANCO ANIMAL SCIENCE RESEARCH  
FERRER INTERNATIONAL S.A.  
HYPOR ESPAÑA  
IDIBAPS  
INSTITUTO GRIFOLS S.A.  
INTERVET R&D LABORATORIES  
LABORATORIOS ALMIRALL S.A.  
LABORATORIOS CZ VETERINARIA S.A.  
LABORATORIOS SYVA S.A.  
LUCTA S.A.  
PFIZER EUROPE S.A.  
PFIZER, S.L.U.  
VETERQUIMICA S.A.



*Researchers and technicians of the CReSA Field trial Group.*



**Knowledge transfer and training**

**06**

# Doctoral thesis and research works

## Doctoral thesis

### **Immunogenic properties of Calicivirus-like particles as vaccine vectors**

Elisa Crisci

Director: Maria Montoya González

### **Estudio de la neosporosis bovina en ganado lechero de Venezuela**

Nelitza Linarez

Director: Sonia Almería de la Merced

### **New insights into the biology of Torque teno sus viruses**

Laura Martínez-Guinó

Director: Tuija Kekarainen, Joaquim Segalés Coma

### **Infection studies with chamois border disease virus in Pyrenean chamois, sheep and pig**

Oscar Cabezón

Director: Joaquim Segalés Coma, Ignasi Marco Sánchez

### **Study of the pathogenesis of highly pathogenic influenza A virus (H7N1) infection in chickens, with special focus in the central nervous system**

Aida J. Chaves

Director: Natàlia Majó Masferrer

## Research works

### **Phenotypical characterization and isolation of a subpopulation of peripheral blood mononuclear cells from swine through negative selection. A new methodology to obtain putative plasmacytoid dendritic cells**

Elena López Altés

Director: Maria Montoya González

### **Immunomodulatory effects of silver nanoparticles in porcine bone marrow derived dendritic cells in vitro**

Sílvia Saballs Dalmau

Director: Maria Montoya González

### **Model d'infecció en Aedes albopictus amb virus Chikungunya a través d'aigua**

Andreu Saura Rebollar

Director: Núria Busquets Martí, Nonito Pagès Martínez

### **Comparison of four PCR techniques for detection and quantification of Torque teno sus viruses**

Alexandra Jimenez-Melsio

Director: Tuija Kekarainen, Joaquim Segalés Coma

### **Estudio comparativo de tres técnicas serológicas ELISA para la detección de anticuerpos frente a circovirus porcino tipo 2 con el método de inmunoperoxidasa en monocapa de cultivo (IPMA)**

Emanuela Pileri

Director: Joaquim Segalés Coma



*One of the priorities of the CReSA is to train future researchers.*

# Congresses

## Organization of congresses, workshops and meetings

### 6th International Symposium on Emerging and Re-emerging Pig Diseases

From June 12th to 15th, Barcelona was, for four days, the focus of the pig industry and animal health research. The International Symposium on Emerging and Re-emerging Pig Diseases is organized in a 4-year basis, always in a different country, and this time was organized in Barcelona by the CRESA. Dr. Joaquim Segalés, researcher at the same institute and professor at the Faculty of Veterinary Medicine (UAB), was the chair of the congress.

The success was confirmed with the assistance of a total of 1,016 delegates from 62 countries; and a total of 11 key note lectures, 35 oral communications and 257 scientific posters were presented.

The opening ceremony of the congress was presented by Margarita Arboix (General Director for Agriculture and Livestock of the Ministry of Environment and Rural and Marine Affairs) and Miquel Molins (General Director of Agriculture and livestock of the Department of Agriculture, Livestock, Fisheries, Food and Environment of the Generalitat de Catalunya), who were the responsible for the symposium inauguration. The three days of the congress were organized according to the diseases included in the program. On Monday, all communications were in the scope of PCVD and emerging viral infections. Porcine reproductive and respiratory syndrome (PRRS) and re-emerging viral diseases were tackled on Tuesday. Finally, on Wednesday, the main subject was swine influenza (SI).

As expected, there were moments to get away and leisure for attendees. The first day counted with a get together reception for the guests in the gardens of the Hotel Juan Carlos I, while on Tuesday night the farewell banquet took place in the gorgeous Sala Oval of the Museu Nacional d'Art de Catalunya (MNAC). The closing ceremony served to announce the name of the next host country of the Symposium.

Proceedings of the 6th International Symposium on Emerging and Re-emerging Pig Diseases available at: [www.emerging2011.com](http://www.emerging2011.com)



Opening ceremony. From left to right: M. Domingo, M. Arboix and M. Molins.



Welcome roundtable "One world-one health: the threat of emerging diseases". From left to right: J. Segalés, T. Blaha, J. Deen and R. Thanawongnuwech.



Auditorium of the Palau de Congressos de Catalunya.



Get together in the gardens of the Hotel Juan Carlos I.



Farewell dinner in Sala Oval of the Museu Nacional d'Art de Catalunya (MNAC).



Collaborators of the CReSA during the symposium.

## NADIR Annual Meeting



The last General Annual Meeting of the NADIR (Network of Animal Disease Infectiology Research Facilities) was held in Barcelona in November 2-4 2011, and was organized by the NADIR Executive Committee and CRESA.

The aim of the annual meeting was to gather the NADIR partners in order to present and discuss the work achieved for NADIR and plan the tasks for the remaining 18 months of the project. 39 people were registered.

An update on the work performed within NADIR was presented in plenary sessions: research and network-

ing activities are on track with no major deviation according to the DoW. Workshop sessions were also organized by the work package leaders to discuss with the partners, and plan the tasks to be fulfilled until the end of the project. Two extra workshops on Rift Valley Fever and West Nile Fever were proposed.

The dynamic of the partners of NADIR allowed a fruitful meeting in term of interaction and discussion. Some issues have been identified during the sessions and will be solved. The delays are expected to be overcome before the end of the project. A major effort has been initiated on the transnational access activities. It has been emphasized that a lot of work will be achieved in the last 18 months of the project,

and will require excellent communication and organization within the work packages.

