European Commission

HORIZON 2020
THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

SAPHIR

Strengthening Animal Production and Health through the Immune Response

Isabelle Schwartz-Cornil, coordinator

Marie-Hélène Pinard-van der Laan, deputy coordinator

INRA SCIENCE & IMPACT

VETERINARY VACCINOLOGY NETWORK

Manchester, 5-6 January 2016

This project has received funding from the European Union's Horizon 2020 program for research technological development and demonstration under grand agreement n°633184

SAPHIR ..??
… THE (SUCCESS) STORY

SAPHIR

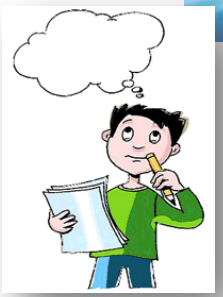
Strengthening Animal Production and Health through the Immune Response

WORK PROGRAMME 2014-2015

Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy

HORIZON 2020

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION



Call for Sustainable Food Security

The card game

INRA Transfert

VERY BIG HELP !!

Coordinator : Animal Health — Virologie Moléculaire

Deputy coordinator : Animal Genetics — GABI

INRA SCIENCE & IMPACT

Partner institute

WAGENINGEN UR For quality of life

The rules

Two steps: MARCH 2014 – JUNE 2014. Decision NOVEMBER 2014

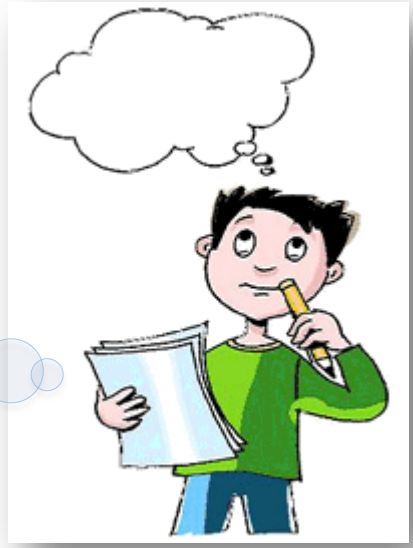
Budget Max: 9 millions d'euros

20% SME =>7.2 millions to academic labs

Big Pharma

+ China

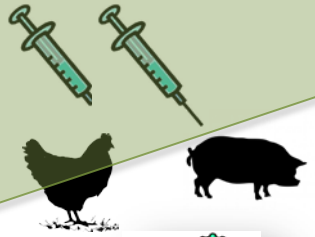
SFS1B. [2014] *Tackling losses from terrestrial animal diseases*



The goal is to better understand the interaction between the immune system of swine, poultry and ruminants and their specific pathogens, in particular pathogens associated with high production losses and to develop innovative and multivalent vaccines taking into account the individual variability in vaccine responsiveness and different developmental stages.

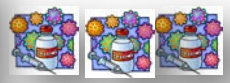
-current and new vaccine vectors (including DNA & DIVA vaccines)
-novel and easy-to-use delivery systems and efficient adjuvants
- earlier onset of protection and a longer duration of immunity.

- New biomarkers and phenotypes for breeding strategies / increased disease resistance.



-at least two vaccines at the demonstration level
-at least poultry and/or swine, and/or ruminants

- Animal pharmaceutical industry + SME involvement
- Third country participants, especially China.



SAPHIR's SUCCESS STORY

Evaluation outcome of SC2 calls in 2014

	Stage 1*	To Stage 2*	Funded*	Success rate*
Sustainable Food Security	397	145	27	7%

SFS1A: Feed-a-Gene (coord INRA)

SFS1B:, SAPHIR (coord INRA), Paragone (coord Moredun)

Evaluation Summary Report

Evaluation Result

Total score: 15.00 (Threshold: 10.00)

