Vaccines for animal parasites (PARAGONE)

Resumen:

Helminth and ectoparasitic infections of ruminants and poultry have a huge impact on the biological efficiency of these vital food sources. Indiscriminate antiparasitic use has led to drug resistance across the globe. The main alternative to the dwindling supply of antiparasitics is vaccines.

Partners from the Europe, Uruguay, SMEs and pharma, will directly move forward prototypes against the ruminant helminths Fasciola hepatica, Cooperia spp., Ostertagia ostertagi, Teladorsagia circumcincta, the ectoparasitic mites, Psoroptes ovis (ruminants) and Dermanyssus gallinae (poultry). They will utilise novel adjuvants or delivery systems to maximise efficacy of some of the prototypes. Moreover, immunology studies will focus on pathogens that have previously proved problematic, often because they release immunosuppressive molecules that must be overcome for vaccines to work or because recombinant vaccines have failed to elicit protection observed with native prototypes. Fundamental, is engagement of the scientists with pharma and other stakeholders (farmers, veterinarians, regulators) via many dissemination activities that will be used to obtain feedback on how the vaccines can be best deployed in the field. The output will be at least two prototypes to the point of uptake by pharma, government or philanthropic agencies, and a clear pathway to commercialisation for all prototypes studied.

Objetivos:

The overall objective is to develop vaccines for the control of helminth and ectoparasitic infections that have a major impact on the efficiency of ruminant and poultry production systems worldwide. Currently, control of these relies almost exclusively on antiparasitics, which is no longer sustainable due to the widespread prevalence of drug resistance as well as consumers' concerns regarding residues in food. The main alternative to the dwindling supply of antiparasitics is vaccines: these prevent rather than cure infection, will have more durable protection with no associated residue issues, so represent green, sustainable and environmentally-friendly forms of control.

Objetivos contribución:

1.-To test protective capacity of a Fasciola hepatica prototype comprising a cocktail of current best candidates.
2.-To study mechanisms of protective and non-protective responses in Fasciola hepatica infection.
3.-To test protective pacacity of a Cooperia oncophora vaccine in C. punctata in sheep.
4.-To test a novel adjuvant delivery system for optimizing responses in ruminants using the best vaccine prototypes.

Entregables:

1.-Cross-protection of vaccine vs. different Cooperia species in sheep tested
2.-Key mechanisms of immune-modulation in F. hepatica infection identified
3.- Mechanisms of immune response to F. hepatica
4.- Elucidation of immune correlate of protection in sheep/cattle immunised vs. F. hepatica
5.-Intra-consortium dissemination: Principal Consortium Meeting III

Impacto:

The main parasites affecting these ruminant hosts across the EU include liver flukes (Fasciola spp.), several gastrointestinal nematodes (i.e. O. ostertagi, C. oncophora, T. circumcincta and H. contortus) and a number of ectoparasitic mites. Most of these are important globally, with the parasites impacting hugely on welfare and productivity by affecting growth rate, fertility, meat quality, wool/milk production. Furthermore, some of these pathogens have been associated with increased susceptibility to other infectious diseases or affect the diagnosis of important non-parasitic infections such as bovine tuberculosis.

By developing at least two vaccine prototypes to demonstration level and tackle vaccine development for poultry and for ruminants. If successful, the project will impact the livestock industry by:

1. Increasing ruminant and poultry health and welfare through better control of highly prevalent and pathogenic pathogens;
2. Improving biological efficiency, and hence, profitability, in the ruminant and poultry sector across a wide range of countries;
3. Delivering novel alternatives to the dwindling supply of effective antiparasitics and hence improve sustainability and innovative capacity within the livestock sector;
4. Delivering non-chemical methods of control that will reduce the administration of chemical products to animals and hence mitigate societal concern regarding food safety;
5. Identifying biomarkers associated with the resistance to disease.

Presupuesto: 8 998 560,00

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