The meeting venue was the Institut d'Estudis Catalans (Barcelona). Moreover, social activities (lunchs, dinners and a cultural guided tour around downtown Barcelona) were also organized.

NADIR has as its strategic aim to realise the potential European leadership in animal infectiology by bringing together 14 L3 animal experiment infrastructures and organising the facilities in order to optimize their investigation and diagnostic/validation tools, achieve economies of scale and use the saved resources to modernise existing facilities in a coordinated manner.



*Plenary session during the NADIR meeting*



*Coffee-break during the NADIR meeting*

Technical seminars of the PATT Plan (DAAM):

**Zoonosis: febre del virus del Nil occidental**

15/11/2011

87 attendees

**Els casos del servei de suport a escorxadors (SESC)**

29/11/2011

57 attendees

Training meetings in the frame of the IRTA/Federació de Cooperatives Agràries de Catalunya (FCAC) project entitled Improvement of the competitiveness of the swine the cooperative sector trough research on health and nutrition:

**Procés per a un diagnòstic definitiu: de la història clínica al laboratori**

25/01/2011

**Epidemiologia aplicada a les granges porcines**

10/05/2011

**Patologia vírica del porc: PRRS, circovirosi i influença**

6/07/2011

**Patologia respiratòria i digestiva bacteriana del porc**

8/11/2011

**XIII Jornades de Porcino de la UAB**

2-4/02/2011

Bellaterra

120 attendees

**CReSA technicals seminars**

In 2011, more 26 seminars were organized at CReSA. Since 2007, Dr Maria Montoya has been in charge of the coordination of technical seminars with guest speakers from different institutions.

**ELS CASOS DEL SERVEI DE SUPORT A ESCORXADORS (SESC)**  
 Jornada tècnica  
 BELLATERRA, dimarts 29 de novembre de 2011

**PRESENTACIÓ**  
 L'objectiu d'aquesta jornada tècnica és discutir els casos més rellevants amb els serveis de suport a escorxadors (SESC) del CRISA. El SESC es va crear mitjançant un conveni amb el Departament de Salut de la Generalitat de Catalunya, i ofereix suport als veterinaris oficials d'escorxadors en la seva responsabilitat sobre la destinació dels animals i de les carnes, tant en tot el que fa gestionar els concrets, de les quals 19 eren concrets telemàtics i 171 corresponien a un total de 47 centres laboratorials de necropsia.

**PROGRAMA**

Presentació de la Jornada Sr. Joaquim Segalés, CRISA/Dept. Sanitat i Anatomia Animal.	9.30 h
El Servei de Suport a Escorxadors (SESC) del CRISA Sr. Enric Vilà, CRISA.	9.40 h
Sessió Interactiva I: casos arribats al SESC • Síndrome de enterocolitis Sr. Alberto Marín, CRISA/Dept. Sanitat i Anatomia Animal. • Altres casos interessants Sr. Enric Vilà, CRISA. Modera: Sr. Joaquim Segalés. Participa: Sr. Alberto Marín, Dept. Sanitat i Anatomia Animal.	10.20 h
Pausa	11.30 h
Sessió Interactiva II: casos arribats al SESC • Síndrome de enterocolitis Sr. Manuel Pérez, CRISA. Modera: Sr. Joaquim Segalés. Participa: Sr. Miquel Nofre i Sr. Sergio López, CRISA.	12.00 h
Cloenda de la Jornada	12.40 h

**INSCRIPCIONS:** La jornada és gratuïta, però cal inscriure's prèviament movent al 93 81 81 81 (ext. 610) o a través del correu electrònic: [inscripcions@crisa.uab.cat](mailto:inscripcions@crisa.uab.cat). Persona de contacte: Sr. Enric Vilà, CRISA.

**LLOC DE REALITZACIÓ:** Sala d'Actes, Facultat de Veterinària de la UAB  
Camp Universitari Autònom, s/n  
08193 - CERDANYOLA DEL VALLES

**ORGANITZACIÓ:** CReSA<sup>9</sup>

**COL·LABORACIÓ:** UFB, IRTA, Departament de Sanitat i Anatomia Animal, UAB

PLANURAL  
 de l'Entorn i la Salut  
 1001 100



**ZOONOSIS EMERGENTS: FEBRE DEL VIRUS DEL NIL OCCIDENTAL**  
 Jornada tècnica  
 BELLATERRA, dimarts 15 de novembre 2011

**PRESENTACIÓ**  
 El virus del Nil Occidental es transmet mitjançant mosquits i manté el seu cicle zoonòtic en aïllats, però esporàdicament es pot manifestar en forma epidèmica i afectar a humans i animals. El brot a Andalusia en equis i en humans al 2010 i en equis al 2011 ha provocat certa alarma a Espanya tant en sanitat animal com en salut pública.

L'objectiu de la jornada és donar a conèixer la situació actual de la Febre del Nil Occidental entre del nord i especialment a Espanya, a més d'aprofundir en el funcionament de la vigilància d'aquesta malaltia i en els conceptes vectorials que es donen a Catalunya, així com apropar el seguiment que s'ha realitzat durant el recent brot de la febre del Nil Occidental a Andalusia.

**PROGRAMA**

Presentació de la Jornada Sr. Jordi Casal, CRISA/Dept. Sanitat i Anatomia Animal.	10.00 h
Febre del Nil Occidental: situació actual i plans de vigilància a Catalunya Sr. Ana Vila, CRISA.	10.10 h
Pausa	10.30 h
Control dels vectors transmissors de la Febre del Nil Occidental Sr. Carles Amador, Servei de Control de Mosquits del Consell Comarcal del Baix Llobregat.	11.20 h
Situació, evolució i epidemiologia de la Febre del Nil Occidental a Andalusia Sr. Manuel Fernández, cap de secció d'epidemiologia; i Sr. Juan Antonio Jaén, cap de servei de sanitat animal, Junta de Andalusia.	12.00 h
Conclusions i Cloenda de la Jornada	13.00 h

**INSCRIPCIONS:** La jornada és gratuïta, però cal inscriure's prèviament movent al 93 81 81 81 (ext. 610) o a través del correu electrònic: [inscripcions@crisa.uab.cat](mailto:inscripcions@crisa.uab.cat). Persona de contacte: Sr. Enric Vilà, CRISA.