SAPHIR project

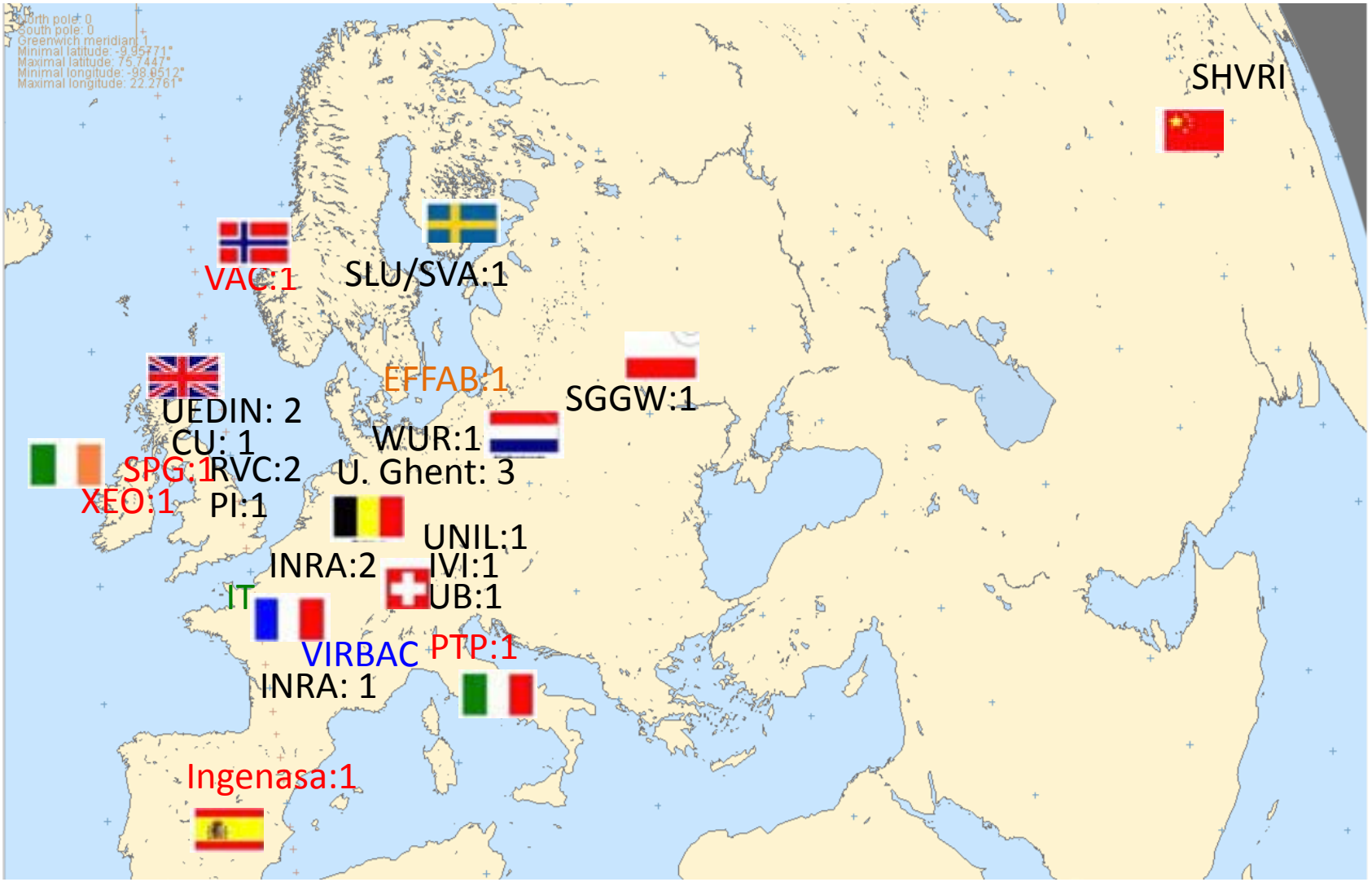
- What is the consortium?
- What are the main objectives?
- What the project will offer in terms of innovation? And How ?

SAPHIR
Strengthening Animal Production and Health through the Immune Response

Consortium overview…

14 institutes (19 labs), 5 SME, 1 forum, 1 tech-transfer, 1 big pharma

12 countries



…Who is doing what ?
A need for

a multidisciplinary approach of livestock infectious diseases control

Sociologists
Economists
Big Pharma
Stakeholders

Socio-economic context analysis of infectious diseases & control measures

3/4

TRL

5/6

VACCINE DESIGN

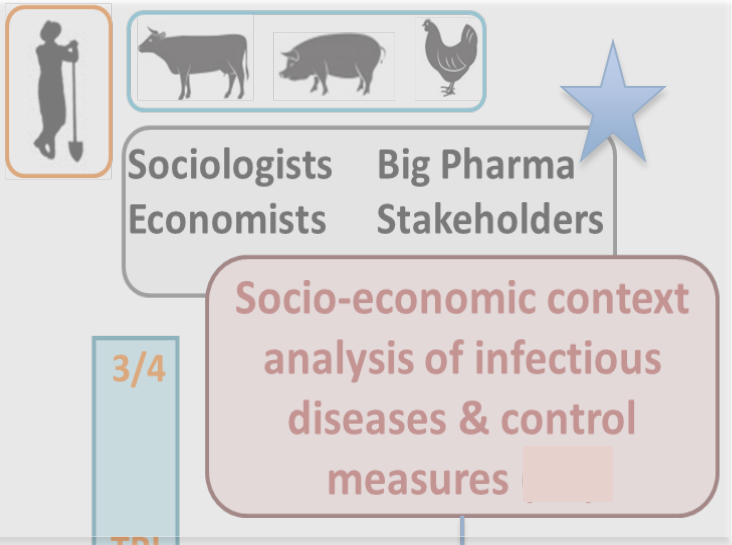
Geneticists
Biotechnologists
Microbiologists
Immunologists
Pathologists
Big Pharma
SME

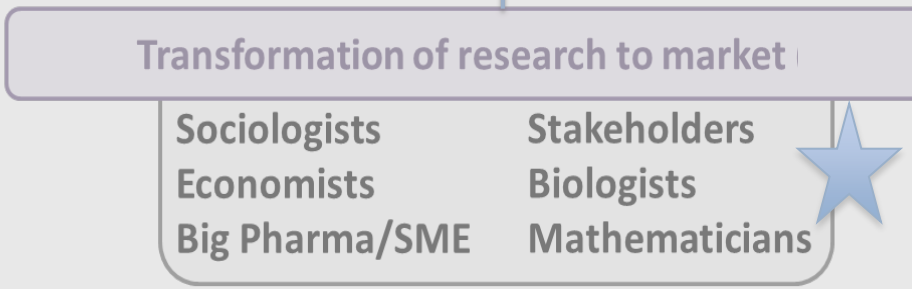
Transformation of research to market

Sociologists
Economists
Big Pharma/SME
Stakeholders
Biologists
Mathematicians

SAPHIR Objectives

a multidisciplinary approach of livestock infectious diseases control





SAPHIR Objectives

☞ Generate effective, safe, affordable vaccination strategies towards the control of endemic pathogens responsible for economic losses in livestock

