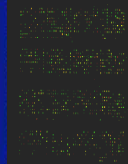




**EADGENE, a European Animal Disease Genomics  
Network of Excellence  
for Animal Health and Food Safety**



**M-H Pinard-van der Laan**

*pinard@jouy.inra.fr*

**INRA – Animal Genetics Division (France)**

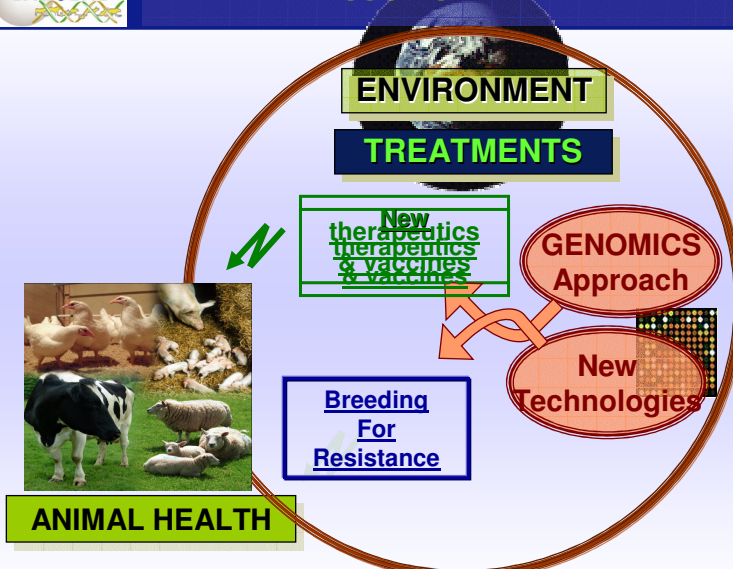
**EADGENE Coordinator**



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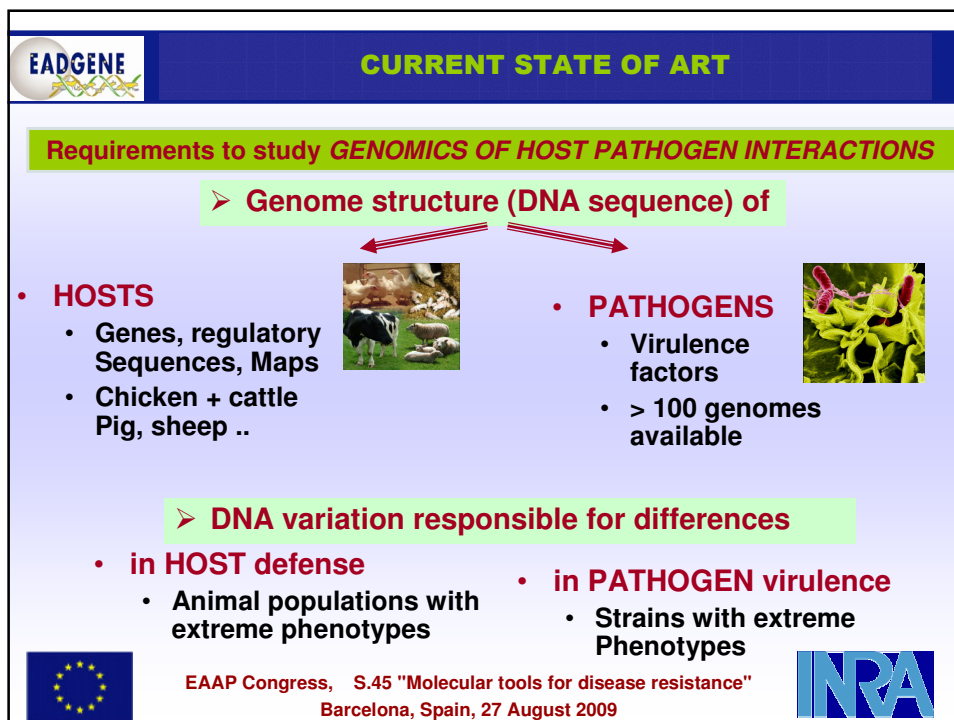
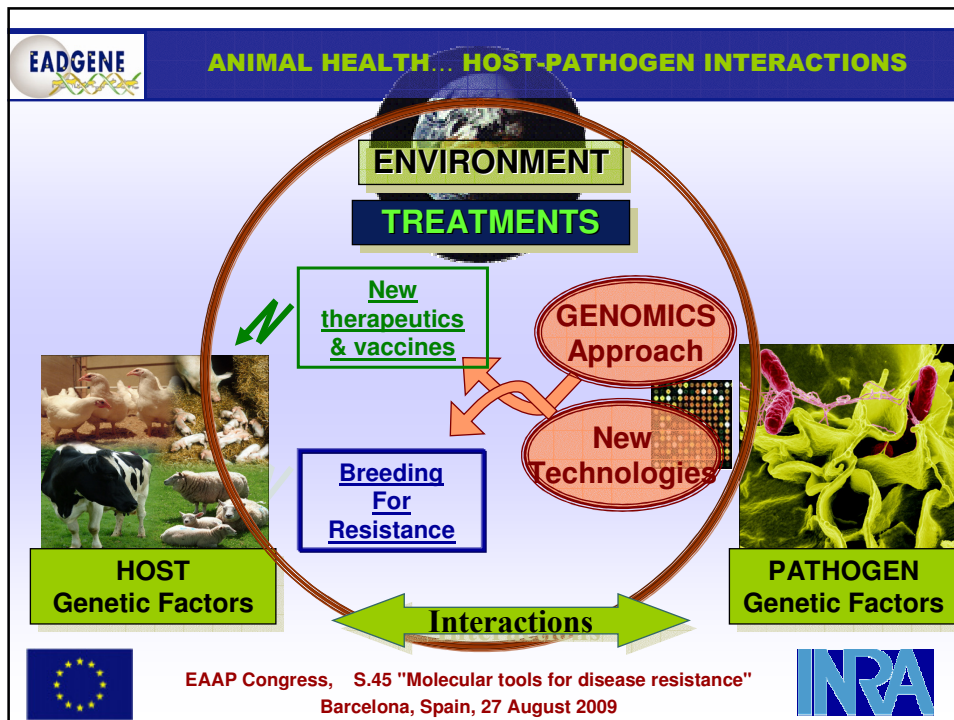


**ISSUE OF ANIMAL HEALTH**



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## CURRENT STATE OF ART

Requirements to study *GENOMICS OF HOST PATHOGEN INTERACTIONS*

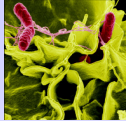
- Genome structure (DNA sequence)
- DNA variation responsible for differences
- Biological function of



?

INTERACTIONS !!

?



- **HOSTS GENES**
  - Mechanisms of defense, proteins involved, interplay between processes

- **VIRULENCE GENES**
  - Mechanisms of virulence, proteins involved



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## POTENTIAL FOR NEW APPLICATION



?

INTERACTIONS !!

?



