UNIVERSITY OF CAMBRIDGE
Department of Veterinary Medicine

PhD Project: Roundworm-microbiome interactions in companion animals and implications for zoonotic disease transmission

Start Date: 1st October 2025

Supervisor: Professor Cinzia Cantacessi

Toxocariasis by the parasitic roundworms Toxocara canis and T. cati is included amongst the six most important neglected parasitic infections in all areas of the world, with populations inhabiting developing countries being particularly at risk of chronic disease. Dogs and cats are natural hosts of T. canis and T. cati, respectively, shedding embryonated eggs with their faeces that contaminate the surrounding environment and act as source of human infection. Regular anthelmintic treatment of companion animals significantly reduces egg shedding; however, in developing countries in particular, human infections remain common. Evidence that egg hatching of human and murine whipworms (i.e. Trichuris) is strictly dependent upon the host microbiome raises the question of whether maturation of T. canis and T. cati eggs depends upon the dog the canine and feline microbiome, respectively. Thus, the specific research aims of this project will be: (i) to understand whether the canine and feline gut microbiome participate in T. canis and T. cati egg maturation processes, respectively; (ii) to determine the impact of Toxocara infection, and of regular anthelmintic intervention in absence of infection, on the canine and feline gut microbiome from birth to adulthood; (iii) to determine whether host gut microbiome signatures (as observed in Aim ii) can be predictive of host susceptibility to infection and/or predisposition to repeated egg shedding. Data from this project will improve evidence base and means with which to intervene appropriately at individual and population levels, including through new diagnostics, and lead to a better understanding of Toxocara spp. fundamental biology and interactions with the host gut microbiome, with implications for reducing host susceptibility using microbiome-targeting interventions.

This interdisciplinary project will integrate key areas of parasitology, microbiology, molecular biology, bioinformatics, microscopy, machine learning and mathematical modelling, and will provide essential skills in these areas (interdisciplinary, transformative technologies, training in vulnerable skills).

How to apply: Contact the Supervisor to discuss the project before submitting an official application.

More on application process here:

https://www.postgraduate.study.cam.ac.uk/courses/directory/cvvtmpvet