**LLOC DE REALITZACIÓ:** Sala d'Actes de la Facultat de Veterinària de la UAB  
Camp Universitari Autònom, s/n  
08193 - CERDANYOLA DEL VALLES

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 1001 100



*Roundtable: Els casos del servei de suport a escorxadors (SESC)*



*Speakers: Zoonosis: febre del virus del Nil occidental*

### **Veterinary epidemiology course in Morocco**

With aim of improving the development of an animal health alert system, CReSA researchers offered a training course about epidemiological surveillance in Rabat (Morocco), during September 19 to 30. The course was supported by the Agencia Española de Cooperación Internacional (AECID).

Jordi Casal (Animal Health and Anatomy Department of the UAB) and Ana Alba, both CReSA researchers

(Veterinary epidemiology and risk analysis subprogram) offered in Rabat the training course called "Epidemiological surveillance, risk assessment and geographic information systems". Nineteen professionals from the Official Veterinary Services coming from different Moroccan regions participated in the course. The objectives of this program were:

- To proportionate the basis for the design, implementation and evaluation of a epidemiological surveillance system
- To be able to understand the basis and application of the most usual risk assessment models and mathematic models for diseases transmission
- To know the basic management of the geographic information system.

The course was coordinated by the Office National de Sécurité Sanitaire des Produits Alimentaires (ONSSA) for Morocco and Subdirección General de Salud de la Producción Primaria del Ministerio del Medio Ambiente y del Medio Rural y Marino (MARM) from Spain.



# Awards

## **PCV2 Research Projects Awarded to CRESA researchers**

For the fifth time, the European PCV2 Research Award sponsored by Boehringer Ingelheim funds research projects related to Porcine Circovirus Type 2 (PCV2) infection and associated diseases. Nine high quality research proposals were submitted from seven different countries (UK, Italy, Spain, Sweden, Denmark, Estonia, and France).

Research projects selected by the independent review board for the 2011 awards:

- **Evaluation of Porcine Circovirus type 2 (PCV2) eradication feasibility by massive vaccination of both sows and piglets** (Dr Marina Sibila, CRESA and Universitat Autònoma, Barcelona, Spain).
- **Effect of long term PCV2 systematic vaccination on viral evolution** (Dr Tuija Kekkarainen, CRESA and Univer-

sitat Autònoma, Barcelona, Spain).

- **Study of PCV2 transplacental transmission after intranasal infection** (Dr Beatrice Grasland, Anses – LERAPP laboratory, Ploufragan, France).

The 2011 European PCV2 research awards were recently presented to the successful investigators by the head of the independent review board, Professor Maurice Pensaert, former head of the Laboratory of Virology of the Ghent University in Belgium, and Dr Erick Lelouche, Head of Global Marketing Animal Health at Boehringer Ingelheim. The ceremony took place at the global headquarters of Boehringer Ingelheim in Ingelheim, Germany.

Boehringer Ingelheim, the leading company in PCV2 vaccines, intends to continuously support independent applied research in the field of PCV2 immunity, pathogenesis, epidemiology and inte-

raction with other (potential) pathogens. A maximum of three prizes, worth 25,000 euros each, are granted to European researchers every year, to advance scientific knowledge in these areas.

The European Porcine Circovirus (PCV2) Research Award is an annual award that recognizes research proposals in the area of applied immunological PCV2 research. The award has an independent review board with leading European scientists in applied porcine research reviewing the entries and deciding upon the winning proposals.



**Boehringer  
Ingelheim**

# Master in Virology

## **Master in Virology**

The objective of the Master (open to graduates from Life Sciences, Health Sciences, Experimental Sciences and Agro food Sciences) is to gain a clearly specialized perspective in order to work in research laboratories, hospitals and biotech companies. The Master in Virology is coordinated by the Universidad Complutense de Madrid (UCM) and benefits

from the collaboration of the *Sociedad Española de Virología* (SEV), the total participation of the UCM and the Universidad Politécnica de Madrid (UPM) and the active participation of specialized professors from other universities and research institutions in Spain: Universidad Complutense de Madrid ; Universidad Politécnica de Madrid; Sociedad Española de Virología; Instituto de Salud Carlos III ; Instituto

Nacional de Investigación y Tecnología Agraria y Alimentaria ; Centro de Biología Molecular Severo Ochoa ; Centro de Investigaciones Biológicas ; Centro Nacional de Biotecnología; Centre de Recerca en Sanitat Animal.

The students will be able to do practical work at the CRESA under the direction of researchers from the center (also Professors Masters lecturers).





## International visits

The CRESA received 50 international visits in 2010, coming from 10 different countries. The reasons for the visits were institucional, to attend seminars, research collaborations, business or internships:

### Jean Pierre Gorvel

Laratory Immunology and cell biology of pathogen/ host cell interactions  
Centre d'Immunologie Marseille-Luminy  
France

### Bryan Charleston

IAH Pirbright Laborator  
United Kingdom

### Zygmunt Pejsak

National Veterinary Institut  
Pulawy  
Poland

### Joe Crenshaw

APC Inc  
USA

### Massimo Amadori

Instituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia-Romagu  
Italy

### Lucas Vagnoni

INTA Castelar  
Argentina

### Andaç Kiliçkap, Burcu Dogan, Ipek Çoğal, Ipek Sevimli, Enikö Kiraly, Murat Perit Berzeg

Veterinary undergraduates,  
IVSA INSTANBUL  
Turkey

### Cihangir Dursun, Eren Kuter, Julide Vatansever, Metin Pekagirbas, Mustafa Önol, Tunç Altintas

Veterinary undergraduates,  
IVSA ANKARA  
Turkey

### Carmen García

Veterinary undergraduate  
Venezuela

### Birthe Hald

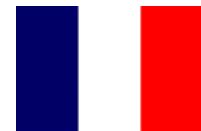
National Veterinary Institute,  
Technical University of Denmark  
Denmark