- **HOSTS GENES**
  - *Improved knowledge on virulence factors*

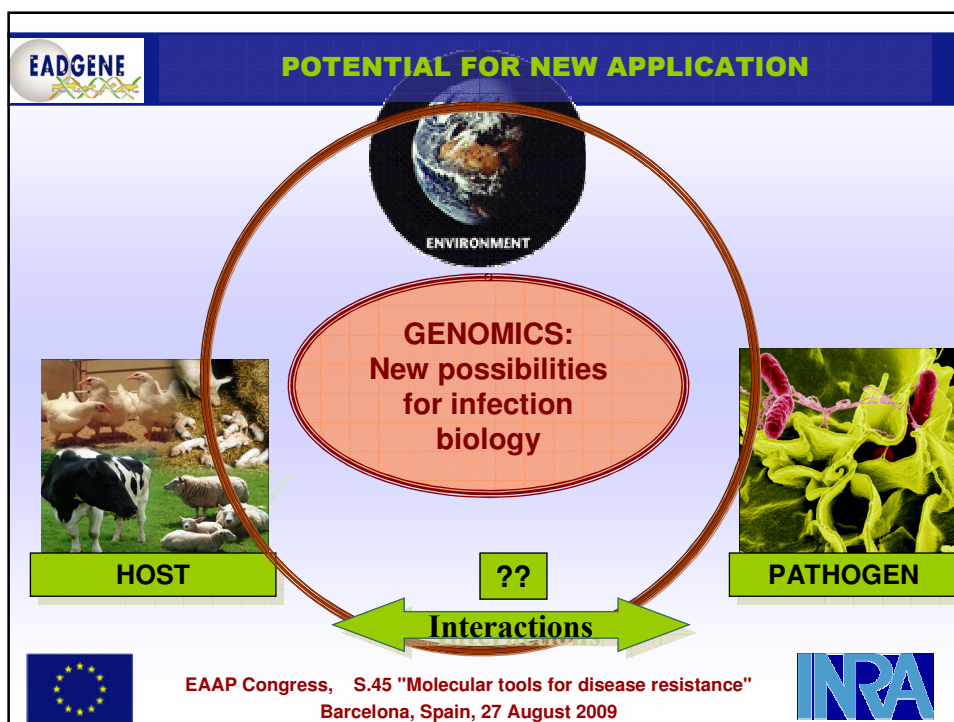
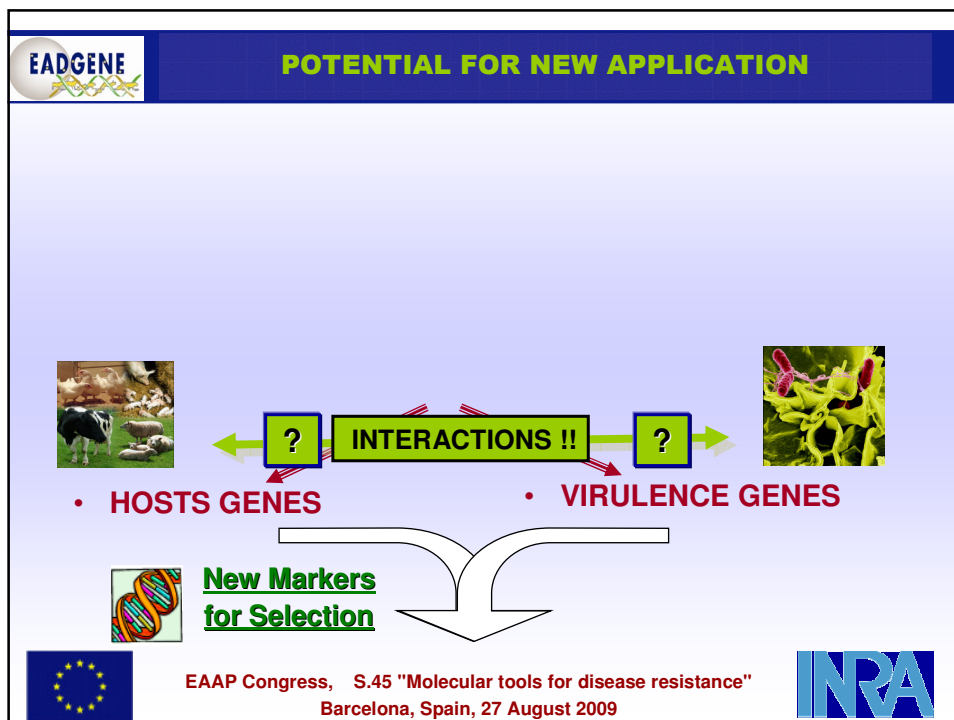
- **VIRULENCE GENES**
  - *Improved knowledge on virulence factors*

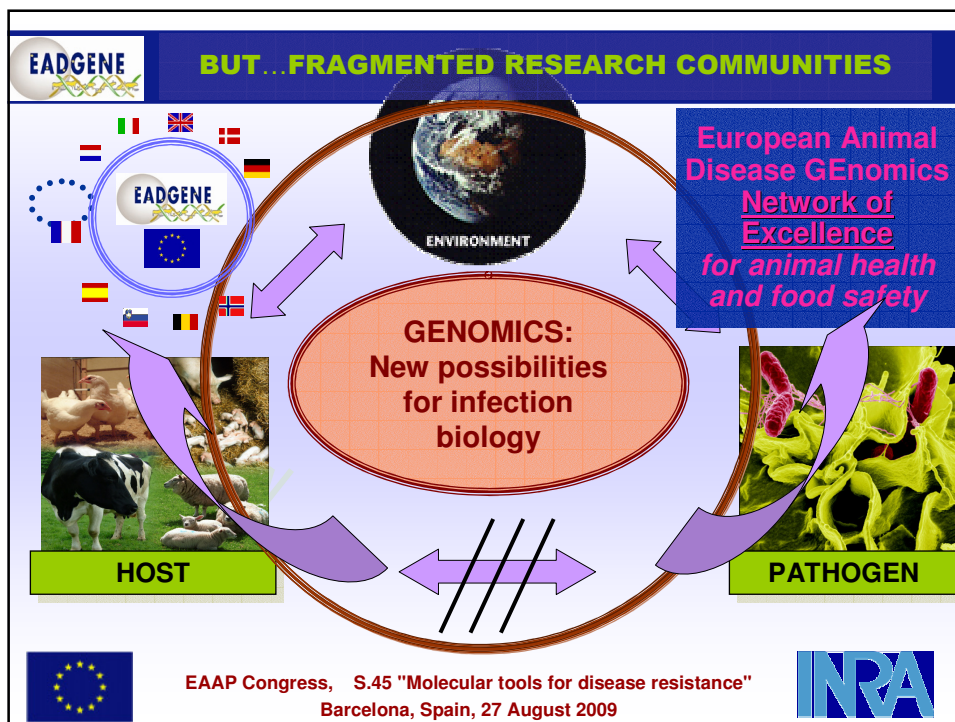
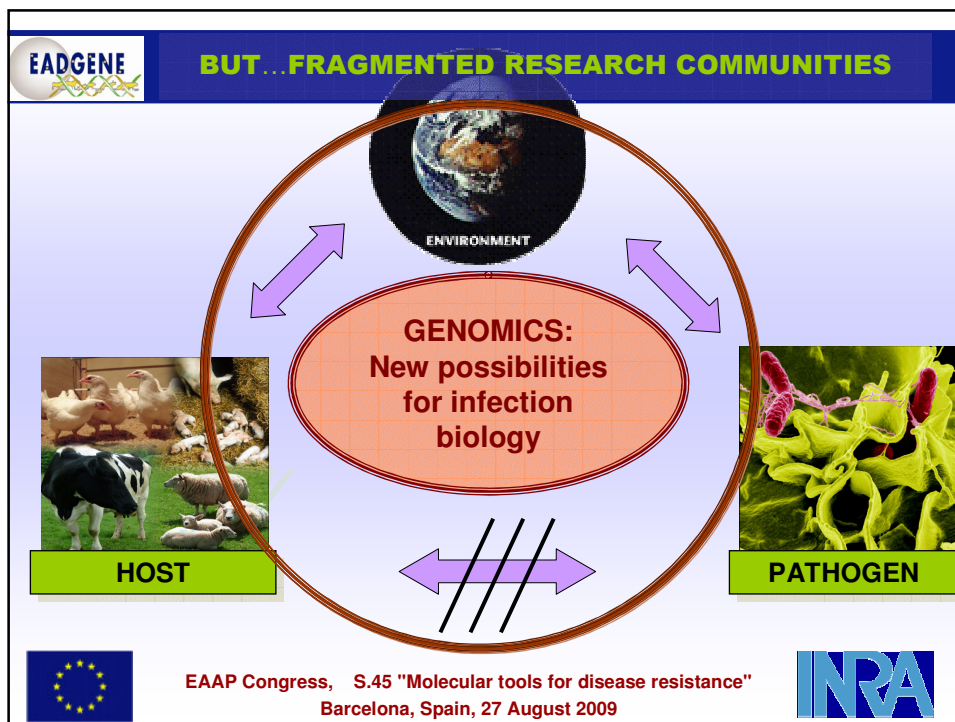


