

SAPHIR INNOVATIONS

ANIMAL PROTEIN SECTOR

This sector encompasses the farming community that is valued € 176 billion and employs 10 million people⁸ and the rising meat and dairy industry that is worth € 300 billion⁹.

The socio-economic evaluation carried out in SAPHIR project allows the understanding of how disease and disease-management strategies function in the context of the livestock system, allowing more effective resource-allocation decisions to be made.

FUTURE

Socio-economic evaluations require quality data, as well as innovative and standardized methodologies. This problem could be addressed with new and resilient public-private partnerships on data sharing and analysis. Such new arrangements have the potential to bring the shared goals of livestock health and sustainability of livestock production in Europe one step closer to realization.

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Eidgenössisches Departement des Innern, Institut für Virologie und Immunologie
<https://www.blv.admin.ch/blv/de/home.html>

European Forum of Farm Animal Breeders www.effab.info

Immunología y Genética Aplicada S.A. Ingenasa www.ingenasa.eu

INRA Transfer www.inra-transfert.fr/en

Parco Tecnologico Padano www.ptp.it/en/

Shanghai Veterinary Research Institute http://www.caas.cn/en/administration/research_institutes/research_institutes_out_beijing/shanghai/77944.shtml

SporeGen www.sporegen.com

Stichting Dienst Landbouwkundig Onderzoek - Stichting Wageningen Research
<https://www.wur.nl/en/Research-Results/Research-Institutes/Bioveterinary-Research.htm>

Sveriges Lantbruksuniversitet www.slu.se/en/

Warsaw University of Life Sciences <http://www.sggw.pl/en/>

The Pirbright Institute <https://www.pirbright.ac.uk/>

The Royal Veterinary College – University of London <https://www.rvc.ac.uk/>

Bern University - http://www.unibe.ch/index_eng.html

Lausanne University <http://www.unil.ch/central/en/home.html>

Universiteit Gent www.ugent.be/en

University of Edinburgh <https://www.ed.ac.uk/home>

Vaccibody <http://www.vaccibody.com/>

Virbac <https://corporate.virbac.com/home-en.html>

Xeolas Pharmaceuticals <http://xeolas.com/>


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STRENGTHENING ANIMAL PRODUCTION AND HEALTH
THROUGH THE IMMUNE RESPONSE

BECAUSE PREVENTION IS BETTER
THAN CURE!

INTEGRATED HEALTH MANAGEMENT STRATEGIES

Combined Measures Integrating:

Genetics and biomarkers-assisted breeding

schemes based on response to vaccines and pathogens, treatments



management of biosafety, housing and nutrition



socio-economic information on existing prevention & control measures (vaccines, treatments, genetics)

STRATEGIES TO IMPROVE SUSTAINABILITY AND INNOVATIVE CAPACITY OF THE LIVESTOCK SECTOR

Antimicrobial resistance (AMR) both in human and animals has reached alarming levels worldwide and is a significant threat to global public health and food security. There is evidence that the emergence of AMR in livestock and humans are connected and results from antimicrobial use (AMU) in both human and veterinary medicine. It is projected that 2/3 of the future growth of AMU will be for animal production¹ to fight with pathogens which incur high production losses and cause between US\$ 0.15 to 3 billion loss per year, not to mention the its impacts on animal welfare. On the other hand, the demand for high value animal food products is expected to rise around 70% by 2050 while 20% of global food production is lost due to animal diseases. These facts make it even more necessary to prevent these diseases before they occur!



ABOUT SAPHIR

WHAT WE DO?

SAPHIR -Strengthening Animal Production and Health through the Immune Response- project has developed vaccine strategies effective against endemic² pathogens responsible for high antimicrobial use, thus resulting in AMR risk and high economic losses in livestock.

As SAPHIR, we aim to strengthen the profitability of food animal systems, improve animal welfare and reduce xenobiotic³ usage in farming with a "One Health" perspective. We take into account that the sustainability and innovative capacity of the livestock sector needs to address the environmental challenges related to its expected expansion.

HOW WE DO?

As SAPHIR, we:

- produce knowledge of immune mechanisms of protection,
- develop affordable, safe and multivalent vaccines with DIVA⁴ properties,
- find efficient adjuvants for fostering an earlier and longer duration of immunity including the perinatal period,
- identify basal biomarkers of individual immunocompetence for future breeding strategies.