☞ Specific and generic vaccine approaches against representative pathogens

* Bovine Respiratory Syncytial Virus (BRSV)
* *Mycoplasma bovis*

* Porcine Respiratory and Reproductive Syndrome Virus (PRRSV)
* *Mycoplasma hyopneumoniae*

* *Eimeria species*
* *Clostridium perfringens*

CHOICES

SAPHIR Objectives

innovative

a multidisciplinary approach of livestock infectious diseases control

Sociologists
Economists
Big Pharma
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Socio-economic context analysis of infectious diseases & control measures

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VACCINE DESIGN

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SAPHIR Objectives

innovative

a multidisciplinary approach of livestock infectious diseases control

VACCINE DESIGN

Development of pathogen–specific vaccine strategies:

- PPRSV
- *M hyopneumoniae*
- *Eimeria*
- *C. perfringens*
- BRSV
- *M bovis*

Development of generic vaccine strategies

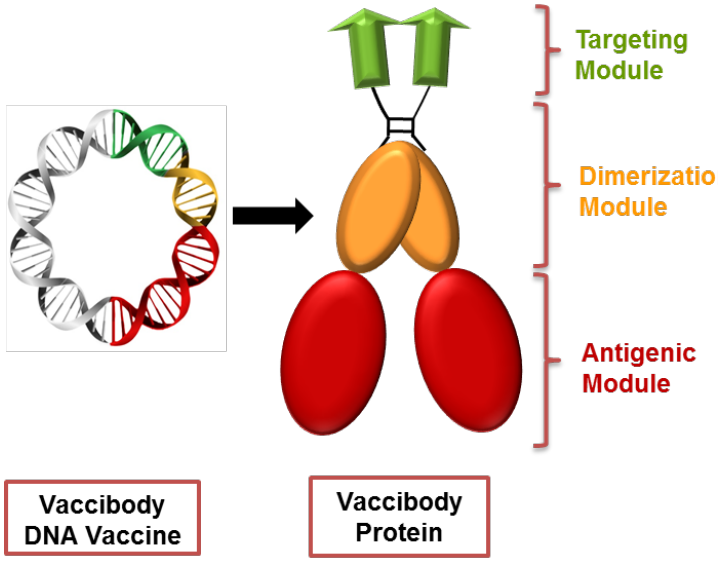
- Improving vaccine adjuvants
- New vaccine platforms
- Optimizing mucosal & skin delivery
- Understanding & improvement of age dependent vaccines responses
- Individual variability of immuno-competence

Objectives => Expected innovations

Efficacious, safe, affordable, field-adapted/broadly reactive, easy to use, DIVA vaccines

❖ High tech recombinants

- discovery of new protective antigens
- genetically modified (attenuated) vaccines
- genetic complementation
- bacilli-based vaccines
- one shot vaccine
- DNA vaccines by targeting of antigen presenting cells
- viral replicons based on Classical Swine Fever Virus