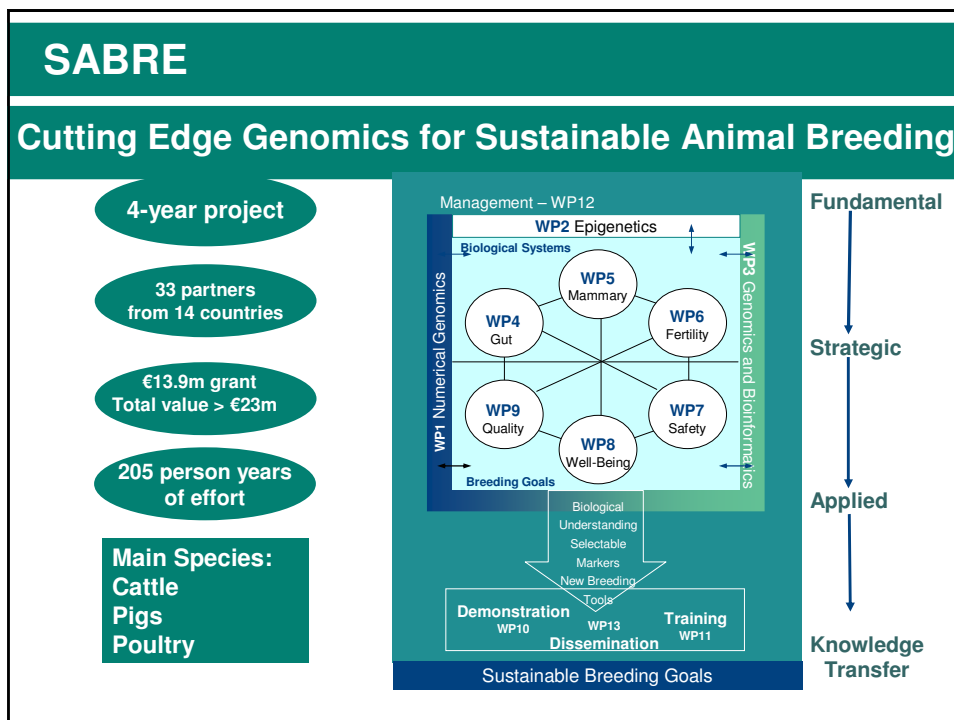
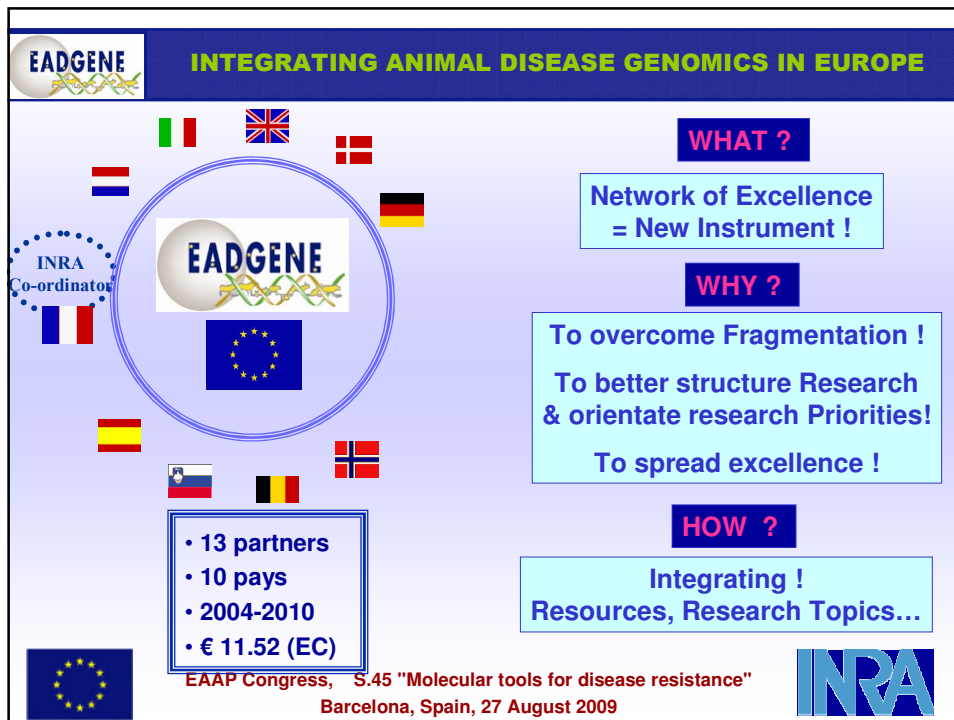
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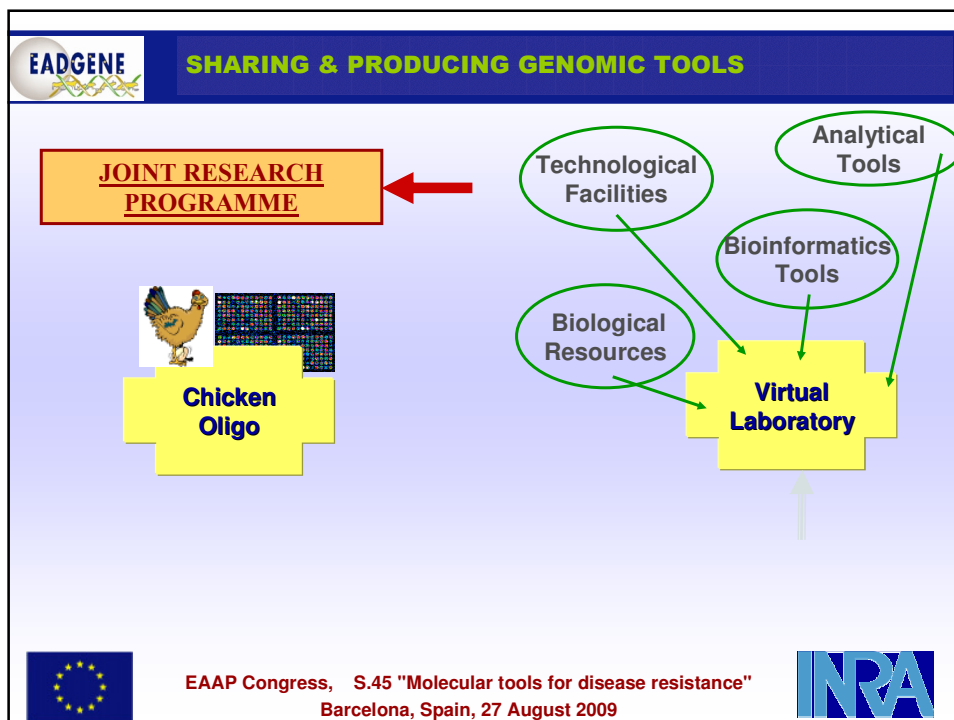
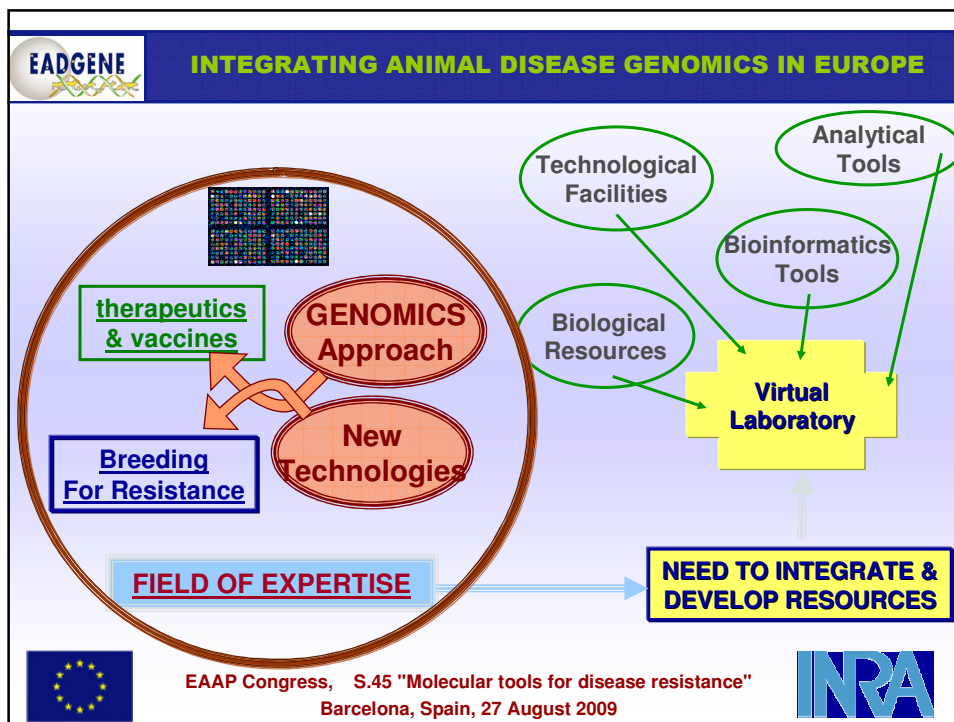


