2011 Annual Report
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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 biocontainment (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.
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.
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  

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

**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 Luis Ortega Mora**  
Spain  
Universidad Complutense de Madrid (UCM)
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 m².

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, termocyclers, PCR sample extraction, electrophoresis, entomology, ultrafreezing, equipment, preparation of reagents, etc.

The level 3 biocontainment unit

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 m² 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, Silvia
(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 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, Concepción
Prieto Martin, 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.

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

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 Communication)

Josep Rexach Fumanya (Communication technician)

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, Virginia

Badiola Sáiz, Ignacio

Ballester Devis, Maria

Bensaid, Albert Moisés

Busquets Martí, Núria

Casal Fàbrega, Jordi

Cerdá Cuéllar, Marta

Darji, Ayub

Darwich Soliva, Laila

De la Torre Martínez, Eugenia

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, Maria

Napp Avelli, Ernesto

Nofrarías Espadamala, Miquel

Núñez Garrote, Jose Ignacio

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, Fernando

Rosell Bellsola, Rosa

Segalés Coma, Joaquim

Sibila Vidal, Marina

Talavera Forcades, Sandra
A large team of BSL2 laboratory technicians provides essential support for research and development.

Technicians

Aloy Escudero, Núria Ayats Murillo, Teresa Cano Carrasco, Esmeralda Cervera Muñoz, Zoraida Córdoba Muñoz, Lorena Espinar Guardaño, Maria Galofré Milà, Núria González Oliver, Judit Huerta Medina, Eva Llorens Segalés, Anna López Jiménez, Rosa Mª Martín Fernández, Maite Moreno Bustos, Mariano Muñoz Calvo, Iván Muñoz Campanya, Marta Navarro Toro, Nuria Navas Sánchez, Maria Jesús Ozaez Puerto, Laura Pérez Maillo, Mónica Pérez Rodriguez, Diego Pérez Simó, Marta Pujol Lucas, Núria Riquelme Guerrero, Cristina Rivas Adán, Raquel Serrano del Pozo, Erika Valle García, Rosa Mª Valle González, Marta

PhD Students


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
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 Porci 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 educational 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

<table>
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<tr>
<th>BODY</th>
<th>RESEARCH PROJECTS</th>
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<td>TOTAL</td>
<td>738.045</td>
<td>353.099</td>
<td>43.690</td>
<td>1.134.834</td>
</tr>
</tbody>
</table>

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

* UAB and IRTA also includes contribution for staff.
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 inmunológi- cos 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 patogenia 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 implica- dos en la inmunopatogenicidad viral  
BIO2008-04487-C03-03  
IP CReSA: Mariano Domingo  
Awarded: 2008  
Duration: 3 years  
End: 31/12/2011

Estudio de los determi- nantes de la barrera de transmisión en *Oryctola- gus, Canus y Gallus* mediante modelos de replica- ción 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 químicas  
AGL 2010-22200-C02-01  
IP CReSA: María Montoya  
Awarded: 2009  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013

Patogenia de enfermeda- des víricas porcinas  
CONSORIDER 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

Evaluacion de consumos de antimicrobianos como factores de riesgo relacionados con la aparicion de resistencia a cefalosporinas en animales destinados al consumo  
AGL2011-28836  
IP: Lourdes García Migura  
Awarded: 2011  
Duration: 3 years  
Start: 01/01/2011  
End: 31/12/2013
### 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 (Porrscon)**  
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

**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 Pages

### 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

### 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**  
DURATION: 2 years  
Start: 17/01/2012  
End: 16/01/2014

### SGR Research Groups

**Immunologia veterinària**  
SGR2009-EMD04212 (funded)  
IP: Enric Mateu

**Patogènia d’infeccions bacterianes**  
SGR 2009-VA042377 (non-funded)  
IP: Virginia Aragón

**Patogènia d’infeccions víriques**  
SGR2009-JS042702 (funded)  
IP: Joaquim Segalés

**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 + extension
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 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-P10/01923
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

Nuevos procedimientos para el diagnóstico y caracterización del virus A (H1N1)v pandémico, esenciales para mejorar la capacidad de la red RE-LEG, 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

Estudio comparativo de la respuesta inmune frente al virus gripe 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
Other projects

Programa anual de actividades de la Unidad de Comunicación el CReSA; un acercamiento a la sociedad
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

Demostación 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

Services for DAAM

Pla de vigilància del virus del Nil Occidental a zones considerades de risc
CReSA 13017
IP CReSA: Anna Alba

Vigilància entomològica de la Llengua Blava
CReSA 13016
IP CReSA: Nitu Pagès

Prestació de Serveis d’anàlisi virològics
CReSA 13032
IP CReSA: Rosa Rosell

Assessorament en el control de tuberculosi en el bovi i el cabrum
CReSA 13011
IP CReSA: Bernat Pérez

Estudi problems 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 epidemiològica 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

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Summary of Peer reviewed papers 2011

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78.9% (60/76) of the scientific publications of the CReSA in 2011 were placed in the first quartile.

