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## The development of diagnostics and therapeutics for eimeria infections in poultry

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Poultry coccidiosis caused by the protozoan parasite *Eimeria* is a major cause of economic losses in the poultry industry. The resilience and short life cycle of the parasite coupled with high stocking densities in modern day commercial poultry establishments ensure that this parasite is an ever-present pathogen in poultry farms. Traditional methods of diagnosis such as oocyst morphology, counting oocysts per gram of faeces and lesion scoring are still heavily relied on even though they are not able to speciate *Eimeria* infections. Polymerase chain reaction (PCR) based diagnostic tools are now available but their relatively high costs, the need for specialized equipment and difficulty of accessing template DNA have hindered their widespread application in field conditions. Current measures employed for the control of this parasite is mostly the use of in-feed anticoccidials which as a result of increasing drug resistance and drug residues in meat have had negative views over the years with consumers calling for their ban. In-feed anticoccidials have been set to be banned in 2021 in the UK and Europe, there is therefore an urgent need to look for alternative control measures. The purpose of this study is to develop Enzyme-Linked Immunosorbent Assay (ELISAs) and accompanying in-field Immunodiagnosics that will differentiate between infecting species of *Eimeria*, and also to map polyclonal IgY responses to all seven *Eimeria* species to develop a multipeptide vaccine. The method for isolating the specific ligands is called next generation phage display (NGPD). To date, to facilitate the development of diagnostic immunoassays, recombinant antibodies that bind *Eimeria* oocysts have been identified, rescued by inverse PCR and screened using ELISA.

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