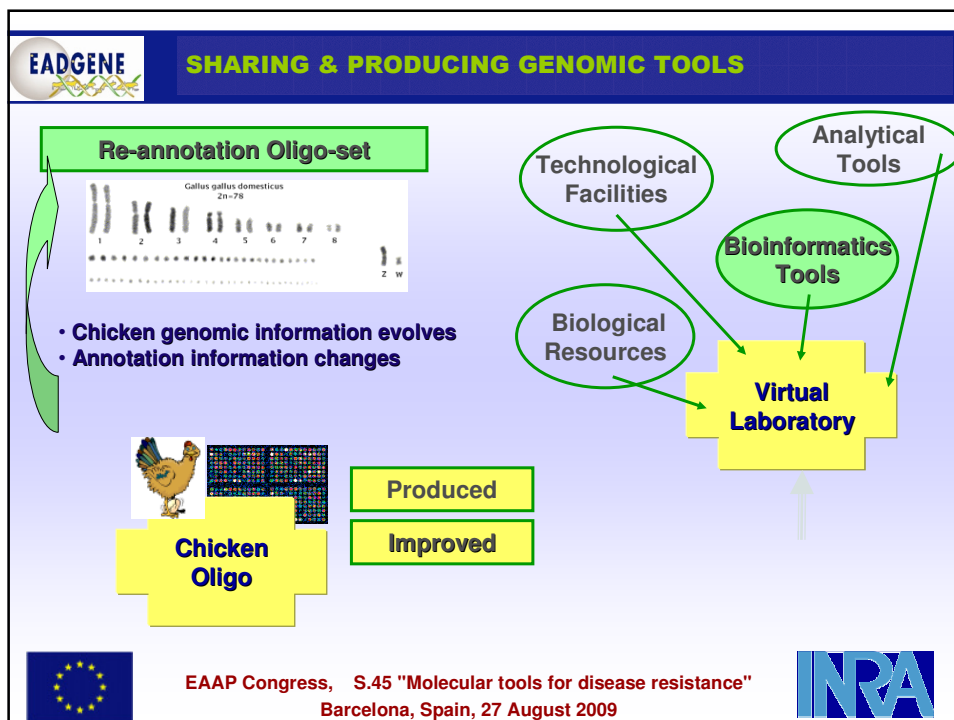
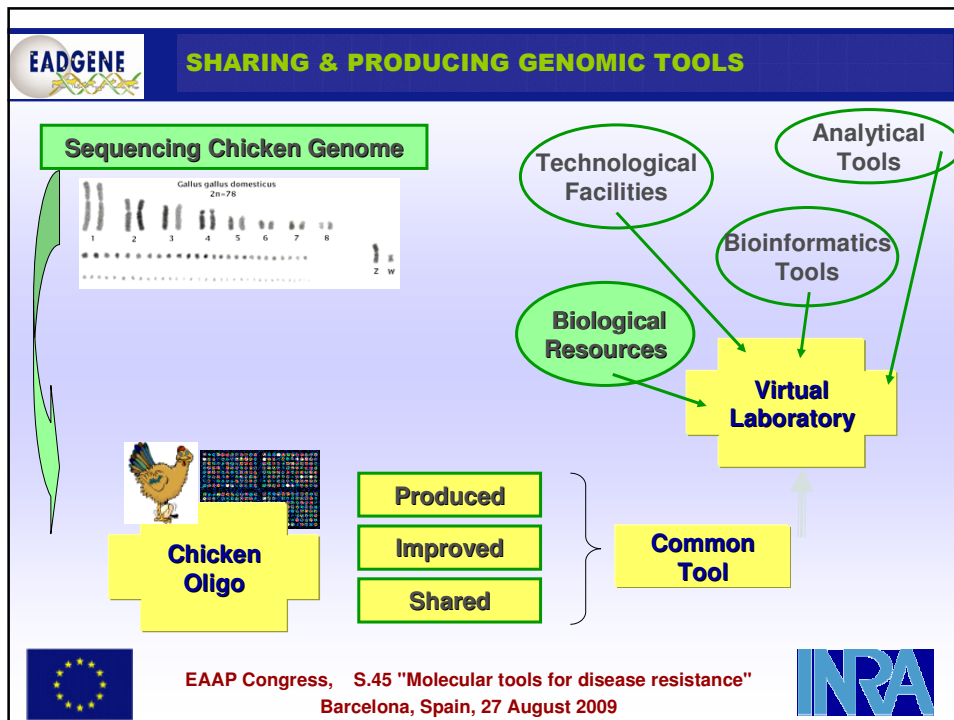




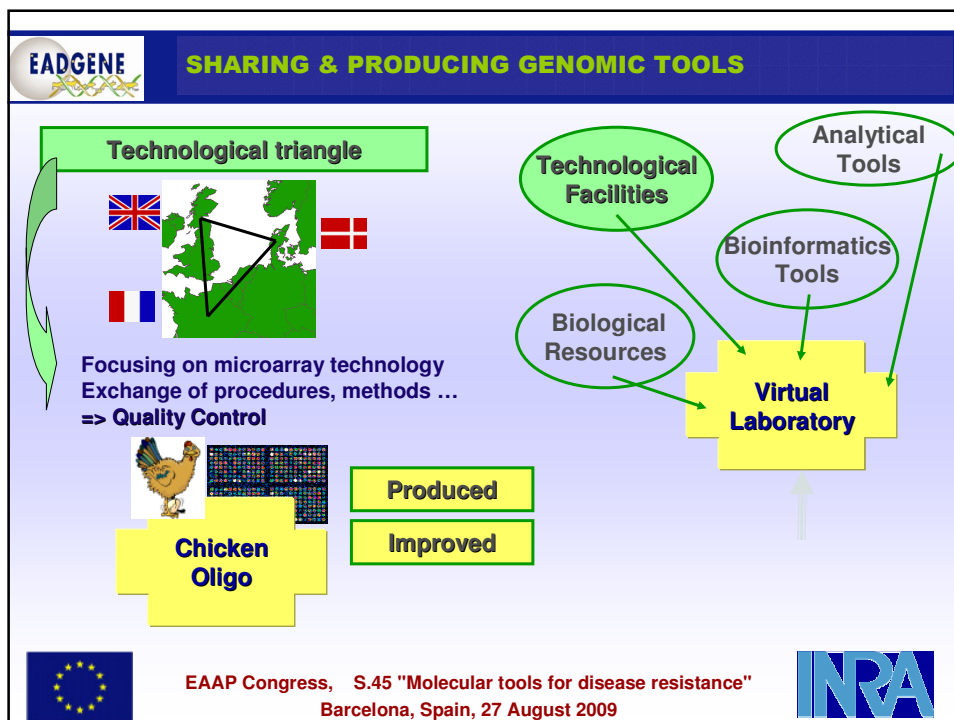
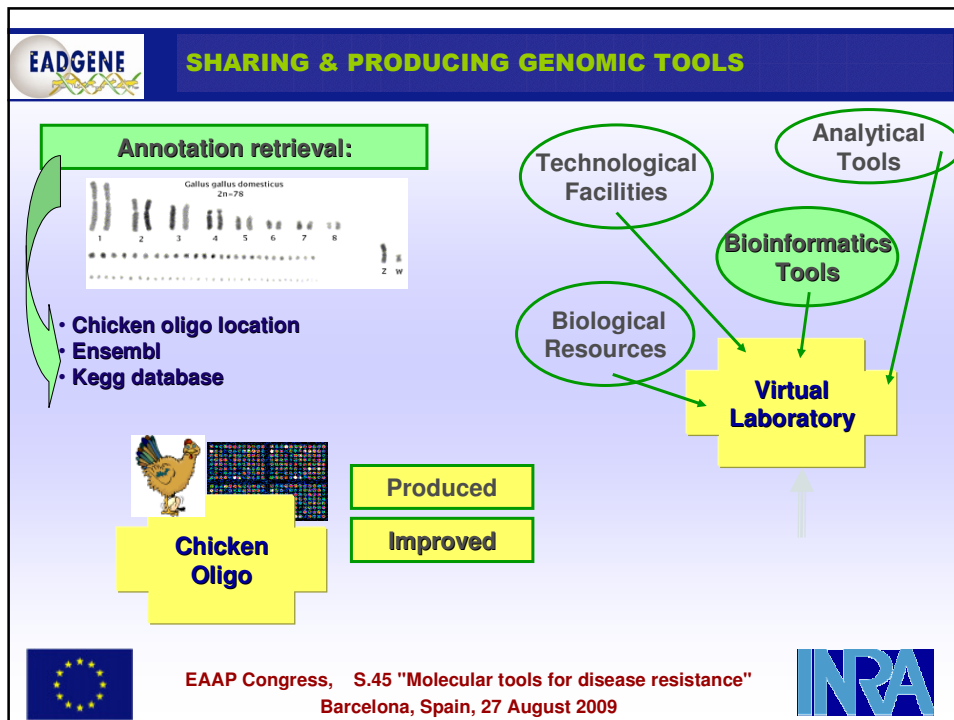