❖ Immune stimulation

- adjuvants (synergistic TLR) and formulations
- skin delivery system

❖ Host genomics

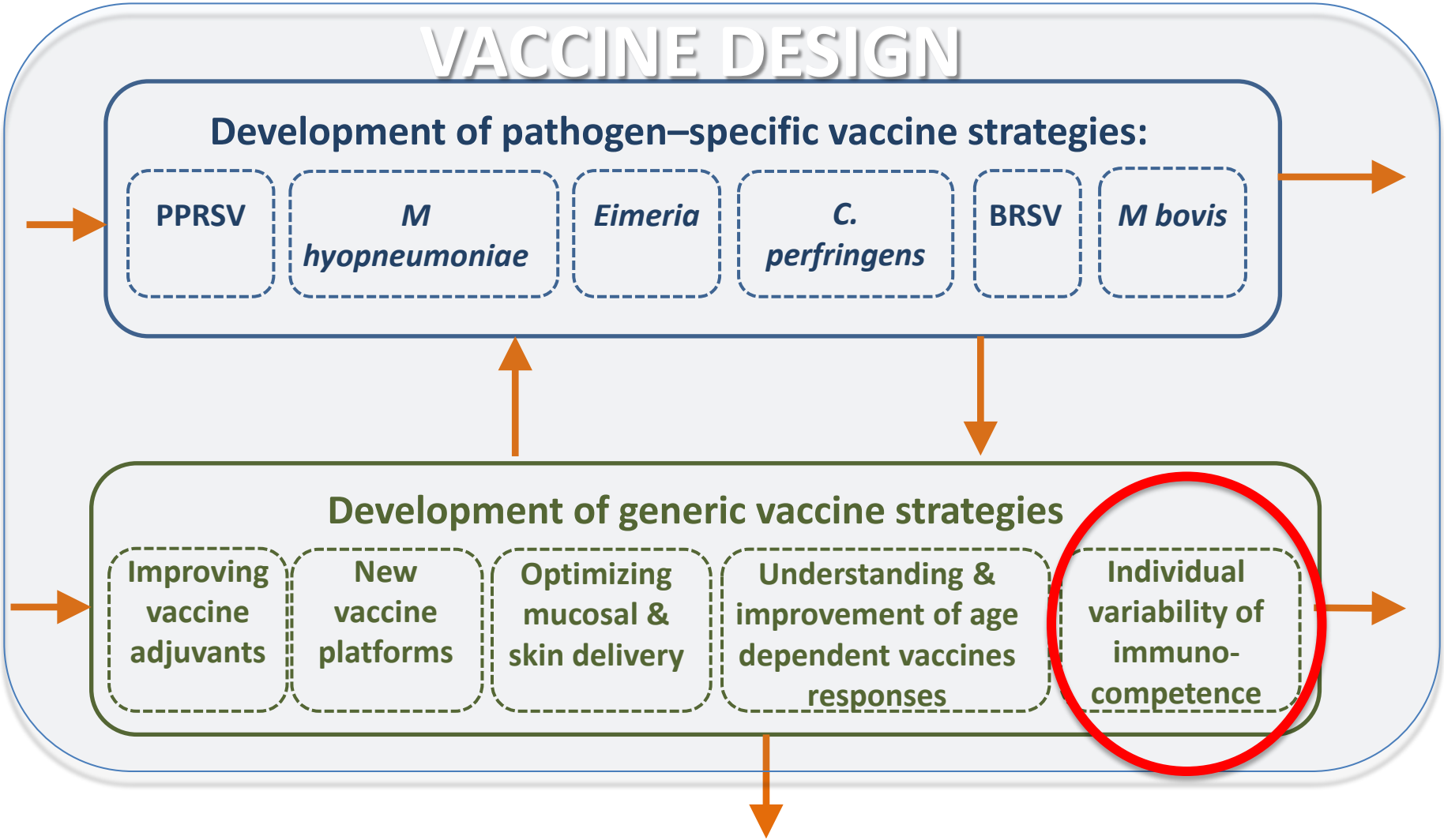
- markers of immunocompetence

❖ Vaccine data integration

SAPHIR Objectives

innovative

a multidisciplinary approach of livestock infectious diseases control



Individual variability of immuno-competence

BREEDING GOALS ARE CHANGING !!

- Yields
- Growth

→

- Product quality
- Reproduction capacity

→

- Environmental footprint
- Adaptation to changing environments
- Resistance to disease
- Robustness
- Welfare

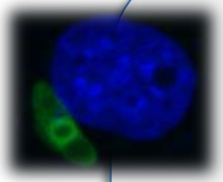
SAPHIR
Strengthening Animal Production and Health through the Immune Response

Individual variability of immuno-competence

To promote sustainable and safe food and farm systems

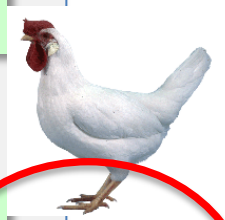
To improve animal health by reducing antibiotics and antimicrobials
AND by maintaining performances for competitivity of livestock systems

A goal: to improve vaccine efficacy AND immune capacity



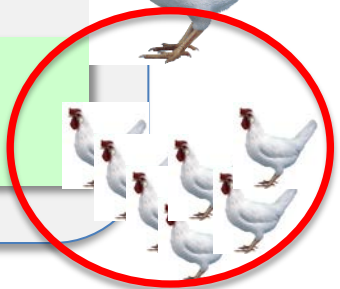
Knowledge on pathogens

Knowledge on hosts



Development of new vaccines

Optimization of immune capacity



Objectives => Expected innovations

Efficacious, safe, affordable, field-adapted/broadly reactive, easy to use, DIVA vaccines

❖ **High tech recombinants**

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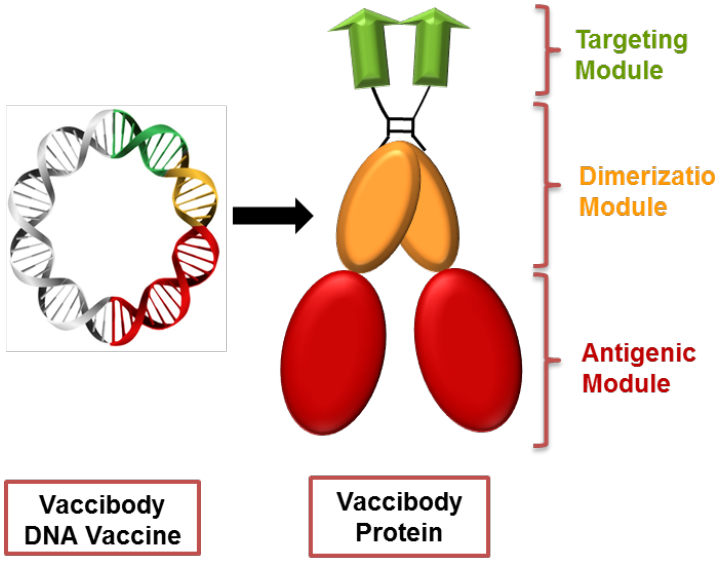