68.4% (52/76) of the scientific publications of the CReSA in 2011 were placed in the Veterinary Sciences category.
Research lines
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 System of Catalonia is structured around five large areas: Vegetal Production, Global Change and Environment, 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 Domínguez. The classification of the research activities and subprograms carried out by the CRESA was recently reorganised.

Program: Animal Health
(Mariano Domínguez)

Subprogram: Veterinary epidemiology and risk assessment
ETREMUS
(Irach Casal)

Subprogram: Bacterial and parasitic infections and resistance to antimicrobials
BAOPAS
(Ignacio Badiola)

Subprogram: Transboundary viral infections
ETIQUES
(Albert Bensaid)

Subprogram: Endemic viral infections
EIDCMOVR
(Joaquim Segalés)

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

Research lines

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.
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 re-mugants 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)


BACPAR subprogram

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 mucosal 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
Judit 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 hyopneumoniae, 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

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 neosporis 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 dela Merced

Researchers and PhD students of the BACTERESP research line.

Researcher and PhD student of the ENDO-PAR research line.
ZOOOTIC 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 differences 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 expression. 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**

**Evalúación 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 cephalosporins 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 β-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*.  

BACPAR subprogram

**Main results**
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 differential 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 mycobacteriaal 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 Neosporoses

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 Agriculture, 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 that 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 CReSA: 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, amoxycillin, 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 Cerda

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 Cerda

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 recognized 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 according 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.
Peer reviewed papers (ISI Citation Index)


EXOTIQUES subprogram

Transboundary viral infections

Coordinator: Albert Moisés Bensaid
albert.bensaid@cresa.uab.cat

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. Socioeconomic 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 pathogenicity, 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 include 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 authochtonous 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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Laboratory technicians
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PhD students
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Researchers and PhD students of the ARTROPOVIR line of research.
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, NA-DIR 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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Researchers and PhD students of the ASFAVIRUS line of research.
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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Researchers and PhD student of the PESTIVIRUS line of research.
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 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.

Researchers
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EXOTIQUES subprogram

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 expected on strengthening 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 encephalitis.
- 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 aims 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, viroemia 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.
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 regions 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.
**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 (INMUNOPRRS)**

**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**

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**PhD students**

Mariona Gimeno Terradellas  
Liudmila Kuzemtseva
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.

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 pathogenesis 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
Maria 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.

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Researchers and PhD students of the INFLUPORCINA line of research.
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 forward:
- 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) exhort 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 vaccines 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) 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 thought, most of the infections to date 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 vilurencia del virus gripe A(H1N1) 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 proper ties, 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.
Publications


Other projects and networks
Animal Infectiology Facilities

NADIR: The Network of Animal Infectiology Facilities
IP CReSA: 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 presenting 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)
CReSA - 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 - Veterinaerinstitutionet (Denmark)
AS VESO - Veterinaermedisinsk oppdragssenter (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)
European Network for Diagnostics of "Imported" Viral Diseases (ENIVD)

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 there citizens.

**The ENIVD members meeting.**

**Understanding and Combating PRRS**

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

IP CReSA: Enric Mateu

EuroPPRSnet is a 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 multidisciplinary 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 established 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-nenovirus (TTV) and Toroviruses (ToV).

Participants
The aim of this program of 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)
  Responsible: Mariano Domingo Álvarez

Centro de Biología Molecular (CBMSO-CSIC)
  Responsible: Francisco Sobrino Castelló

Centro Nacional de Biotecnología (CNB-CSIC)
  Responsible: Dolores Rodríguez Aguirre

Centro de Investigación en Sanidad Animal (CISA-INIA)
  Responsible: Alejandro Brun Torre

Departamento de Biotecnología (Biotecnología-INIA)
  Responsible: Francisco Javier Domínguez Juncal

Departamento de Biotecnología (Biotecnología-INIA)
  Responsible: José Ángel Martínez Escrivano

Universidad Complutense de Madrid (UCM)
  Responsible: 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 production. 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)


Services for the Generalitat de Catalunya and private companies
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 Catalonian 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.
Surveillance for avian influenza in wild birds in Catalonia

Programa de vigilància d’influència 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 influence 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 implemented 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 intradermotuberculosis 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-γ 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 an 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 moths 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 Entomologic 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’anàlisis 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 Teritorial 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.