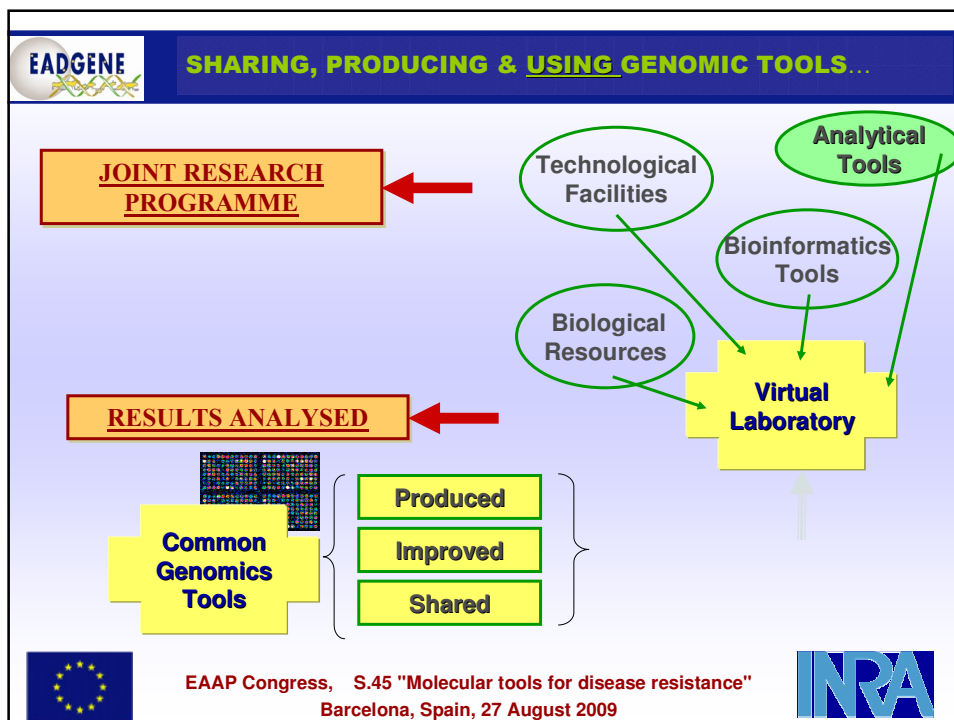
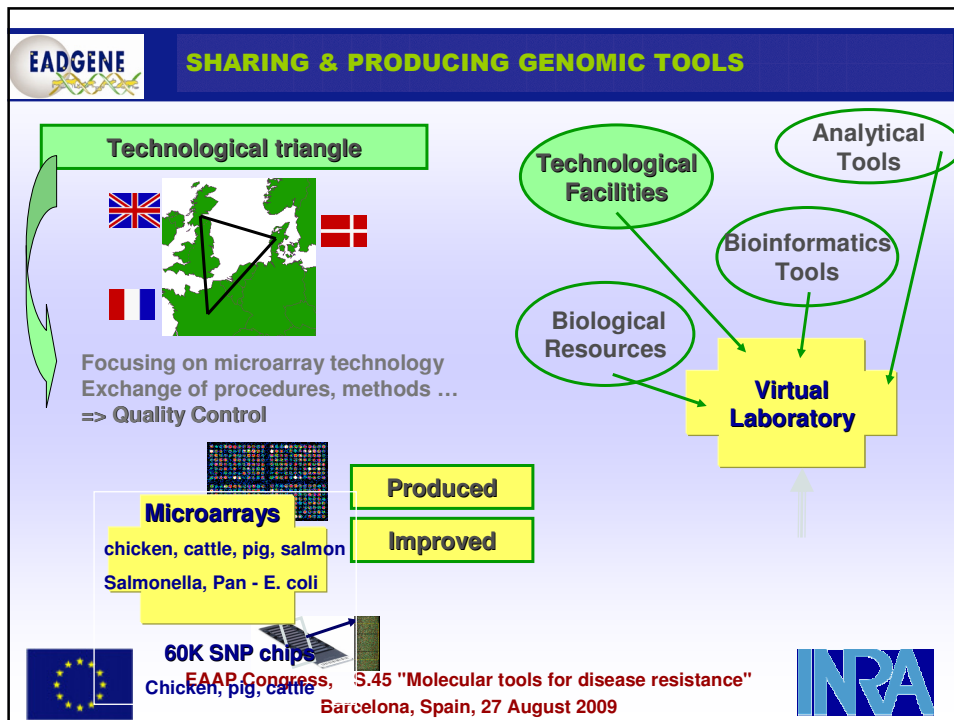


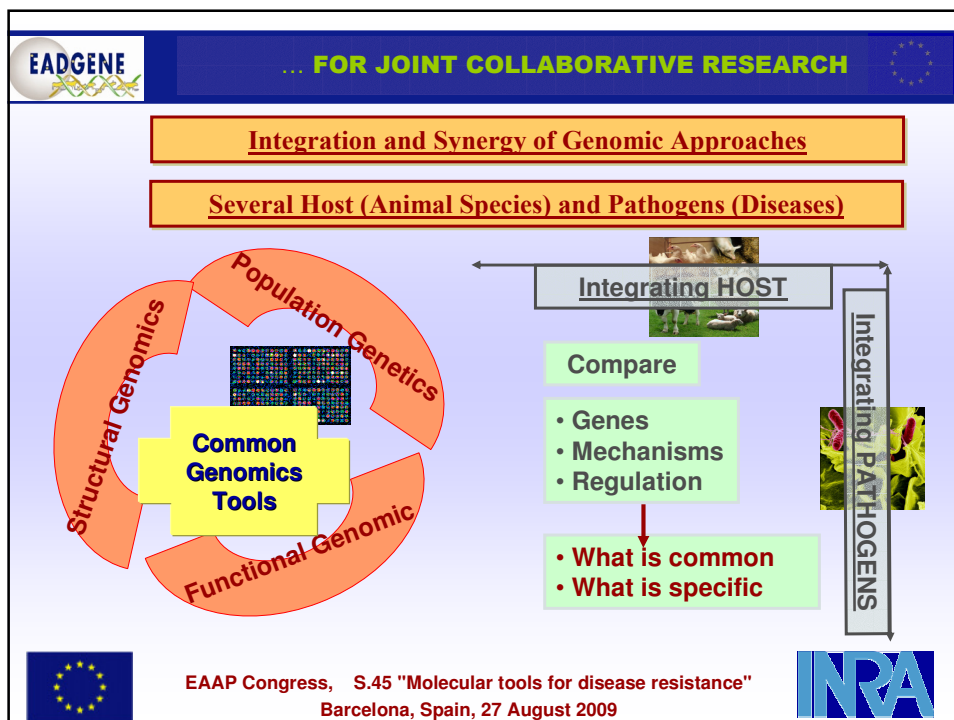
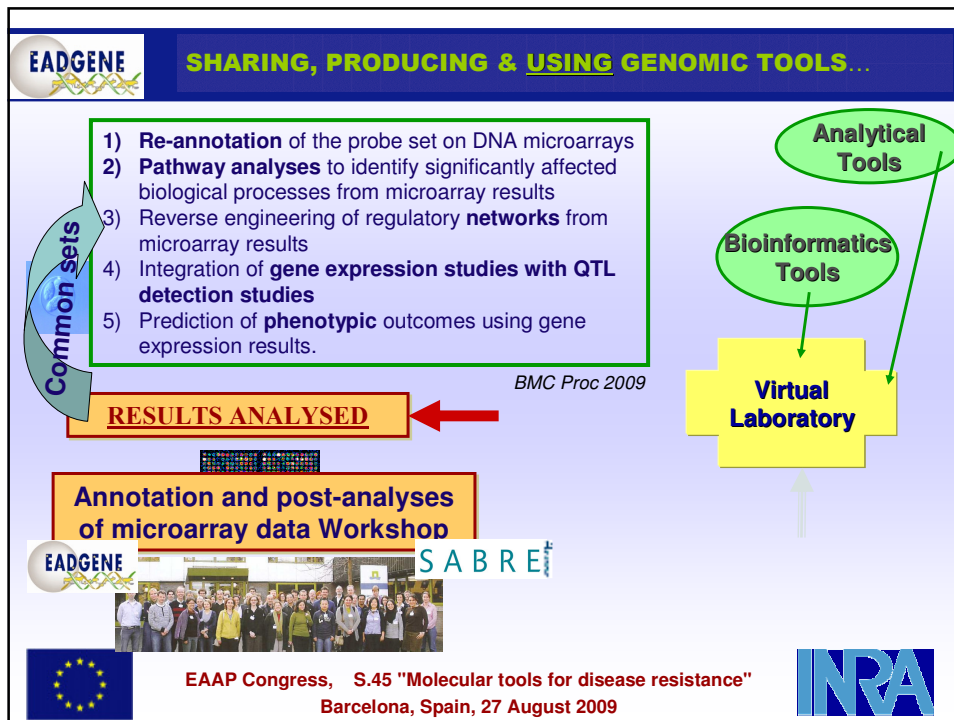