❖ **Immune stimulation**

- adjuvants (synergistic TLR) and formulations
- skin delivery system

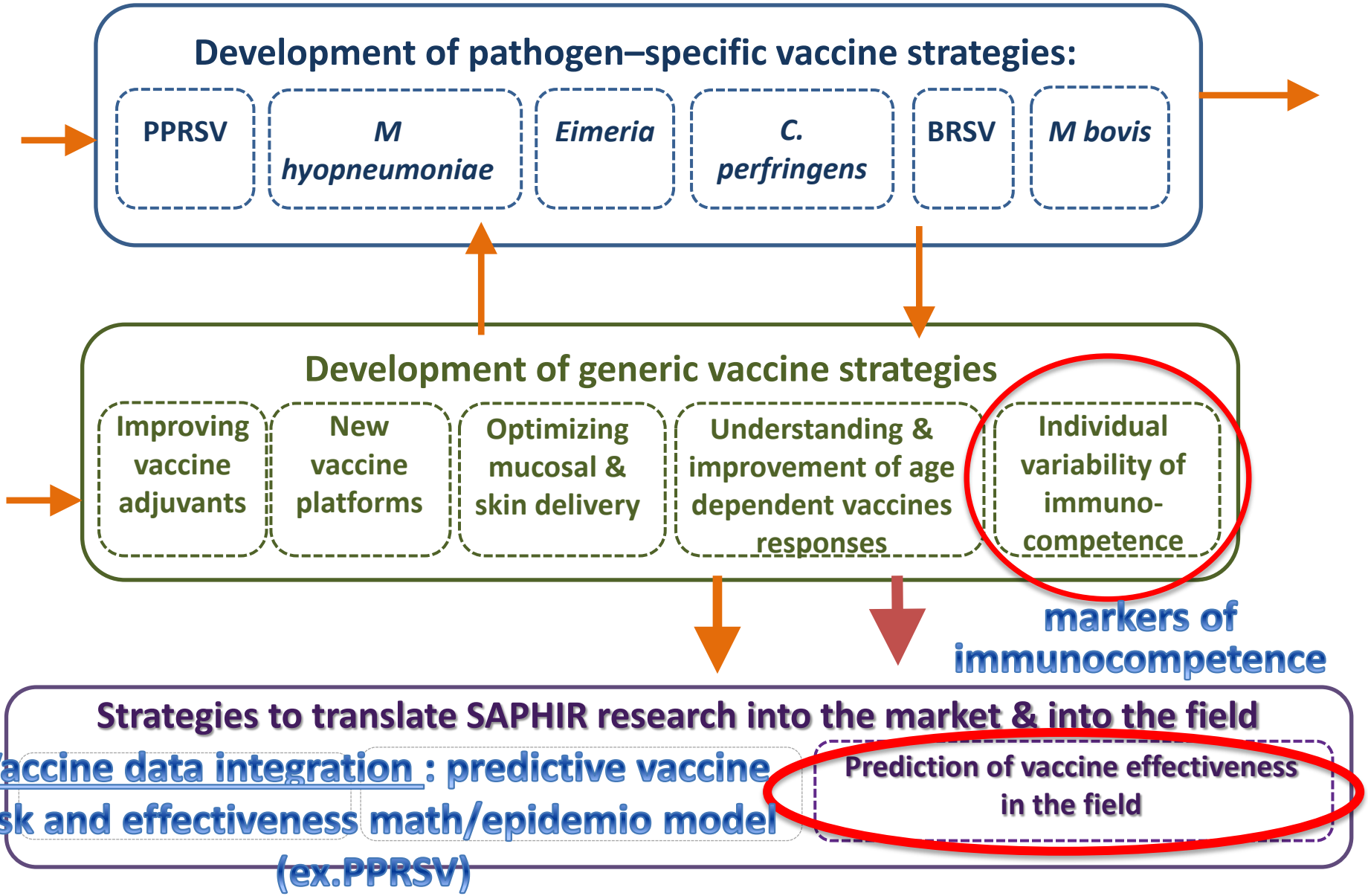
❖ **Host genomics**

- markers of immunocompetence

❖ **Vaccine data integration**

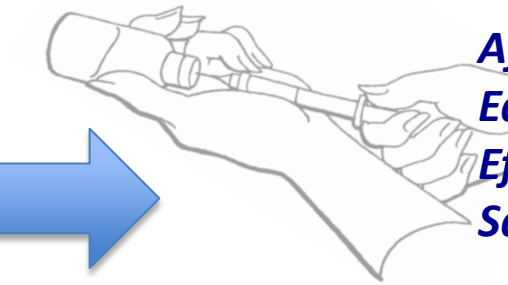
Objectives => Expected innovations

VACCINE DESIGN



Objectives => Expected innovations

Welfare
Health
Quality
Sustainability
Profitability



Affordable
Easy to use
Efficient
Safe

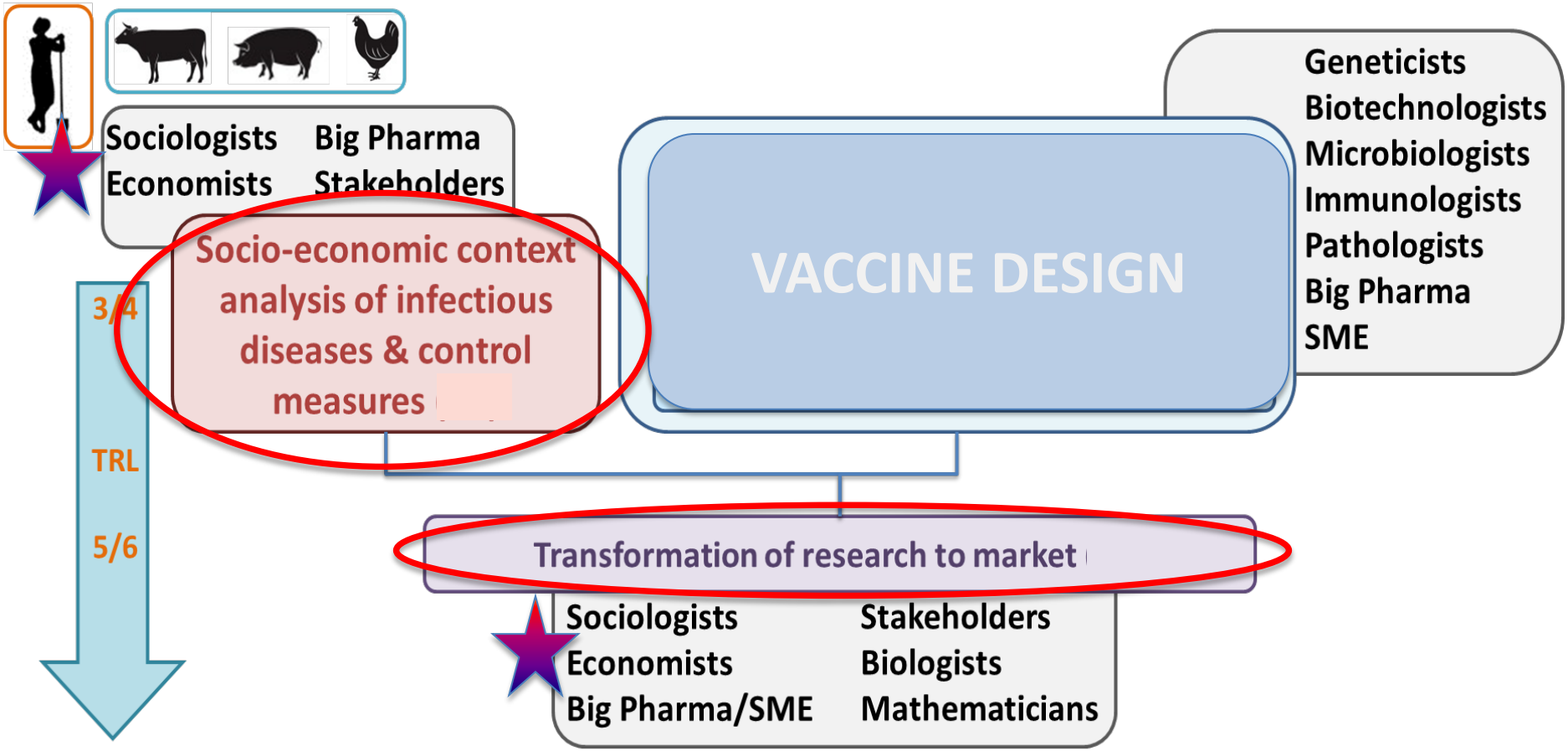
✓**Scientific:** decipher the mechanism of immune protection and of pathogen evasion, understand the impact of age and [illegible] optimize adjuvant and formulation for rapid and long term immunity

