



IT08

Current research in *Eimeria* species affecting chicken

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Seven species of the parasite *Eimeria* cause coccidiosis in chickens, an enteric disease transmitted between birds by the faecal-oral route, characterised by malabsorption, diarrhoea and/or haemorrhage with estimated costs of more than US\$3 billion each year. Prophylactic anticoccidial drugs are routinely used to control *Eimeria* spp. and oral commercial vaccines based on live parasites are available, although their high costs of production limit their use, especially in the broiler (meat) sector. With poultry becoming the main source of animal protein in many developed and low-and-middle income countries (the world's chicken flock is >22 billion, producing 1.4 trillion eggs and 100 million tonnes of meat each year) and new regulations to reduce usage of in-feed drugs, the poultry industry needs to explore alternative approaches to avoid losses caused by endemic and re-emerging diseases. Regardless of their high impact and wide prevalence, there are many aspects of the biology and host-parasite interaction completely unknown in *Eimeria* spp. In consequence, there are different lines of research open with the aim of generating new knowledge in basic biology of *Eimeria* as well as improving its control. Some of these investigations include: study of new morphological features and improvement of genome annotations; research on next-generation recombinant anticoccidial vaccines (identification of new candidates, evaluation of new delivery systems, analysis of populations), use of *Eimeria* as vaccine vector (for other *Eimeria* species and additional avian pathogens), improvement of molecular tools and *in vitro* systems for the identification and evaluation of new vaccine candidates and chemoprophylactic compounds.

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A risk based surveillance programme for *Toxoplasma gondii* in pigs using a combination of farm auditing and serological screening

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Toxoplasma gondii is recognized as one of the major foodborne pathogens with a high human disease burden. In the Netherlands, pork contributes to about 11 % of the meatborne *T. gondii* infections. To control *T. gondii* infections in pigs, EFSA has advised to perform serological testing of pigs and audits of pig farms on risk factors for *T. gondii* infection. In the Netherlands, a program was started to translate the EFSA advice into a practical risk based surveillance system. In first instance, a large scale serological monitoring of fattening pigs was started and seroprevalence over time was determined. Next, the association between within-herd seroprevalence and risk factors for *T. gondii* on fattening pig farms in the Netherlands was determined. For this, a questionnaire for auditing farms for the presence of risk factors of *T. gondii* was developed and used on 25 case and 50 control farms. Results show that there is a significant association between seroprevalence and risk factors as cats present on farms, use of unheated feed products and feeding wet feed. Moreover, on-farm presence of rats and mice also increases *Toxoplasma* transmission risks. Subsequently, a study was started on farms to quantify the effectiveness of interventions on farms. A cross-over clinical trial was set up in which case farms were their own control and the cross-over moment is the implementation of interventions on risk factors to change farm management. Farms with a high within-herd seroprevalence were followed for at least during a year and monitored periodically for seroprevalence and implementation of interventions to eventually reduce the disease burden. The break-even point was calculated for which the intervention cost at fattening pig farms equal averted human disease burden and averted cost-of-illness minus cost of the surveillance program. The results shows favourable economic perspectives for interventions to control pig meat-born transmission of *T. gondii*.