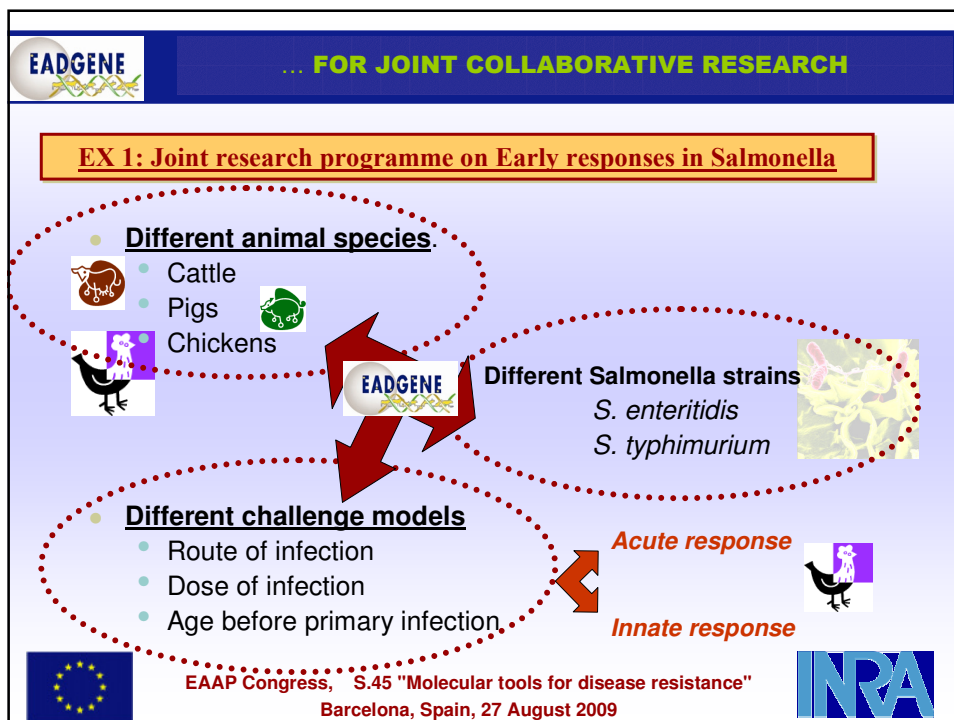


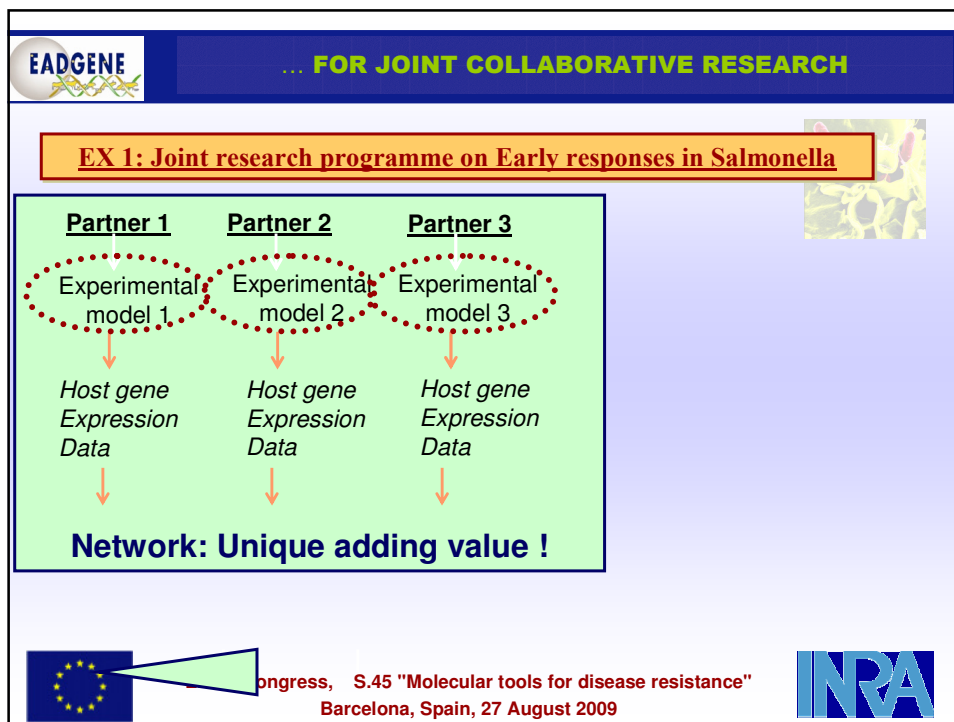












**EADGENE** ... FOR JOINT COLLABORATIVE RESEARCH

**EX 1: Joint research programme on Early responses in Salmonella**

|  | Salmonella | Host species | Organ                    | Time post infection | In vitro infection       |
|--|------------|--------------|--------------------------|---------------------|--------------------------|
|  | SE         |              | Caeca<br>Entero,<br>mono | 3w – 6w             | Monocytes,<br>Epithelial |
|  | STM        |              | MLN                      | 1d – 1w             | Macrophage<br>PMN        |
|  | STM        |              | Intestine<br>Jejunum     | 2 – 8<br>hours      | NO<br>SISP               |
|  | SE         |              | Intestine<br>Jejunum     | 1d – 3w             | NO                       |
|  | STM        |              | -                        | -                   | Enterocyte               |
|  | STM/ SE    |              | -                        | -                   | Monocytes,<br>PMN, DC    |

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**INRA**

... FOR JOINT COLLABORATIVE RESEARCH

EX 1: Joint research programme on Early responses in Salmonella

Host responses differ significantly after Salmonella infection

Dependent on species, Salmonella strain, challenge model, cell-type

There are some similarities in gene regulation between hosts

Independent of species, challenge model

Role of TLR4 ➡

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... FOR JOINT COLLABORATIVE RESEARCH

➡
"Role of TLR4, and TLR4-dependent signaling pathways, in the resistance to Salmonella infection and carrier state"

- QTL mappings for resistance to *Salmonella* infection and for resistance to *Salmonella* carrier state + QTL confirmed in commercial lines
- Role of TLR4 in resistance to *Salmonella* carrier state in adults but not in young

• Kinetics of TLR4 expression analyzed with different cell lines, *in vitro* infected by *Salmonella*

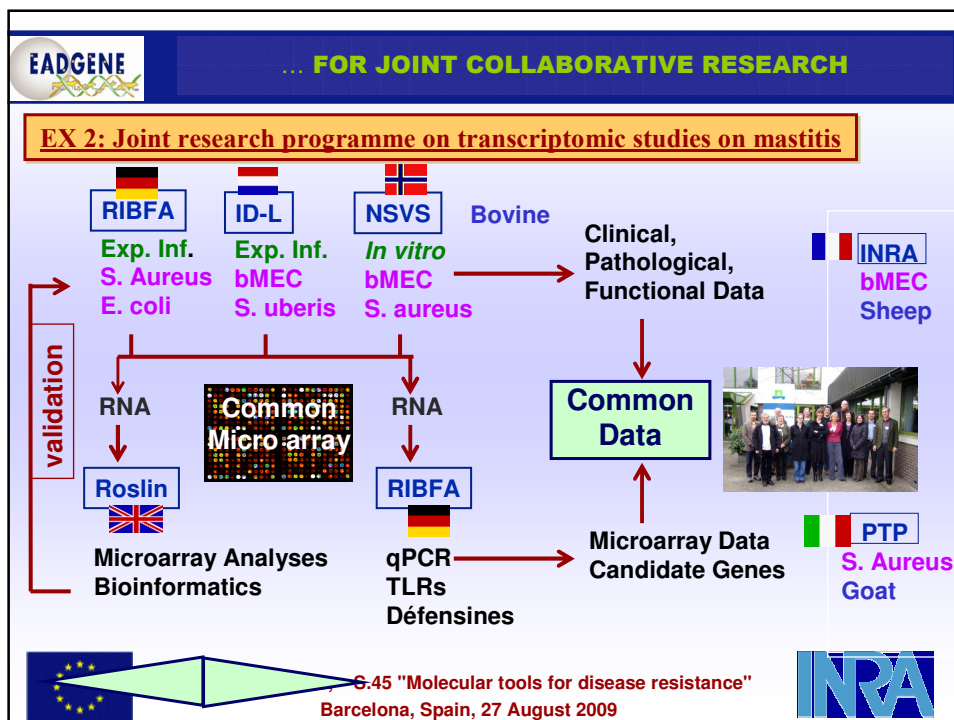
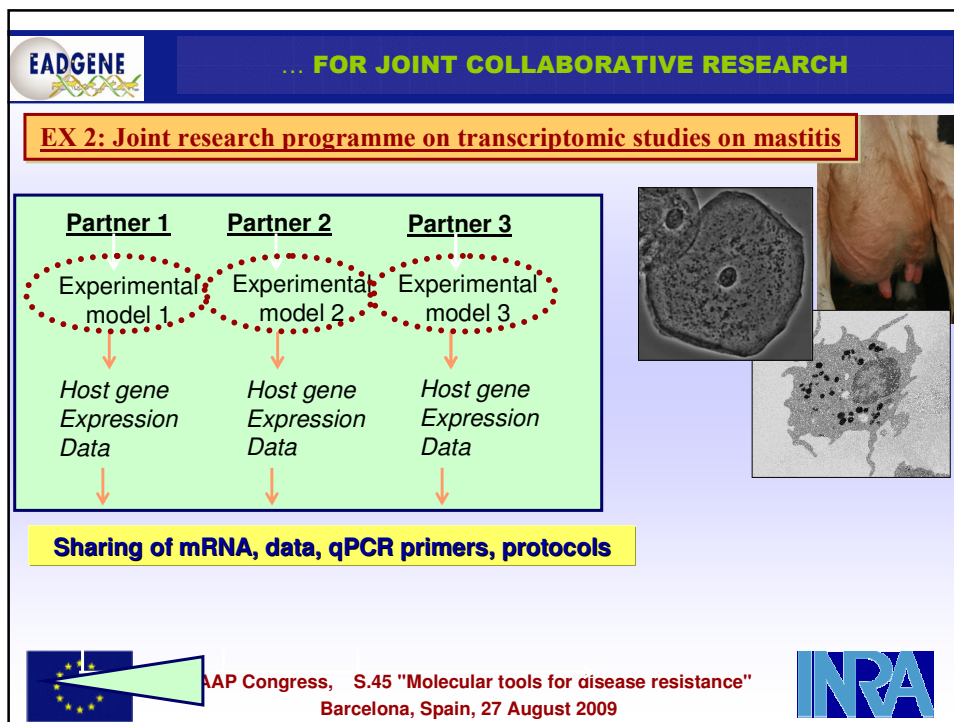
• TLR4 mRNA expression analyzed at the organ level + in cells purified during the carrier state (in R/S)

