



VETBIONET

Veterinary Biocontained facility Network for excellence in animal infectiology research and experimentation

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TNA Provided

Name of the TNA project	Name of TNA user	Organisation of TNA user	Country of TNA user	Installation from the RI	Start date	End date	Number of units of access provided
Comparison of the virulence of two isolates of <i>Toxoplasma gondii</i> in an ovine trophoblast cell line	Daniel Gutiérrez-Expósito	University of León/ Instituto de Ganadería de Montaña (CSICULE)	ES	MRI	28 th February 2019	29 th March 2019	1
Isolation and prediction of the zoonotic potential of <i>Anaplasma phagocytophilum</i> isolates from livestock, wildlife and ticks	Lauretta Turin	Department of Veterinary Medicine, University of Milan, Italy	IT	MRI	5 th July 2022	4 th September 2022	2
Establishment of 3D cultures for <i>Cryptosporidium parvum</i> , <i>Neospora caninum</i> and <i>Eimeria bovis</i> and study of related host-parasite interactions	Anja Taubert	Institute of Parasitology (IP), Justus Liebig University Giessen, Giessen, Germany	DE	MRI	6 th June 2022	4 th July 2022	1
The impact of co-infections with <i>Cryptosporidium parvum</i> and bovine coronavirus in young calves	Lucy Robertson	Parasittologisk laboratorium Institutt for mattrygghet og infeksjonsbiologi / Institutt for parakliniske fag NMBU, Faculty of Veterinary Medicine, NORWAY	NO	MRI	5 th January 2023	7 th February 2023	1
Mastvacc: measuring the efficacy of a multicomponent recombinant fusion protein vaccine against mastitis caused by <i>Staphylococcus aureus</i> in dairy cows	Andrew Waller	Intervacc, Sweden	SE	MRI	31 st October 2022	28 th February 2023	2

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Final reports of each TNA provided

TNA 1: Comparison of the virulence of two isolates of *Toxoplasma gondii* in an ovine trophoblast cell line

The results obtained in this TNA project suggest that there may be differences in the ability of the two selected isolates of *T. gondii* (TgShSp1/ TgM4) to infect and affect ovine trophoblast cells. TgShSp1 proved to be a highly invader isolate whereas TgM4 was more prolific. However, no differences were observed regarding cytokine expression. These differences might influence the outcome of the gestation when the infection occurs. The studies were conducted in one cell line, which could limit the findings but collectively the results indicate that further investigation is warranted.

TNA 2: Isolation and prediction of the zoonotic potential of *Anaplasma phagocytophilum* isolates from livestock, wildlife and ticks

This TNA project was based on the exploitation of techniques and resources present in the host lab, to enable knowledge transfer to the visiting researcher and allow similar analysis of local samples in the receiving laboratory. Due to the nature of the samples all work had to be carried out in a BSL-2 laboratory. Training in cell and pathogen culture, nucleic acid isolation and purification, molecular biology techniques, sequence and phylogenetic analysis took place during the access. A manuscript describing the work covered in this TNA was published in the journal, Pathogens: <https://doi.org/10.3390/pathogens12020216>

TNA 3 : Establishment of 3D cultures for *Cryptosporidium parvum*, *Neospora caninum* and *Eimeria bovis* and study of related host-parasite interactions

Cryptosporidium parvum, *Neospora caninum* and *Eimeria bovis* are obligate intracellular parasites of global medical and veterinary importance. *C. parvum* is one of the most important causal agents of animal and human cryptosporidiosis, which is responsible for almost a million human deaths each year. Neosporosis (a disease caused by *N. caninum*) is transplacentally transmitted, inducing abortion in cattle and neurological disease in dogs. Finally, *E. bovis* is a highly pathogenic coccidia, responsible for severe haemorrhagic typhlocolitis in calves and high economic losses in the cattle industry worldwide. Out of these three pathogens, only *C. parvum* has been cultured successfully in 3D murine *in vitro* culture systems. The user's main goal was to receive training from members of the Organoid Group at the Moredun Research Institute (access provider), where livestock small intestine epithelial organoids have been successfully developed and are being implemented for studying host-parasite interactions. This will allow the user to establish similar livestock cell culture platforms to study specific host-parasite interactions in her laboratory in Germany and therefore represents a skills and technology transfer. All these infections models will then be used to screen for the efficacy of new drugs and compounds against these apicomplexan parasites and to study parasite-host cell-interactions on a metabolic and cell cycle-based level. Moreover, this will constitute a valuable opportunity to facilitate knowledge exchange and to establish a new, strong, long-term collaboration between The Moredun Research Institute and the Institute of Parasitology at Justus Liebig University Giessen.

TNA 4: The impact of co-infections with *Cryptosporidium parvum* and bovine coronavirus in young calves

This study seeks to improve knowledge about two of the most important aetiological agents of calf diarrhoea: bovine coronavirus and the protozoan parasite *Cryptosporidium parvum*. Diarrhoea is a common disease of new-born calves and knowledge generated from our study is intended to contribute towards improving cattle health and welfare. Although in vitro models provide some insights, they are insufficient to investigate how these pathogens cause disease. Infection studies are essential to address between-pathogen interactions. The TNA user wants to investigate synergistic or antagonistic effects that may occur when animals are infected with both pathogens. The study includes 15 calves divided into three experimental groups; two groups are exposed to the different infections individually, and one group is exposed to both infections. The calves should develop diarrhoea, but disease severity is expected to be, at most, moderate. All current recommendations for animal experimentations involving cattle have been considered and welfare is being closely monitored during the experiment. Every experimental procedure is performed by trained personnel with appropriate licenses. Preliminary results (the study started in early January) indicate that infection with the pathogens has been successful, and diarrhoeal symptoms and/or mild respiratory symptoms have developed in the different groups. Faecal samples are collected on a daily basis and blood twice weekly, and will be analysed at the user laboratory in Norway. In addition, pathology samples will be collected for analysis.

TNA 5 Mastvacc: measuring the efficacy of a multicomponent recombinant fusion protein vaccine against mastitis caused by *Staphylococcus aureus* in dairy cows

The initial prime and boost vaccinations on pregnant dairy cows went well with no safety or injection site issues reported. However, calving was extended compared to initial expectations resulting in a 3-week delay for the final post calving boost. All calves are healthy and growing well and it is still anticipated that the *Staphylococcus aureus* challenge and vaccine efficacy analysis will proceed two weeks following the final boost as originally planned. The trial is still ongoing at the time of reporting.