SOA20
Study the role of the immune system of farm animals
(OO8 Action 1)
PROJECT TITLE: Role of the immune system in farm animals (ImmSysRole)

Priority area	Operational objective
Treatment and Vaccines (for farmed animals)	Develop new vaccines or improve existing ones, including adjuvants and immune modulators.
Key words	**Partner participation**
Immune system, Immunogenetics, vaccines, adjuvants, antibodies, biomarkers, cytokines, immune cells	ANSES, DEFRA, AU, CIRAD, CREA, CSIC, DTU, FLI, INRAE, IRTA, ISS, EID-IVI, IZS - Teramo, NRIAP, NVI, Sciensano, SVA, UNIPD, UCPH, WR

Project summary

For optimal vaccines and natural disease resistance, it is crucial to understand the role of the immune system. Here, researchers collaborate to better determine genetic markers, initial responses and long term correlates of immune protection against diseases in farmed animals – ranging from large mammals to birds and fish, also considering external and internal factors that influence the immune system.

Project objectives

- Increase collaboration and knowledge sharing to strengthen Immune system research (T1)
- Gain better understanding of the genetic basis and early life development of a strong immune system (T2)
- Identify better biomarkers and maps of immune protection using high-end technologies (T3)
- Gain better information on protective immunity at the entry site (T4)
- Gain knowledge on external and internal factors of importance for the onset of the immune response to vaccines (T5)

Outcomes and impacts

- By better mapping of the genetic basis of immune competence, and the characterization of early life immune system development, we will be able to better advice breeding and husbandry of young animals aiming for strong immunity.
- Through mapping of long term immune responses (antibody, B-cell and T-cell receptor sequencing) we can develop better understanding and more specific correlates of long-term protection to help design optimal vaccines.
- A better overview of early and local innate responses to pathogens and vaccines (RNA seq, cytokines) and their links to long-term protection can help suggest better early indicators to optimize antigens, adjuvants and vaccine types.
- Non-invasive biomarkers (milk, mucus) and better cell models can help obtain immunological information with less animals sacrificed for research.
- Studies on the effect of environmental (temperature/microplastics) and internal (nutrition, metabolism, stress) factors on the immune system can help adapt existing knowledge to a changing world and advice husbandry and feed producers.
- Increased communication and better method sharing between farm animal immunologists will strengthen future vaccine development.