EPIZONE THEME 5

Highlights of five years international collaboration on intervention strategies

To develop a platform to harmonise, standardise, improve and develop intervention strategies for epizootic diseases

Theme 5 Intervention Strategies Aims

- Europe under constant threat from number of current and emerging epizootic diseases
- Goal to reduce or interrupt outbreaks and provide alternative to mass slaughter
- For many of these diseases, vaccines are either not available or not fit for purpose –ie vaccines need to be safe, efficacious, DIVA strategy available
- Use of antivirals could limit spread in the period before immunity develops

Theme 5 Intervention strategies

50 participants from 13 partners

TL : Linda Dixon (IAH)

DTL: Marie-Frédérique Le Potier (Anses)

WP5.1: Vaccine technologies, Alejandro Brun (INIA)

WP5.2 : Host responses, T. Valhemkamp - G. Keil (FLI)

WP5.3 : Adjuvants and Immunomodulators, P. Heegard (DTU)

WP5.4 : Antivirals, F. Koenen - R. Vrancken (VAR)

4 Workpackages providing technology interaction groups which cross-cut pathogens.

Epizone network provides:

- A unique opportunity for scientists from different veterinary fields to interact. Many never meet because they work on different animal species or different pathogens in different countries. The opportunity to have a real "technology platform“ and to share high containment animal facilities and other resources.
- Theme 5 strategy:
- Working groups on specific pathogens which cross-cut technology driven workpackages
- Organisation of an annual theme 5 meeting

Some Networking highlights

- Participation in EU funded projects (ArboZoonet, ASFrisk, CSFgoDIVA, PigFlu)
- Joint review articles submitted (Vaccine, Virus Res, J. Virol, Arch Virol).
- Immunological tool box : bovine TLR2 and porcine MX1 (IC 5.6) available
- Establishment of core working groups (BTV, ASFV, RVFV)

Towards standardized animal models

- BlueTongue Virus and African Horse Sickness Interferon knock out mouse model to study vaccine strategies

Mice

Lambs/young adults

Gestating ewes

Rift Valley Fever : establish an infection model in sheep to test new vaccine developments, lead to the creation of ENCRAD network (IC 5.7)

Example of networking success (IC5.6): joint experiment on African swine fever

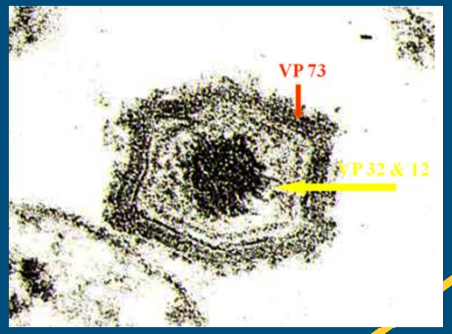
ASF challenge model:

Clinical scoring

Host responses:

Identification of T cell response inducing proteins

Acute phase protein



Safe Antigen delivery : viral vectors, DNA, recombinant proteins,…

Adjuvant & immunomodulators

Antiviral : ready to be challenged in vivo

DIVA Diagnostic

Outcomes from theme 5

Example of new antigen delivery , adjuvant,

Patent Application

Liposome/alginate method for fish oral immunization, patent application by CIRAD (Laurence Dedieu) and CISA-INIA (Carolina Tafalla).

A license for use of the protocol for oral immunization of fish has been established between the two partners (ongoing work)

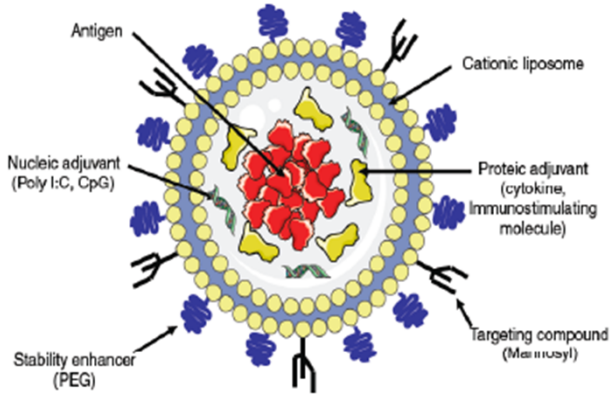


Fig. 1 Schematic diagram showing the possibility of incorporating various components with potential for improving vaccine delivery and efficacy into liposomes
From *Heegaard et al. 2011* Arch Virol. 156: 183-202.