### Kjeld Lynge Madsen, Tina Sefsiek Hansen, Jens Gammegaard, Hans Madvig

Clausen, Jacob Hansen, Elo Knudsen, Hanne Kongsted  
CEVA Rosco Animal Health A/S Clients  
Denmark

### Iurchenia Aleksei, Presnyakov Victor, Krasnokutskaya Nelli, Khudyakov Andrey, Kapran Nina, Kirpichnikov Yury, Kurkin Victor, Simonov Alexander, Zueva Olga, Medvedev Nikolay, Lebedev Mikhail, Konovvalov Alexander, Konovvalova Vera, Stekolnikova Olga, Zakharova Natalia, Degtyarev Evgeny, Nogin Roman, Mikhaylova Tatiana, Shnychkina Uliana, Kolosova Tatyana, Mikhaylenko Alexander, Potekha Vktoriya, Tikhonov Georgy, Nekrasov Igor

S.P. Veterinaria clients  
Russia





# Website and press releases

## Users: a general view

87,614 visits/year

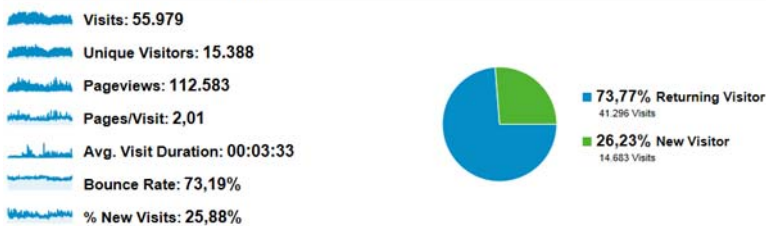
21,884 users

162,345 pages visited/year

116 countries/territories

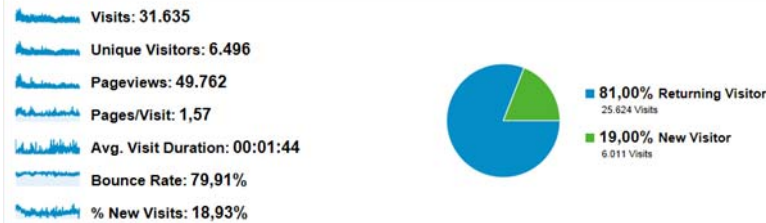
### Cresa.es statistics

15.388 usuarios han visitado este sitio.



### Cresa.cat statistics

6.496 usuarios han visitado este sitio.



## Top visitor countries

1	Spain	78.683
2	Sweden	554
3	United States	505
4	Netherlands	482
5	Colombia	473
6	Mexico	457
7	New Zealand	443
8	France	426
9	Italy	424
10	Australia	405
11	United Kingdom	374
12	Venezuela	352
13	Germany	335
14	Austria	315
15	Argentina	301
16	Brazil	255
17	Finland	235
18	Chile	214
19	Portugal	124
20	Peru	112
21	Denmark	108
22	Turkey	104
23	Cuba	98
24	Belgium	97
25	Canada	87

**CReSA**  
 Centro de Reseña en Sanitat Animal

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**ENLLAÇOS DIRECTES**

- Actualitat
- Personal
- On ens trobem ?
- Projectes
- Oferta tecnològica
- Serveis
- Ofertes de treball
- Contacte

**LES XIFRES D'UNA DECADA (2001-2010)**  
 44 tesis doctorals llegendes

**Actualitat**

- 25-10-2011 S'imparteix un curs sobre epidemiologia veterinària al Marroc. Del 19 al 30 de setembre, investigadors del CReSA van impartir un curs de formació en vigilància epidemiològica a Rabat (Marroc), amb l'objectiu de millorar el desenvolupament del sistema d'alerta en salut animal. El curs va tenir el recolzament de l'Agència Espanyola de Cooperació Internacional (AECDI). (llegir-ne més)
- 06-10-2011 L'eliminació de la tuberculosi bovina ha estat heterogènia a Espanya. Les campanyes de control dutes a terme des de 1956 no han aconseguit eradicar la tuberculosi bovina i s'han estancat entre el 1,6 i el 1,8% de ramats positius. Investigadors del CReSA i la UAB han estudiat l'èxit d'aquestes campanyes a tot el territori de l'estat i han conclòs que el patró d'eliminació de la malaltia no ha estat homogeni en el territori, sinó que hi ha zones en què la taxa d'eliminació ha estat més gran que en altres. (llegir-ne més)
- 30-09-2011 La FECYT concedeix un ajut de cultura científica i de la innovació al CReSA. La Fundació Espanyola per a la Ciència i Tecnologia (FECYT) ha concedit un ajut al CReSA per a finançar el seu programa anual d'activitats, dins la Xarxa d'Unitats de Cultura Científica i de la Innovació (UCC+i). (llegir-ne més)
- 23-09-2011 La forma de les ales és útil per a diferenciar espècies de *Culicoides*. La correcta identificació de les espècies de vectors és essencial per a la vigilància

**FINANÇAMENT CReSA**

**CReSAPIENS**

**CReSA TV**

**CReSA DIGITAL**  
 de subscripció gratuïta

**SESC**

## Press releases

39 news stories about the research and activities carried out by the CRESA were written and disseminated in 2011:

28-11-2011

### **Doctoral thesis about new vaccine vectors**

On December 2, 2011, Elisa Crisci, (PhD student of the CRESA) will present her doctoral thesis entitled "Immunogenic properties of calicivirus-like particles as vaccine vectors", directed by Dr Maria Montoya.

18-11-2011

### **Doctoral thesis about pathogenesis of avian influenza virus**

On November 25 2011, Aida Chaves (PhD student of the CRESA) will defend her doctoral thesis entitled "Study of the pathogenesis of highly pathogenic influenza A virus (H7N1) infection in chickens, with special focus in the central nervous system", directed by Dr Natàlia Majó.

14-11-2011

### **CRESA scientists: close to you, an exhibition**

An itinerant exhibition for the general public on research in animal health is shown from 8 to 18 November, 2011 at the Veterinary School, UAB Campus (Bellaterra, Barcelona). After this period, the exhibition will be offered to schools, libraries and other institutions to be used during the 2011-2012 planning year.