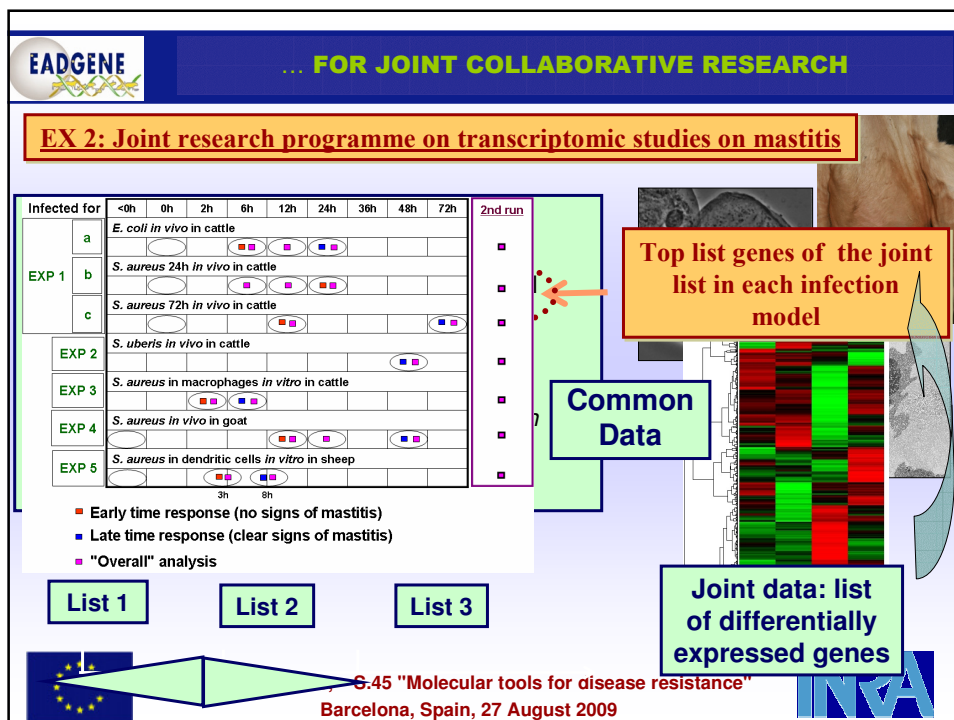
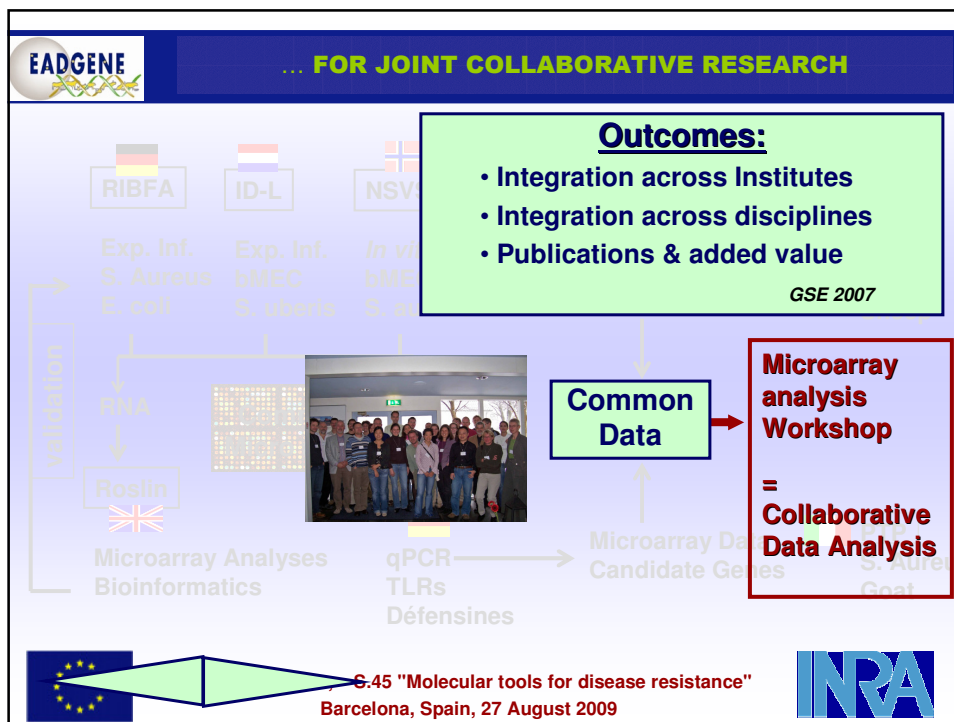
•Protein network built associated with TLR4 of genes modified in infected jejunal loops of pigs (*E. coli* or *Salmonella*)