WP5.4 Antivirals

Beginning of EPIZONE (2006)

Antiviral research virtually unexplored domain in vet. sciences

"The objectives of this WP were to:

create an inventory of possible targets for antivirals, share expertise and reagents that can be used to test the efficacy of antivirals in in vitro assays and by using in vivo models.

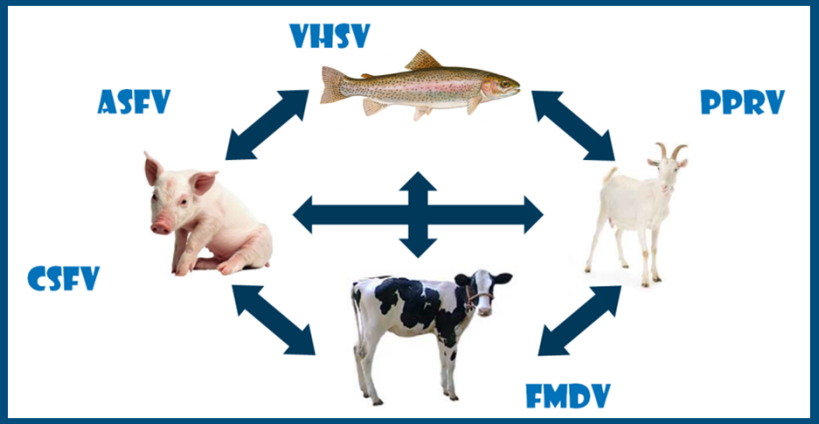
... the development of model systems for testing the in vivo efficacy of antiviral reagents"

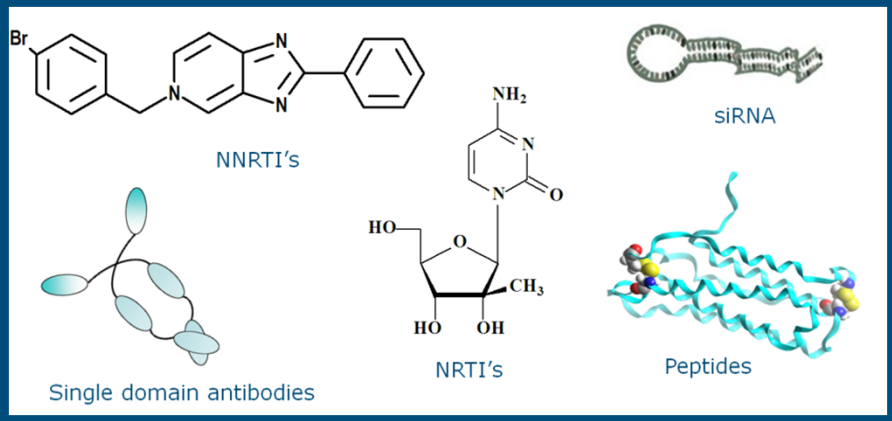
8 Partners, ~15 scientists

Now

Increase of visibility and awareness of antiviral research

Where fish virology meets pig virology, meets... Antivirals: a wide variety of agents





Proofs of concept : Small molecules can reduce replication and prevent transmission of CSFV to contact untreated pigs