02-11-2011

### **Published a study that evaluated vaccination campaigns against avian influenza**

Researchers from the Centre de Recerca en Sanitat Animal (CRESA) participated in a study published in Clinical and Vaccine Immunology with the objective to evaluate two vaccina-

tion campaigns carried out between 2006 and 2008 in zoos and wildlife centers. To date, this is the most comprehensive study reported concerning number of animals and species.

25-10-2011

### **Veterinary epidemiology course offered in Morocco**

With aim of improving the development of an animal health alert system, CRESA researchers offered a training course about epidemiological surveillance in Rabat (Morocco), during September 19 to 30. The course was supported by the Agencia Española de Cooperación Internacional (AECID).

06-10-2011

### **Elimination of bovine tuberculosis has been heterogeneous in Spain**

Despite control campaigns carried out since 1956, Bovine tuberculosis eradication has not yet been achieved and prevalence has remained between 1.6% and 1.8%. Researchers from the CRESA and UAB studied the success of these campaigns in Spain and concluded that the elimination pattern was not homogeneous throughout Spain and the ratio of elimination was different among zones.

30-09-2011

### **CRESA is granted by the FECYT for activities of scientific culture and innovation**

CRESA has been granted by the Spanish Foundation for the Science and Technology (FECYT) to carry out the annual program of activities within the Network of Scientific Culture and Innovation Units (UCC+i).

23-09-2011

### **Usefulness of wing form in differentiating *Culicoides* species**

The correct identification of vector species is considered an essential issue for entomological

surveillance and therefore to understand the epidemiology of arthropod borne diseases, as is the case for Bluetongue disease. Researchers of the CRESA have described significant differences in wing form among *Culicoides* species by means of geometric morphometric techniques in the Journal of Medical Entomology.

15-09-2011

### **Doctoral thesis about Torque teno virus**

Next September 21st, Laura Martínez Guinó, PhD student of the CRESA, will present her doctoral thesis entitled "New insights into the biology of Torque Teno sus viruses", led by Tuija Kekarainen and Joaquim Segalés.

16-08-2011

### ***Streptococcus suis* polysaccharide interferes with dendritic cell functions**

A study by scientists at the University of Montreal in collaboration with scientists at CRESA has determined that the capsular polysaccharides of *Streptococcus suis* are an important virulence factor involved in the functions of porcine dendritic cells.

09-08-2011

### **Seminar for cooperative veterinarians at CRESA**

Last 6th July, Laila Darwich, Sergio López and Gerard Martin offered the seminar called "Swine viral diseases: PRRS, circovirus and influenza". This event was organized by the CRESA, in association with the Federació de Cooperatives Agràries de Catalunya (FCAC) and the IRTA.



07-07-2011

### **Implication of the host nucleus during African swine fever virus (ASFV) infection**

Researchers of the CReSA have demonstrated the relevance of the host nucleus during ASFV infection. These discoveries might have important implications when searching for antiviral strategies against ASF that is currently causing real economical problems in many sub-Saharan countries and knocking at the door of the EU.

04-07-2011

### **Services commissioned by the Generalitat de Catalunya**

During 2010, CReSA carried out different actions for the departments of the Generalitat de Catalunya with animal health and public health responsibilities. The 2010 Annual Report is already available at the CReSA website.

23-06-2011

### **More than 1000 attendants at the international symposium organized by CReSA**

More than 1000 people attended the 6th International Symposium on Emerging and Re-emerging Pig Diseases held at the Palau de Congressos de Catalunya, Barcelona (Spain). During 4 days, veterinarians and scientists from around the world presented the latest and more relevant information on emerging and re-emerging diseases of swine, with special emphasis on porcine reproductive and respiratory syndrome (PRRS), porcine circovirus diseases (PCVD) and swine influenza (SI).

21-06-2011

### **CReSAPIENS, new science divulgation journal**

CReSAPIENS is a science divulgation journal aimed to divulgate the knowledge and results of research generated at the CReSA. This initiative has been

funded by the FECYT, through the Call for Aid for the promotion of scientific culture and innovation 2010.

07-06-2011

### **Professor Zygmunt Pejsak visited the CReSA**

Last 17th May 2011, Professor Pejsak, from the National Veterinary Research Institute (Pulawy, Poland) gave a lecture in CReSA entitled "Swine production and organization of research on pig health control in Poland". He showed updated pig production figures and explained the research system for animal health in Poland.

16-05-2011

### **DNA immunization of pigs with foot-and-mouth disease virus minigenes**

One of the main challenges in animal health research is developing new and more effective and safer recombinant vaccines against foot-and-mouth disease (FMD), one of the most contagious and economically devastating diseases for ungulates. Researchers of the CReSA, INIA and CBMSO have published in Virus Research the last results obtained with DNA vaccines.

11-05-2011

### **From genetic characterization to Glässer's disease vaccine development**

"Polynucleotides of Haemophilus parasuis and its use" is a CReSA's patent (WO/2007/039070) that has allowed the selection of new antigen candidates for vaccination against Glässer's disease. Those antigens were selected using a reverse vaccinology approach.

03-05-2011

### **Future prospects in the development of vaccines against RNA viruses**

The meeting organized by the European network EU-ROPRRSNET will take place in

Barcelona (10-11 June 2011). Future prospects for developing vaccines against the Porcine Respiratory and Reproductive Syndrome Virus (PRRSV) will be presented. The deadline for the abstracts submissions is May 15th, 2011.

27-04-2011

### **Role of T interferon-gamma in protection against classical swine fever (CSF)**

A study carried out by researchers of the CReSA demonstrates that interferon-gamma induction correlates with protection by DNA vaccine expressing E2 glycoprotein against classical swine fever virus infection in domestic pigs.

19-04-2011

### **Quantitative assessment of the probability of bluetongue virus overwintering by horizontal transmission: application to Germany**

CReSA has developed a model of stochastic risk assessment in order to assess the probability that the bluetongue virus persists after winter. To put it into practice, was implemented in Germany between 2006 and 2007.

12-04-2011

### **A study shows the high susceptibility of the partridge against the highly pathogenic H7N1 strain**

A group of researchers from CReSA studied the susceptibility of the red-legged partridge to two strains of avian influenza virus and showed that this species may contribute to the spread of a potential local outbreak of the virus.



