NEXT-GENERATION VACCINES AND DIAGNOSTICS TO PREVENT LIVESTOCK REPRODUCTIVE DISEASES OF WORLDWIDE IMPACT

Horizon Europe, the European Union research and innovation funding programme, has recently funded the new project REPRODIVAC. The aim of the project will be to develop innovative vaccines and diagnostics for endemic and zoonotic reproductive pathogens of livestock to improve animal welfare, reduce antimicrobial usage in farming, protect public health with a 'One Health' perspective, and strengthen the profitability of food animal systems.

For the next five years, 16 partners representing 7 European countries (Italy, United Kingdom, Spain, France, Netherlands, Germany, Switzerland) will work together to tackle four of the most economically important livestock diseases. In particular the activities will be focused on: ovine enzootic abortion (OEA), one of the most common infectious causes of abortion in small ruminants worldwide, caused by *Chlamydia abortus*; Q fever, an important and highly contagious zoonotic disease of worldwide impact, caused by *Coxiella burnetii*; swine brucellosis, a neglected disease with high zoonotic impact in the Americas and Asia, with the potential to re-emerge in Europe, caused by *Brucella suis*; and porcine reproductive and respiratory syndrome (PRRS), responsible for major economic losses in the swine industry worldwide, caused by PRRS viruses (PRRSV).

The consortium spans academia and industry with complementary expertise including structural biology, microbiology, immunology, plant and veterinary sciences. This will enable an interdisciplinary approach: (1) applying reverse and structural vaccinology to select and design vaccine and diagnostic candidate antigens; (2) exploiting relevant protein expression systems to produce these antigens; (3) developing rationally attenuated and viral vectored vaccines; and (4) setting-up a suite of molecular and immunological diagnostic tests, including point-of-care tests (PoC), to discriminate vaccinated from infected animals (DIVA).

Infectious diseases of livestock threaten food security and public health and cause a major economic (value of global animal health market equal to €40 billion) and animal welfare burden. In the pig industry, for instance, annual losses to PRRSV in the USA and Europe alone are estimated to exceed $600 million and €1.5 billion, respectively. REPRODIVAC will strengthen European capacity and competence by establishing a comprehensive network of preeminent European scientists, international organisations, and industry partners to advance research and promote technological developments. In particular: ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy, Coordinator), WUR (Wageningen University and Research, The Netherlands, Partner), UDL (University of Lleida, Spain, Partner), CEP (Consorci Centre d'estudis Porcins, Spain, Affiliated Entity), CEVA (CEVA Animal Health, France, Partner), FLI (Friedrich-Loeffler Institut, Germany, Partner), CITA (Centro de Investigacion y Technologia

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Agroalimentaria de Aragon, Spain, Partner), UON (University of Navarra, Spain, Partner), UMU (University of Murcia, Spain, Partner), EPFL (Ecole Polytechnique Fédérale de Lausanne, Switzerland, Associated Partner), GSP (Associacio Porcsa-Grup de Sanejament Porcì, Spain, Associated Partner), CZV (CZ Vaccines S.A., Spain, Associated Partner), GDX (Global DX Ltd, United Kingdom, Associated Partner), TPI, The Pirbright Institute, United Kingdom, Associated Partner), MRI (Moredun Research Institute, United Kingdom, Associated Partner), ENSL (Ecole Normale Supérieure de Lyon, France, Partner).

The new vaccines and diagnostics will be further developed and made accessible to users by the industrial partners involved in the project. Thereby, by using the latest technologies in vaccine and diagnostic development REPRODIVAC will improve animal health and welfare, sustainability of the livestock sector and productivity, as well as human health.

Notes for the Editor:
The REPRODIVAC project will run from 2022 – 2027 with an overall budget of about 6.3 million €.
The project is funded by the European Union Horizon Europe funding programme.
The 16 partners are distributed over the European continent (Italy, United Kingdom, Spain, France, Netherlands, Germany, Switzerland) and form a well-balanced mix between fundamental scientists, applied scientists and enterprises that have a track record in bridging fundamental science to applications in the livestock industry.

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