Transmissible spongiform encephalopathies

Diagnòstic del pla de vigilància de les Encefalopaties Espingiformes 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 system 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 presentation 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.

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 provide 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
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 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

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**Clients in 2011**
ADISSEO FRANCE S.A.S
ANDRÉS PINTALUBA S.A.
APC EUROPE
BIOBÉRICA
BOEHRINGER INGELHEIM VET-MEDICA GMBH
CEVA SANTE ANIMALE S.A
CLINOB 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.
Doctoral thesis and research works

Doctoral thesis

Immunogenic properties of Calicivirus-like particles as vaccine vectors
Elisa Crisci
Director: Maria Montoya González

New insights into the biology of Torque teno sus viruses
Laura Martínez-Guinó
Director: Tuija Kekarainen, Joaquim Segalés Coma

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

Estudio de la neosporosis bovina en ganado lechero de Venezuela
Nelitza Linarez
Director: Sonia Almería de la Merced

Infection studies with chamois border disease virus in Pyrenean chamois, sheep and pig
Oscar Cabezón
Director: Joaquim Segalés Coma, Ignasi Marco Sánchez

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

Model d’infecció en Aedes albopictus amb virus Chikungunya a través d’aigua A
ndreu 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 Z con el método de inmunoperoxidasa en monocapa de cultivo (IPMA)
Emanuela Pileri
Director: Joaquim Segalés Coma

Immunomodulatory effects of silver nanoparticles in porcine bone marrow derived dendritic cells in vitro
Silvia Saballs Dalmau
Director: Maria Montoya González

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 Z 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.
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.

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.
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 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 (lunches, 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.
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 historia clínica al laboratori
25/01/2011

Epidemiologia aplicada a les granges porcines
10/05/2011

Patologia vírica del porc: PRRS, circovirosi i influència
6/07/2011

Patologia respiratòria i digestiva bacteriana del porc
8/11/2011

XIII Jornadas 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.
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.
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).
- **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 Pennaert, 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 interaction 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.

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 institutional, 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 Laboratory
United Kingdom

Zygmunt Pejsak
National Veterinary Insititute
Pulawy
Poland

Joe Crenshaw
APC Inc
USA

Massimo Amadori
Instituto Zooprofilattico Sperimentale della Lombardia e dell’Emilia-Romagui
Italy

Lucas Vagnoni
INTA Castelar
Argentina

Andaç Kiliçkap, Burcu Dogan, Ipek Çogal, Ipek Sevimli, Enikö Király, Murat Perit Berzeg
Veterinary undergraduates, IVSA INSTANBUL
Turkey

Cihangir Dursun, Eren Kuter, Julide Vatansever, Metin Pekagirbas, Mustafa Önlol, Tunç Altintas
Veterinary undergraduates, IVSA ANKARA
Turkey

Carmen García
Veterinary undergraduate
Venezuela

Birthe Hald
National Veterinary Institute,
Technical University of Denmark
Denmark

Kjeld Lyng Madsen, Tina Sefsiek Hansen, Jens Gam‐
melgaard, Hans Madvig Clausen, Jacob Hansen, Elo
Knudsen, Hanne Kongsted
CEVA Rosco Animal Health A/S Clients
Denmark

Iurchenia Aleksei, Presnya‐
kov Victor, Krasnokutskaya
Nelli, Khudyakov Andrey,
Kapran Nina, Kirpichnikov
Yury, Kurkin Victor, Simonov
Alexander, Zueva Olga, Med‐
vedev Nikolay, Lebedev Mikhail,
Konovvalov Alexander,
Konovvalova Vera, Stekolni‐
kova Olga, Zakharova Natalia,
Degtyarev Evgeny, Nogin
Roman, Mikhailova Tatiana,
Shnychkind Uliana, Kolosova
Tatyana, Mikhaylenko Alex‐
ander, Potekha Viktoriya,
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.

Visits: 55,979
Unique Visitors: 15,388
Pageviews: 112,583
Pages/Visit: 2.01
Avg. Visit Duration: 00:03:33
Bounce Rate: 73.19%
% New Visits: 25.88%

Cresa.cat statistics

6,496 usuarios han visitado este sitio.

Visits: 31,635
Unique Visitors: 6,496
Pageviews: 49,762
Pages/Visit: 1.57
Avg. Visit Duration: 00:01:44
Bounce Rate: 79.91%
% New Visits: 18.93%

Top visitor countries

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<td>Spain</td>
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<tr>
<td>Sweden</td>
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<tr>
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<td>505</td>
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<td>Netherlands</td>
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<td>United Kingdom</td>
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<td>Belgium</td>
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<td>Canada</td>
<td>87</td>
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</tbody>
</table>
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 calcivirus-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 vaccination 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 FE-CYT 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, Laia Darwich, Sergio López and Gerard Martín 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 (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 with CReSA that has been released this week in its own channel, CReSA TV.