07-04-2011

### **CReSA TV expands the audiovisual contents**

"Biosecurity for the research", "Mosquito-borne diseases" and "Foodborne diseases: Salmonella and Campylobacter" are the three new videos which CReSA has published this week in its own channel, CReSA TV.

5-03-2011

### **African swine fever virus is plenty of energy**

Dr José Manuel Sánchez-Vizcaino gave a seminar the last 18th of March in Bellaterra after visiting CReSA. He talked about the current epidemiological situation of the African swine fever virus (ASFV) in Africa, the Caucasus and the Russian Federation.

14-03-2011

### **CReSA researchers present the last applied research in pigs**

During the XIII UAB Swine Conference, researchers of the CReSA presented the last discoveries on swine influenza epidemiology, genetic and immunological variability of the PRRSV, studies of Haemophilus parasuis colonization and new vaccine developments against Glässer's disease and African swine fever.

10-03-2011

### **The new General Director of Research visits the CReSA**

Last March 2, 2011, Josep Maria Martorell, General Director of Research of the Generalitat de Catalunya, and Carles Jaime, Vice-rector for Strategic Projects and Planning of the Universitat Autònoma de Barcelona (UAB), met the members of CReSA Board.

09-03-2011

### **The feather pulp, an ideal sample for the early detection of highly pathogenic avian influenza viruses in**

### **poultry**

A study realized by CReSA's researchers determined feather pulp as a perfect sample to identify cases of highly pathogenic avian influenza viruses in poultry infected.

21-02-2011

### **CReSA will collaborate in the avian influenza surveillance of wild birds for one year more**

The Department of Agriculture, Livestock, Fisheries, Food and Natural Environment of the Generalitat de Catalunya has published the annual surveillance programme of avian influenza. CReSA collaborates since 2006.

16-02-2011

### **Emerging2011: Young person's bursary**

The 6th International Symposium on Emerging and Re-emerging Pig Diseases will offer Young Person's Bursaries to the presenting authors of the accepted abstracts who are aged 35 or under and are still in training (enrolled in a PhD program).

11-02-2011

### **Seminar for cooperative veterinarians at CReSA**

Last 25th February, Dr Joaquim Segalés and Dr Laila Darwich offered the seminar called "Process for a definitive diagnosis: from the clinical story to the lab". This event was organized by the CReSA, in association with the Federació de Cooperatives Agràries de Catalunya (FCAC) and the IRTA.

09-02-2011

### **CReSA becomes part of ENIVD**

ENIVD is a European network of collaboration that pretends to be an organization that aims to put as much effort on viral infectious diseases imported that threaten the population.

04-02-2011

### **CReSA tv: a digital channel to bring science to everybody**

CReSA has launched its own channel where you can watch digital audiovisual content produced by the centre. CReSA tv will feature informative videos for all ages that will explain the main research carried out by the centre.

01-02-2011

### **Pathologists from CReSA have developed an atlas of avian necropsy**

"Atlas de la necropsia aviar. Diagnóstico macroscópico y toma de muestras" is the name of the book written by two researchers from CReSA. Roser Dolz and Natalia Majó have developed a detailed and accurate guide to avian necropsy.

17-01-2011

### **CReSA takes part at the COPIT meeting**

On November 19th, 2010 was held the COPIT meeting. The Eureka building of the Universitat Autònoma de Barcelona was the meeting point of different companies and research centers in order to establish a first contact and create attachment points for possible collaborations.

12-01-2011

### **A low cost experimental vaccine protects pigs against circovirus**

Researchers from CReSA (Dr Fernando Rodriguez and Dr Joaquim Segalés) have published an article in the Vaccine journal demonstrating the capability of Trichoplusia ni insect larvae to produce the recombinant capsid protein (Cap) of porcine circovirus type 2 (PCV2) and the potential use of this protein to obtain a low cost experimental vaccine against this virus.

## Estudiantes del CReSA: investigadores del futuro

CReSA | 05 enero 2011  
El Centre de Recerca en Sanitat Animal (CReSA) invierte en la formación de profesionales procedentes de diversos campos de la investigación. Ellos mismos nos hablan de los estudios que realizan, las cualidades necesarias para investigar, las motivaciones, el futuro,... De primera mano conocemos cómo serán los investigadores del futuro.

## Una vacuna experimental de bajo coste protege los cerdos frente a la circovirus

CReSA | 13 enero 2011 12:54  
Los Drs. Fernando Rodríguez y Joaquim Segalés, del CReSA, han publicado un artículo en la revista Vaccine que demuestra la utilización de la larva del insecto *Trichoplusia ni* para producir la proteína recombinante de la cápside del circovirus porcino tipo 2 (PCV2) y el uso de esta proteína en una vacuna experimental frente a PCV2 con un coste de producción muy reducido.

## La perdiz roja puede contribuir a la propagación del virus de la gripe aviar

CReSA | 13 abril 2011 12:08  
Un grupo de investigadores del Centro de Investigación en Salud Animal (CReSA) estudiaron la susceptibilidad de la perdiz roja a dos cepas del virus de la gripe aviar y demostraron que esta especie puede contribuir a la propagación de un potencial brote local del virus.

## La 'enfermedad de la frontera' afecta al rebeco pirenaico desde hace dos décadas

SINC | 20 abril 2011 13:31  
Fuente: VETERINARY MICROBIOLOGY 149 (1-2): 17-22, 21 de abril de 2011. Autor principal: Ignasi Marco, UAB.

## De la caracterización genética al desarrollo de la vacuna de la enfermedad de Glässer

CReSA | 13 mayo 2011 18:32  
Una patente del Centre de Recerca en Sanitat Animal (CReSA) ha permitido la selección de nuevos antígenos candidatos para la vacunación contra la enfermedad de Glässer que sufren los cerdos. Estos antígenos se seleccionaron mediante un enfoque de vacunología inversa.