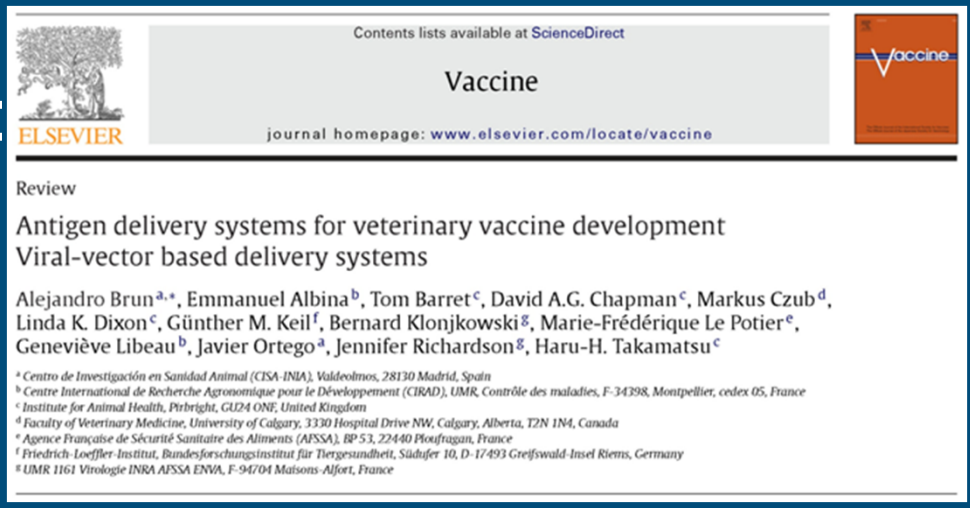
- NRL-meeting ASF/CSF 2010:

  Included in recommendations towards EC

Post-EPIZONE: Rethink potential role of antiviral treatment as alternative intervention strategy against infectious diseases in livestock

Knowledge dissemination

- Peer review papers:
  - WP5.1 : 17
  - WP5.2 : 12
  - WP5.3 : 25
  - WP5.4 : 25



Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Review

Antigen delivery systems for veterinary vaccine development
Viral-vector based delivery systems

Alejandro Brun[a,*], Emmanuel Albina[b], Tom Barret[c], David A.G. Chapman[c], Markus Czub[d], Linda K. Dixon[c], Günther M. Keil[f], Bernard Klonjkowski[g], Marie-Frédérique Le Potier[e], Geneviève Libeau[b], Javier Ortego[a], Jennifer Richardson[g], Haru-H. Takamatsu[c]

[a] Centro de Investigación en Sanidad Animal (CISA-INIA), Valdeolmos, 28130 Madrid, Spain
[b] Centre International de Recherche Agronomique pour le Développement (CIRAD), UMR, Contrôle des maladies, F-34398, Montpellier, cedex 05, France
[c] Institute for Animal Health, Pirbright, GU24 ONF, United Kingdom
[d] Faculty of Veterinary Medicine, University of Calgary, 3330 Hospital Drive NW, Calgary, Alberta, T2N 1N4, Canada
[e] Agence Française de Sécurité Sanitaire des Aliments (AFSSA), BP 53, 22440 Ploufragan, France
[f] Friedrich-Loeffler-Institut, Bundesforschungsinstitut für Tiergesundheit, Südufer 10, D-17493 Greifswald-Insel Riems, Germany
[g] UMR 1161 Virologie INRA AFSSA ENVA, F-94704 Maisons-Alfort, France

- Communication > 30 abstracts submitted to annual meeting

Joint review

Arch Virol. 2011 Feb;156(2):183-202. Adjuvants and delivery systems in veterinary vaccinology: current state and future developments.
Heegaard PM, Dedieu L, Johnson N, Le Potier MF, Mockey M, Mutinelli F, Vahlenkamp T, Vascellari M, Sørensen NS.
Review of the state of the art with selected examples of experimental data from veterinary animals

EPIZONE – Theme 5 meeting – 19 November 2009 -PARIS

Thank you to all theme 5 partners & EPIZONE coordinator