5-03-2011
African swine fever virus is plenty of energy
Dr José Manuel Sánchez-Vizcaíno 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 parasinus colonization and new vaccine developments against Glasser’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 Rodríguez and Dr Joaquim Segalés) have published an article in the Vaccine journal demonstrating the capability of Trichoplusia ni insect larvae to produce the recombiant 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.

78
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 rebecho pirenaico desde hace dos décadas
SINC| 20 abril 2011 13:31

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 mundo.

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 llevadas 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 Catalan d’Estudis Avançats 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 las 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:

<table>
<thead>
<tr>
<th>Date</th>
<th>School</th>
<th>Level</th>
<th>Subject</th>
<th>Location</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/01/2011</td>
<td>Escola Municipal Treball</td>
<td>CFGS de laboratori de diagnòstic</td>
<td>Batxillerat Biologia</td>
<td>Granollers</td>
<td>20 students</td>
</tr>
<tr>
<td>09/02/2011</td>
<td>Col·legi Sant Gabriel</td>
<td>2n Batxillerat</td>
<td>Viladecans</td>
<td>Batxillerat Biologia</td>
<td>22 students</td>
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<td>10/02/2011</td>
<td>Escola Pia de Mataró</td>
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<tr>
<td>16/02/2011</td>
<td>IES Martí Dot</td>
<td>Batxillerat Biologia</td>
<td>Sant Feliu Llobregat</td>
<td>Batxillerat Biologia</td>
<td>9 students</td>
</tr>
<tr>
<td>23/02/2011</td>
<td>Col·legi Natzaret</td>
<td>Batxillerat Biologia</td>
<td>Espluques de Llobregat</td>
<td>Batxillerat Biologia</td>
<td>22 students</td>
</tr>
<tr>
<td>02/03/2011</td>
<td>IES de Sales</td>
<td>Batxillerat Biologia</td>
<td>Viladecans</td>
<td>Batxillerat Biologia</td>
<td>17 students</td>
</tr>
<tr>
<td>08/03/2011</td>
<td>Escola Pia de Caldes</td>
<td>Batxillerat Biologia</td>
<td>Caldes de Montbui</td>
<td>Batxillerat Biologia</td>
<td>9 students</td>
</tr>
<tr>
<td>16/03/2011</td>
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<td>Batxillerat Biologia</td>
<td>Barcelona</td>
<td>Batxillerat Biologia</td>
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</tr>
<tr>
<td>23/03/2011</td>
<td>IES Miquel Martí i Pol</td>
<td>CFGS Anatomia Patològica</td>
<td>Cornellà de Llobregat</td>
<td>Batxillerat Biologia</td>
<td>25 students</td>
</tr>
<tr>
<td>30/03/2011</td>
<td>IES Jaume Balmes</td>
<td>Batxillerat Biologia</td>
<td>Barcelona</td>
<td>Batxillerat Biologia</td>
<td>28 students</td>
</tr>
<tr>
<td>06/04/2011</td>
<td>IES Miquel Martí i Pol</td>
<td>CFGS Laboratori de Diagnòstic Clinic</td>
<td>Cornellà de Llobregat</td>
<td>Batxillerat Biologia</td>
<td>30 students</td>
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<td>Batxillerat Biologia</td>
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</tr>
<tr>
<td>20/04/2011</td>
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<td>27/04/2011</td>
<td>IES Miquel Martí i Pol</td>
<td>CFGS Laboratori de Diagnòstic Clinic</td>
<td>Cornellà de Llobregat</td>
<td>Batxillerat Biologia</td>
<td>25 students</td>
</tr>
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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

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.
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.

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 important 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 institutions, as well as anybody interested in life sciences.

2 bulletins were published in 2011:

CReSADIGITAL 16
April 2011

CReSADIGITAL 17
September 2011

The first number of CReSADIGITAL received more than 510 subscribers.
CReSA TV and YouTube

The digital channel called CReSA TV was funded by a project funded by the Co-missionat 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

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 toxicinfections
- “Mad cows” and the enigmatic prions
- Hemorrhagic pig diseases
- From genetic characterization to “universal” vaccine development
- Tuberculosis eradication
- Bluetongue and mosqui-toes

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.


CRESA Annual Report 2010

Encàrrecs de Serveide la Generalitat de Catalunya 2010


Associations and networks

Consell Català de la Comunicació Científica (C4)

Associació Catalana de Comunicació Científica (ACCC)

Plataforma Vet+i