## Avances contra el virus de la peste porcina africana

CReSA | 08 julio 2011 11:50  
Investigadores del Centre de Recerca en Sanitat Animal (CReSA) han demostrado que el núcleo de la célula huésped está más implicado de lo que se creía en la infección con el virus de la peste porcina africana (VPPA). Este descubrimiento podría tener implicaciones importantes en la búsqueda de estrategias antivirales contra un virus que causa graves problemas económicos en muchos países del ...

## La forma de las alas es útil para diferenciar especies de Culicoides

CReSA | 23 septiembre 2011 14:51  
La correcta identificación de las especies de vectores es esencial para la vigilancia entomológica y para entender la epidemiología de las enfermedades transmitidas por artrópodos, como la enfermedad de la lengua azul. Investigadores del CReSA han descrito en la revista Journal of Medical Entomology diferencias significativas en la forma alar de distintas especies de Culicoides empleando...

## La eliminación de la tuberculosis bovina ha sido heterogénea en España

CReSA | 06 octubre 2011 15:42  
Las campañas de control lleva-

das a cabo desde 1956 no han conseguido erradicar la tuberculosis bovina y se ha estancado entre el 1,6 y el 1,8% de rebaños positivos. Investigadores del CReSA y la UAB han estudiado el éxito de estas campañas en todo el territorio del estado y han concluido que el patrón de eliminación de la enfermedad no ha sido homogéneo en el territorio, sino que existen zonas...

## Descartan nuevas epidemias de Morbillivirus en delfines listados del Mediterráneo

UV / SINC | 17 noviembre 2011 09:39  
Investigadores del Institut Cavallès de la Universitat de València, de la Universitat Autònoma de Barcelona, del Centre Recerca en Sanitat Animal y del CRAM descubren que la infección por Morbillivirus queda latente en algunos ejemplares de forma crónica, por ello, pueden darse muertes puntuales en años posteriores a epidemias. Los datos, publicados en el último número de la revista Diseases...



# Activities for students

## Escolab 2011

From February to May 2010, CReSA offered visits within the initiative Escolab 2011. In total, 305 secondary level students from 14 different schools have been able to know the center:

18/01/2011

**Escola Municipal Treball**  
CFGS de laboratori de diagnòstic  
Granollers  
20 students

09/02/2011

**Col·legi Sant Gabriel**  
2n Batxillerat  
Viladecans  
15 students

10/02/2011

**Escola Pia de Mataró**  
Batxillerat Biologia  
Mataró  
48 students

16/02/2011

**IES Martí Dot**  
Batxillerat Biologia  
Sant Feliu Llobregat  
15 students

23/02/2011

**Col·legi Natzaret**  
Batxillerat Biologia  
Espluques de Llobregat  
22 students

02/03/2011

**IES de Sales**  
Batxillerat Biologia  
Viladecans  
17 students

08/03/2011

**Escola Pia de Caldes**  
Batxillerat  
Caldes de Montbui  
9 students

16/03/2011

**Oak House School**  
Batxillerat Biologia  
Barcelona  
16 students

23/03/2011

**IES Miquel Martí i Pol**  
CFGS Anatomia Patològica  
Cornellà de Llobregat  
25 students

30/03/2011

**IES Jaume Balmes**  
Batxillerat Biologia (2n)  
Barcelona  
28 students

06/04/2011

**IES Miquel Martí i Pol**  
CFGS Laboratori de Diagnòstic Clínic  
Cornellà de Llobregat  
30 students

13/04/2011

**IES Lliçà**  
Batxillerat Biologia  
Lliçà d'Amunt  
20 students

20/04/2011

**Escola Municipal Trabajo**  
Batxillerat Biologia  
Granollers  
20 students

27/04/2011

**Escola Municipal Trabajo**  
Cicle Formatiu Superior /  
Microbiologia  
Granollers





## Science week 2011

On the occasion of the 15th edition of Science Week (7-20m November 2011) the CReSA received a total of 8 groups:

21/11/2011  
**Escola Pia Mataró**  
 2º Bachillerato  
 Mataró  
 40 students

22/11/2011  
**IES Roger Llúria**  
 2º CFGS Laboratorios  
 Barcelona  
 29 students  
 23/11/2011

**Escola Sant Ignasi Sarrià**  
 2º Bachillerato  
 Barcelona  
 15 students

24/11/2011  
**Escola Pia Mataró**  
 2º Bachillerato  
 Mataró  
 36 students

The screenshot shows the UAB website interface. At the top, there is a navigation bar with 'A A A', 'Contrast +/-', 'Castellano | English', 'Mapa web', 'Directori', and a search bar labeled 'CERCADOR' with the placeholder 'Introdueix el text'. Below this is a header section with the UAB logo and navigation links: 'ESTUDIAR', 'INVESTIGAR', 'VIURE', and 'CONEIX LA UAB'. To the right of these links is the text 'Els vídeos de la UAB' and an image of a video camera. Below the header is a horizontal menu with categories: 'Divulgació científica', 'Jornades i Conferències', 'Vídeos institucionals', 'UAB Campus', 'UAB als mitjans', and 'Destacats mitjans'. The main content area features a video player with a red 'Televisió' tab selected. The video player shows a woman speaking in front of a screen displaying a building. To the right of the video player is a search bar labeled 'Cercador' with a 'Paraula' input field, 'De:' and 'Fins:' dropdown menus for 'Any' and 'Mes', and a 'Cercar' button. Below the search bar is a section titled 'Els més vistos' (Most viewed) with four video thumbnails and titles: 'Pràctiques d'Acolliment Lingüístic', 'L'antimant', 'BTY: La UAB acull 125 alumnes de primària', and 'La primatóloga Jane Goodall, a la UAB'.

*Barcelona TV visited the CReSA during the Science Week and broadcasted a Reportage about us on the program Connexió Barcelona.*

## Program ARGÓ

The Program Argó UAB offers the possibility to know centers of research, projects

and investigators of the UAB. In 2011, 8 students took part of this program .