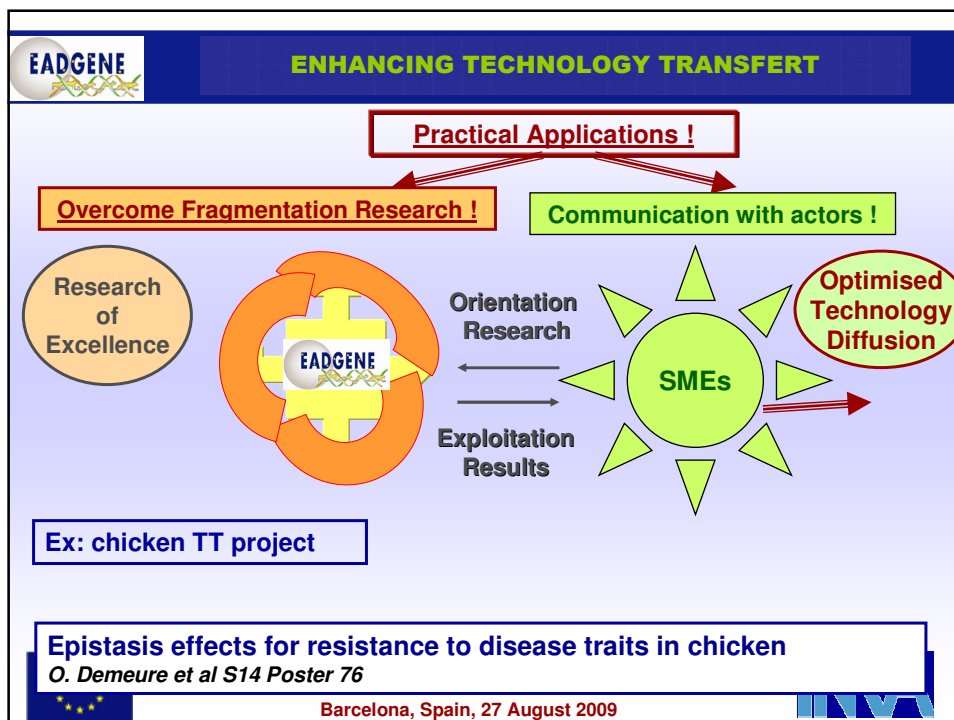
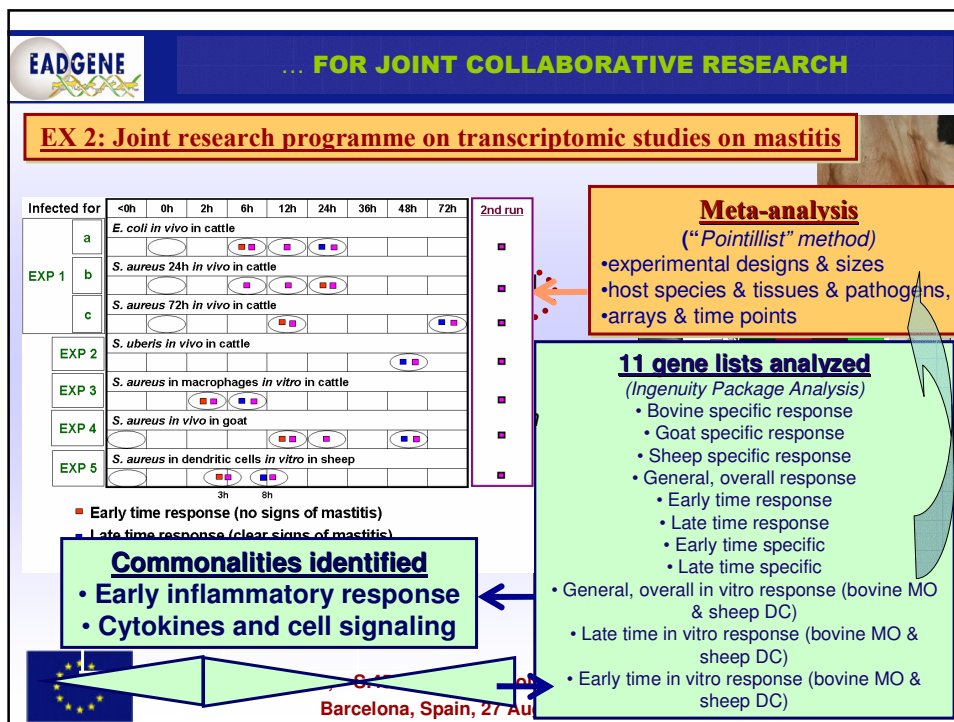
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ENHANCING TECHNOLOGY TRANSFERT

- **QTL detection**

- **Identification of QTL affecting the different traits and comparison of locations + transfer in commercial lines**

- **Modeling and testing epistasis**

- How many QTLs are involved in resistance to coccidiosis and what are their effects ?

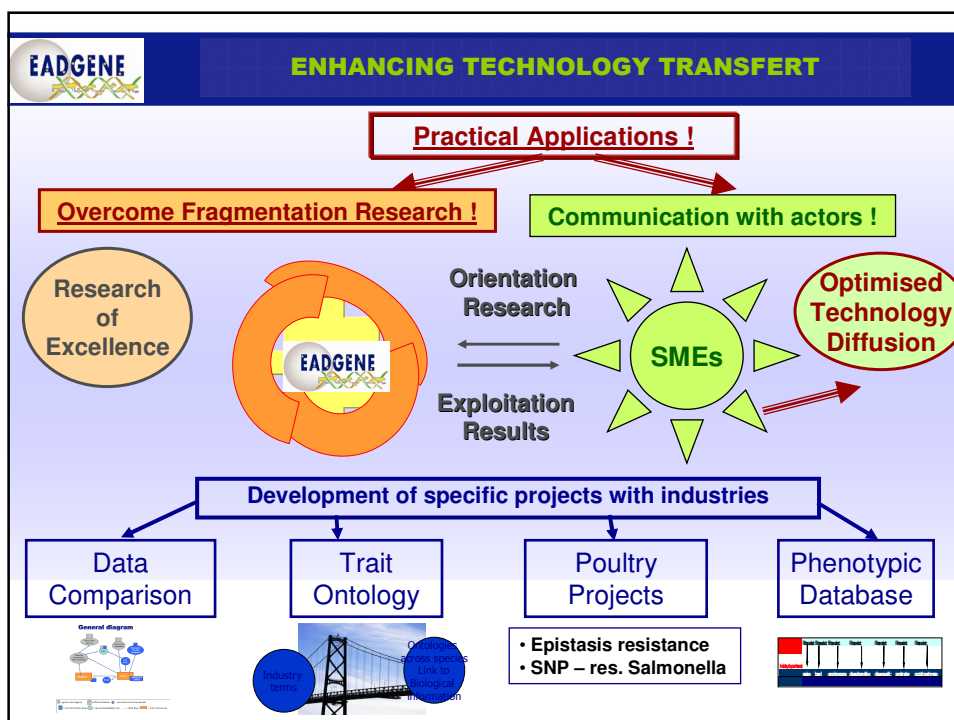
- Selection for resistance to coccidiosis...! Effects on production traits (growth, meat quality, body composition) ?

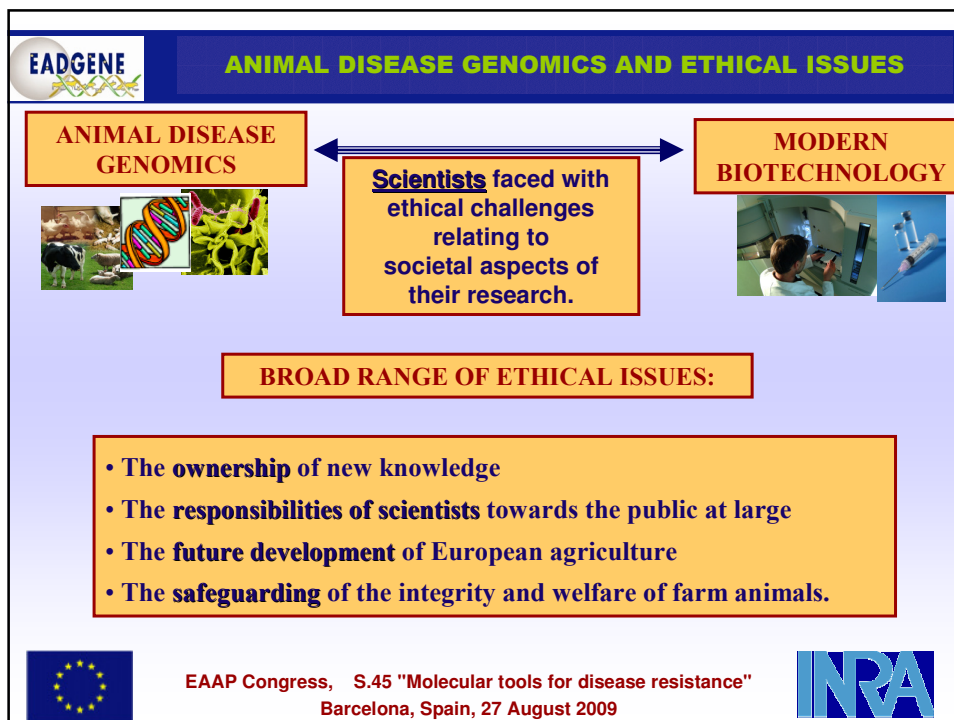
- What is the epistasis extent for all these traits in chicken ? Would it affect the selection efficiency ?

Epistasis effects for resistance to disease traits in chicken

O. Demeure et al S14 Poster 76

Barcelona, Spain, 27 August 2009







## Achievements / Challenges

- ❖ Integration across institutes
  - ❖ Reduced fragmentation, Improved awareness of benefits
  - ❖ Increased mobility, Improved possibilities for training
- ❖ Integration across disciplines
  - ❖ Overcome host - pathogen and "wet - dry" divide
- ❖ Build long term research relationships
  - ❖ Benefits joint research, joint publications
- ❖ Joint resources / data
- ❖ Attracted industrial interest
  - ❖ Improved collaboration
- ❖ Joint acquisition
  - ❖ EU-projects




**Genes, SNPs, molecular pathways, gene-networks involved in host-pathogen interactions**






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## Achievements / Challenges

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**DURABILITY NETWORK !**





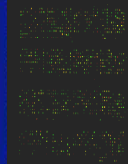

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**THANK YOU FOR YOUR ATTENTION**



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[www.sabre-eu.eu](http://www.sabre-eu.eu)



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