Overall, we propose an "Integrated Health Management System" which integrates all these measures to prevent and control diseases in order to breed more "robust animals" that are better adapted to environmental changes.

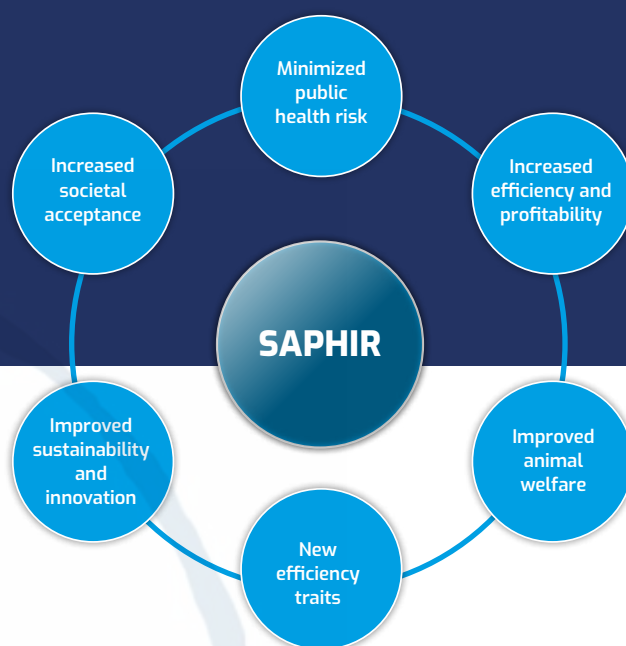
WHO ARE WE?

SAPHIR is an EU Horizon 2020 project which brings together interdisciplinary expertise from 14 academic institutes including a Chinese partner, 5 SMEs, one pharmaceutical company and European Forum of Farm Animal Breeders.



Our project is based on 6 pillars which will make a significant impact on the livestock sector and public health.

- Minimize public health risk
- Increase efficiency and profitability of animal agriculture
- Improve animal welfare
- New efficiency traits for farm animal breeding
- Improve sustainability and innovative capacity of the livestock sector
- Increase societal acceptance regarding new preventive strategies and vaccines



SAPHIR INNOVATIONS

VETERINARY VACCINE MARKET

This market is valued € 3.6 billion in EU with 8% of turnover spent on R&D⁵. It takes 8 - 12 years to develop and license a major new animal health product in EU, at a € 50 - 200 million cost.

SAPHIR has contributed significantly to this market by developing:

- new tissue culture-adapted PRRSV, PRRSV DNA and new *M. hyopneumoniae* bacterin vaccines for pigs,
- *M. bovis* vaccine candidates, BRSV protein and attenuated vaccines for cattle,
- Recombinant *Eimeria* vaccines for chickens,
- Adjuvants of specific types for species and age categories (neonates)

The new knowledge in immuno-protective mechanisms and the mathematical modeling of vaccine risk and effectiveness will be useful for future vaccine developments and improvements.

VETERINARY DIAGNOSTICS MARKET

This market is valued € 0.7 billion in EU with an annual growth of 1.6% per year⁶. SAPHIR has showed that vaccines that allow differentiation of vaccinated from infected animals (DIVA) can be used to monitor vaccine efficacy at large scale and to protect animals included in control programmes based on biosecurity.

LIVESTOCK BREEDING AND SELECTION SECTOR

This sector brings € 1.83 billion annual economic gain with about 10% re-invested in research⁷. Effective genetic improvement programs are vital to the competitiveness of livestock industry.

Marker discovery and identification of underlying genetic variability done by SAPHIR supports the prediction of immunocompetence and the design of innovative breeding programs integrating improved health and robustness. Our project has identified genetic markers and blood biomarkers of good and bad responders to pig vaccines that can be used in breeding schemes. Also, the detection of broncho-alveolar lavage biomarkers of severe respiratory disease evolution allows a tailored use of antimicrobials.

5 <http://www.ifaheurope.org>
6 <http://www.marketsandmarkets.com>
7 http://www.euroqualityfiles.net/vision_pdf/vision_fabre.pdf

² Endemic disease or pathogen: The presence of a disease or infectious agent in a given geographic area or population group (McGraw-Hill Concise Dictionary of Modern Medicine. © 2002)

³ A chemical substance found within an organism that is not naturally produced or expected to be present within the organism

⁴ Vaccines that make it possible to distinguish infected from vaccinated animals (DIVA)