# Divulgation

## CReSAPIENS, new science divulgation

CReSAPIENS is a science divulgation journal aimed to divulgate the knowledge and results of research generated at the CReSA. This initiative has been funded by the FECYT, through the Call for Aid for the promotion of scientific culture and innovation 2010. CReSAPIENS has been created with the aim of approaching science to society, trying to make understandable issues only reserved for the scientific community until now. The Editorial Board of CReSAPIENS is a multidisciplinary team that has been working enthusiastically to create this divulgation tool in order to disseminate the scientific knowledge in animal health and advances achieved by the CReSA researchers.

In the first issue we dealt with a topic that generates a growing concern: the emerging viral diseases as a consequence, among other factors, of global migratory movements, climate change, animal movements and deforestation; and due in part

to globalization. We cannot forget cases such as the Asian bird flu outbreaks in 2005 and social alarm caused by the pandemic flu in 2009.



The first number of CReSADIGITAL received more than 510 subscribers.

## CReSADIGITAL: 476 subscribers

One of the priorities of the CReSA is the transfer of knowledge and scientific advances to the animal health sector and the diffusion of the results of its research. Therefore, the CReSA has created CReSADIGITAL, a news bulletin that offers a summary of the most impor-

tant news, studies, publications and activities shown on the center's website. CReSADIGITAL is aimed at professionals related to the agri-food sector and the animal health area, including veterinarians, researchers, students, producers, associations, companies and institu-

tions, as well as anybody interested in life sciences. 2 bulletins were published in 2011:

CReSADIGITAL 16  
April 2011

CReSADIGITAL 17  
September 2011

## CReSA TV and YouTube

The digital channel called CReSA TV was funded by a project funded by the Comissionat per a Universitats i Recerca of the Generalitat de Catalunya. To reach all audiences, the aim of this channel is to offer content related to the activity of the CReSA in an informative and comprehensive way. Five different video clips have been recorded that seek to solve the eternal problem of understanding science: they can be understood by the general public. In 2011, these video clips were uploaded at YouTube:

- CReSA students: future researchers
- Do you know about flu?
- Biosecurity for research
- Mosquito-borne diseases
- Foodborne diseases



**Toxiinfecciones alimentarias: salmonella y campylobacter**  
investigación se hace en el CReSA para conocer mejor estas bacterias. ... cresa uab ... salmonella campylobacter ciencia "sanidad animal" CReSA ...  
de cresa uab | hace 1 año | Visto 2611 veces

**Enfermedades transmitidas por mosquitos**  
enfermedades exóticas y muy lejanas. ¿Pero son realmente tan lejanas? ... cresa uab ... enfermedades mosquitos chinkingunya dengue "fiebre amarilla" ...  
de cresa uab | hace 1 año | Visto 2247 veces

**Estudiantes del CReSA: investigadores del futuro**  
De primera mano conocemos cómo son los investigadores del futuro. ... cresa uab ... Estudiantes doctorado investigación CReSA veterinario ...  
de cresa uab | hace 1 año | Visto 128 veces

**Bioseguridad para investigar**  
con microorganismos que pueden llegar a ser altamente patógenos. ... cresa uab ... CReSA veterinaria bioseguridad investigar investigación ...  
de cresa uab | hace 1 año | Visto 382 veces

**¿Conocemos la gripe?**  
... cresa uab ... ¿Conocemos la gripe? ...  
de cresa uab | hace 1 año | Visto 134 veces

## CReSA scientists: close to you, an exhibition

An itinerant exhibition on research in animal health was aimed at the general public and pretended to show the animal health research carried out by the CReSA investigators. Moreover, a book showing the information of this exhibition was developed. This exhibition was funded by the Spanish Foundation for the Science and Technology (FECYT).

Some of the topics include:

- Animals, pathogens and biosafety
- Researchers, students and technicians
- The "flu"
- Mosquito-borne diseases
- Food toxiinfecciones
- "Mad cows" and the enigmatic prions
- Hemorrhagic pig diseases

- From genetic characterization to "universal" vaccine development
- Tuberculosis eradication
- Bluetongue and mosquitoes.

The exhibition was shown:  
- 8 to 18 November, 2011 at the Veterinary School, UAB Campus (Bellaterra, Barcelona)  
- 28 November-8 December, 2011 at the Escola Daina (Olesa de Montserrat, Barcelona)

After this period, the exhibition will be offered to schools, libraries and other institutions to be used during the 2011-2012 planning year.



## Publications: books, materials and reports



*CRESA research contributions to the International Symposium on Emerging and Re-emerging Pig Diseases 2011.*



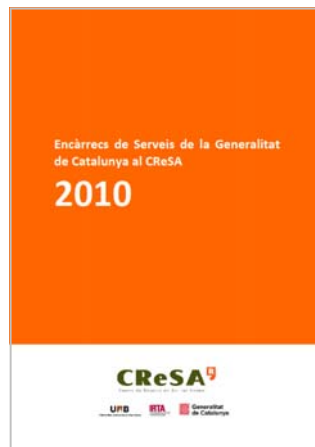
*Book chapter: Rodríguez-González, E. Ciencia y tecnología, ¿en qué piensan los jóvenes 2.0. En: Percepción social de la ciencia y la tecnología 2010, FECYT, 2011, págs. 203-238.*



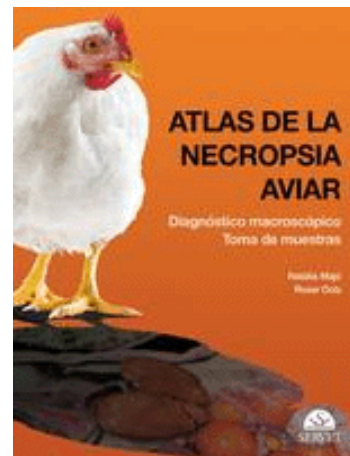
*Booklet: Científicos del CRESA: más cerca de ti*



*CRESA Annual Report 2010*



*Encàrrecs de Serveis de la Generalitat de Catalunya 2010*



*Book: Majó N, Dolz R. Atlas de la necropsia aviar. Diagnóstico macroscópico y toma de muestras. Sponsored by Merial.*

## Associations and networks

Consell Català de la Comunicació Científica (C4)

Associació Catalana de Comunicació Científica (ACCC)

Plataforma Vet+i



Con el apoyo de:



**UAB IRTA**

 **Generalitat  
de Catalunya**

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