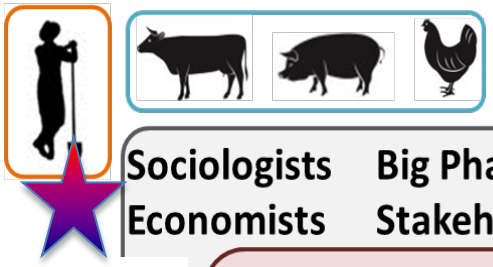
IMPACT

✓**Technological:** develop [illegible] vaccines and permit epidemiological monitoring, develop [illegible] convenient delivery methods, identify markers of immunocompetence for marker-assisted breeding

✓**Socio-economic:** understand the socio-economic factors that influence the use and acceptability of vaccines

Objectives => Expected innovations => Impact

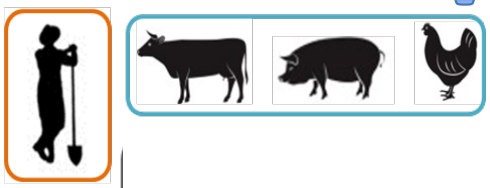




Sociologists Big Pharma
Economists Stakeholders

Socio-economic context analysis of infectious diseases & control measures

Understanding the socio-economic drivers of vaccine use at field level



Farmer's Behaviour

Preventive Behaviour:

Communicating & Implementing Biosecurity

Population Advice

"Rules" of disease

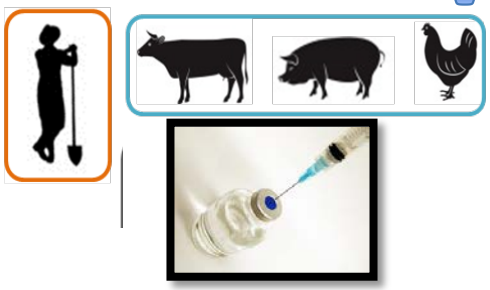
Exceptions to the rules

Chance and luck

Lay Epidemiology

Fatalism

Understanding the socio-economic drivers of vaccine use at field level



≠ **Vets' Behaviour**

Using Diagnostics in Practice

Routines & Repetition

Individual learning embodied skills

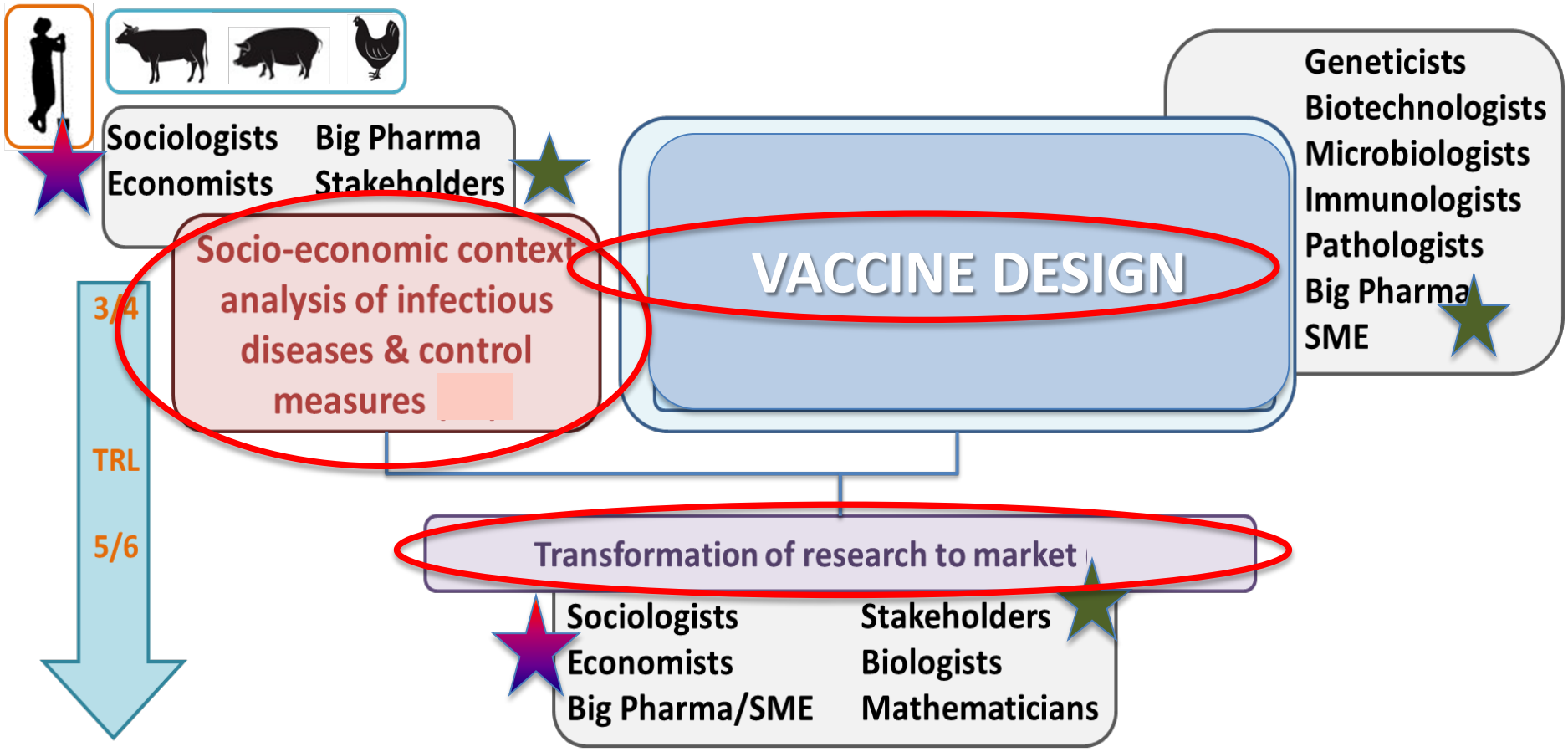
Practice Cultures

Sharing "war stories" of difficult tests

Identity

The heroism of the farm vet

+ Exploitation strategy + Communication + Dissemination

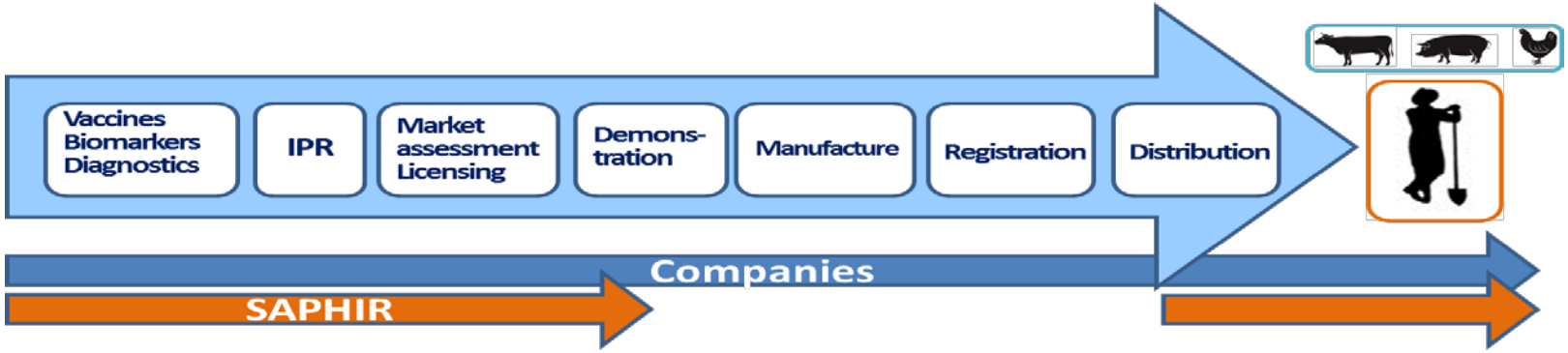


Exploitation strategy

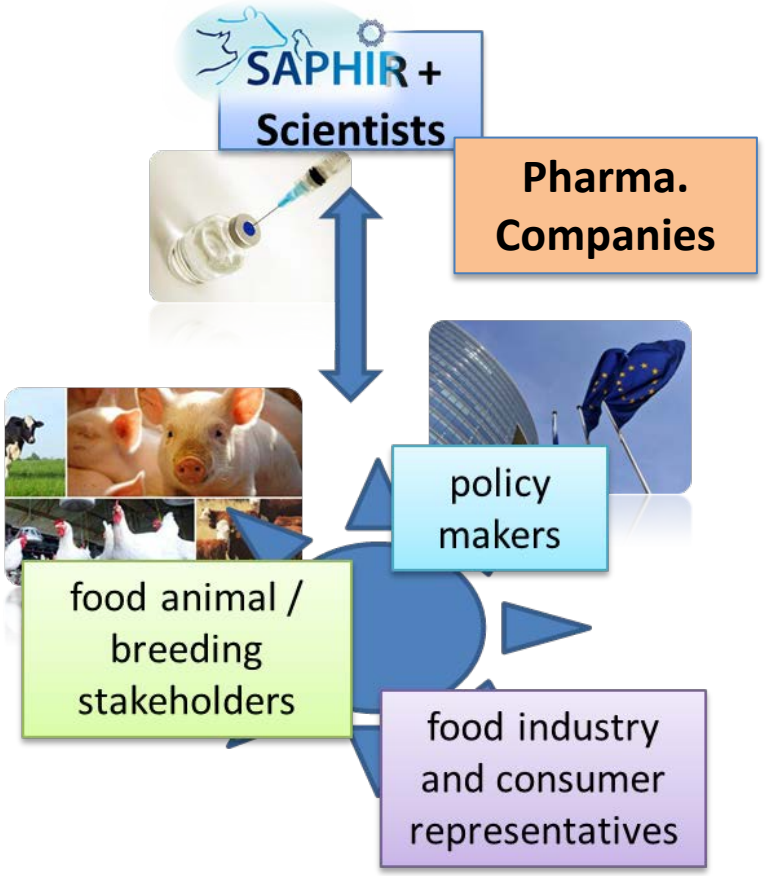
SAPHIR potential outcomes

- New vaccines
- Companion diagnostic tools for vaccine monitoring (DIVA vaccines)
- New biomarkers for immunocompetence
- Prediction models of vaccine effectiveness
- Integrated health strategy (herd management, socio-eco, food, genetics, vaccines)

SAPHIR exploitation plan



- ✓ Partnership with pharmaceutical companies (pre-existing and new agreements)
- ✓ IPR: Intellectual Property Use and Dissemination Committee + CA
- ✓ Publications green models
- ✓ Marketing values
- ✓ Demonstration experiment



Communication Dissemination

Workshops for stakeholders :

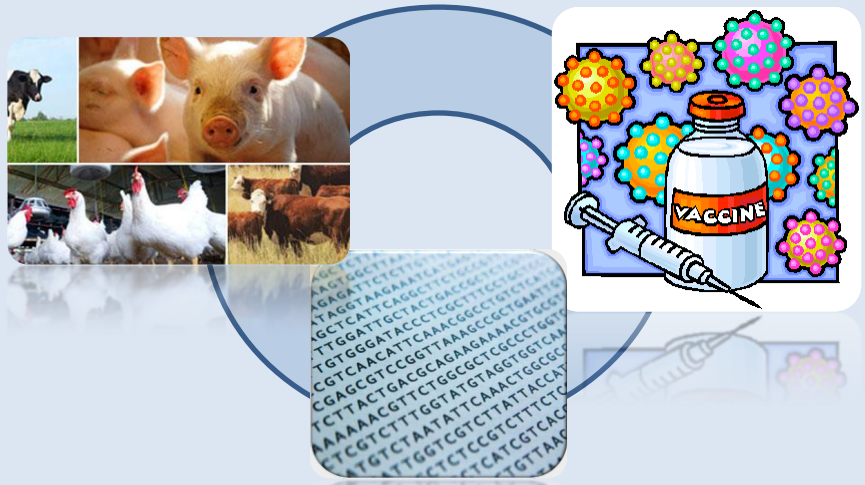
- **Facilitating interactions between academy and stakeholders (industry, policy, society…)**
- **Increasing mutual awareness**
