

ERA-Net Vaccinology

International Coordination of infectious Animal Health research including zoonoses

Animal health represents a key element to guarantee food safety and security, by means of competitive and sustainable (economic, social and environmental) livestock systems. Partnerships and collaborations at the European and International level are important in fighting infectious animal diseases (including fish and bee diseases) including those which are a significant threat to human health.

ERA-Net would cover the four major groups of diseases (including emerging and re-emerging diseases): those subject to detailed international standards related to trade; those regulated at national level; those that are threat to public health and the non-regulated diseases controlled at farm level. These diseases include infestations by "pests", i.e. internal (helminth) or external (arthropod) parasites including red mite, as well as infections by viral, bacterial, protozoal or fungal pathogens, and multifactorial diseases.

International cooperation will pool and share resources and expertise between countries to further the fundamental understanding of hosts, pathogens and their interactions. Also, focus on understanding wider animal infectious disease issues e.g. systems-based studies that integrate host/pathogen studies with the epidemiology, and population dynamics of disease, pathogenesis, ecology, evolution, and transmission, resulting eventually in better prevention of disease.

The major focus will be on development of effective vaccines, generic technology platforms for producing novel and/or improved vaccines, and rapid, accurate and easy to use in-field diagnostics technology. Despite recent successes, there are still diseases for which there are either no vaccines or where current vaccines lack optimal efficacy **in particular when we consider early-life vaccination which require specific development**. New and improved vaccines have been identified as an important component in strategies to reduce reliance on antimicrobials (OIE *ad hoc* Group on prioritisation of diseases for which vaccines could reduce antimicrobial use in animals, 2015). In most cases there is a lack of vaccines because classical methods of generating vaccines have failed **due to strong antigenic variation of pathogens, insufficient knowledge on correlate of protection, or the fact that** the current market situation wouldn't justify the cost of their development. While the induction of immunological memory is fundamental to vaccines there is lack of a clear understanding of how best to design vaccines that drive long-lasting and protective memory responses. Also, there is a need for improved adjuvants as well as DIVA vaccines and diagnostics. It is also possible that technological advances would make the development of vaccines more economically viable. Industry engagement in projects selected under the ERA-NET is encouraged. The projects selected under the ERA-NET should follow the policies and contribute to the objectives of the STAR-IDAZ International Research Consortium.

In addition, consideration needs to be given to data sharing, integration and analysis to accelerate identification of outbreaks, enabling a rapid response and thus reducing the spreading of diseases.

Expected Impact:

- Provide new generic tools and systems for better prevention and improved preparedness to react to animal disease outbreaks, most prominently by designing and developing new or improved vaccines **suitable for all stages of development of the animals**, including DIVA, and diagnostic tools [C];
- Improve control of specific infectious diseases, including highly pathogenic avian influenza viruses, by translating key knowledge on host and pathogen interaction into pathways for new/improved vaccines [C];
- **Improved knowledge on correlate of protection and adjuvants for farm animals;**
- Improve collaboration with international initiatives to promote coherence and the applicability of research to preventive tools in order to control animal diseases [C];
- Contribute to the reduction of antimicrobial use in livestock, minimising antimicrobial resistance.