- **2 Workshops in Brussels Connecting with other events**

Exploitation strategy

Communication Dissemination

WWW SAPHIR

INTEGRATED HEALTH MANAGEMENT STRATEGIES



Combined measures integrating :

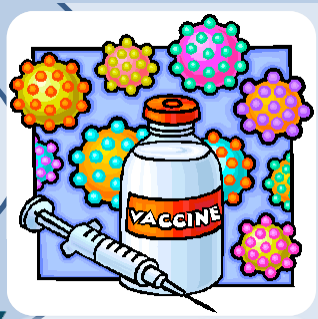
- ❖ socio-economic information on existing and new vaccines
- ❖ genetics and biomarkers-assisted breeding
- ❖schemes based on response to vaccines and pathogens
- ❖management of biosafety, housing and nutrition

Exploitation strategy

Communication Dissemination

SAPHIR

Launching of a Global Alliance for Veterinary Vaccinology



VETERINARY VACCINOLOGY NETWORK

Exploitation s

Courses directed to SAPHIR scientists and animal health professionals:

- ❖ SAPHIR experts on
  - pathogens and their vaccines
  - socio-economics of vet vaccines
  - industrial constraints for vaccine development
- ❖ UK Veterinary Vaccinology Network experts
- ❖ PARAGONE (SFS1B-H2020) experts on parasite pathogens
- ❖ FeedaGene (SFS1A-H2020) experts on nutrition and genetics for more robust animals

Multidisciplinary + Synergy Needed for developing Innovative Strategies for Livestock Disease Control

BBSRC
bioscience for the future

VETERINARY VACCINOLOGY NETWORK

ANR

PARAGONE
vaccines for animal parasites

SAPHIR
Strengthening Animal Production and Health through the Immune Response

Genetics and nutrition for livestock production

« SusAn »
Sustainable Animal Production Systems

anihwa
Animal Health and Welfare ERA-Net

2015-2019

http://www.h2020-saphir.eu/