Letter of intent

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Applicant
Title National Center for Host-Microbiome-Environment Interaction (C-HoME)

Abstract
Despite the long-standing advocate, there is a slow progress to reduce, refine, and replace the use of animals for scientific purposes (“3R principle”) since the launch of the directive 2010/63/EU. This slow progress is aggravated by the increasing demand of animal use in ever-expanding microbiome-host interaction research. There is emerging need of advanced alternative models to facilitate the compliment of the 3R principle, and meanwhile enable researchers to gain human-relevant insights in basic and clinical microbiome research. To address this need, Center for Host-Microbiome-Environment Interaction (C-HoME) offers an open infrastructure for humanized and animal-free research on the interaction of host, microbiome, and their environment. C-HoME aims to create a unique facility, centered in the state-of-the-art physiomimetic platforms, that enable a broad scale of research on host-microbiome-environment interactions at an unprecedented depth and humanized manner. The C-HoME is composed of four complementary facility cores: mucosal barrier microphysiological system (MPS), immunology, organotypic model, and microbiome. With these core facilities, C-HoME will deliver a coherent package of humanized tissue models and enabling technology that serve as a new home for biomedical and basic research in the fields of infections and GI disorders, animal and human nutrition, fundamental microbiology, probiotics & prebiotics, and live biological therapies. The implementation of C-HoME is highly aligned with the research priority groups of Medical Sciences (tissue models) and Life sciences and ‘enabling’ technology in LSRI Roadmap 2021, and links to the Green Life Sciences through UNLOCK.

In order to set up C-HoME, we will leverage the state-of-the-art single and multiple-organ microphysiological systems including GuMi and PhysioMimix MPS, two enabling technologies for the co-culture of mucosal barrier with other types of cells including anaerobic microbes individually or in consortia, innate immune cells, and neurons. The MPS will be set up in collaboration with the co-applicant CN Bio Innovations, which is a leading bioengineering company specializing in single and multi-organ MPS and innovative lab technologies. Further, we will create an organoids biobank that store the tissues and organoids from healthy and diseased human/animals, hence enable the modeling of different diseases. As immune cells are important components regulating and responding the environmental stimuli in the mucosal barrier, we will establish an immunology core that supplies high-quality characterization and phenotyping of immune cells. Finally, the microbiome core will provide expertise and service on assembling microbial consortia in co-culture with their mammalian host cells.

A multidisciplinary team will be assembled to set up C-HoME. The groups of researchers include Jianbo Zhang (UvA, GuMi, gut microbiome), Stanley Brul (UvA, molecular biology, microbiology), Marieke van Ham (Sanquin, immunology), Janneke Samsom (EUMC, mucosal immunology), Wouter de Jonge (AUMC-AMC, gastroenterology, mycobiome), Meike Wortel (UvA, metabolic models), Jurgen Seppen (AUMC-AMC, molecular biology), Aniko Korosi (UvA, neuroscience, microbiome), David Hughes (CN Bio, engineering), Hauke Smidt (WUR, microbiome, UNLOCK), Jerry Wells (WUR, organoids, mucosal immunology, pathogens), and Hans Bouwmeester (WUR, organs-on-chip). A steering committee will be established to direct the daily management of the infrastructure.

The relevant research fields: 21.80.00 Immunology; 22.10.00 Microbiology; 23.20.00 Organs and organ systems; 23.70.00 Nutrition

Organisation responsible for the application

Confirm letter of intent
With submitting this form via ISAAC I declare to have filled in this form completely and truthfully.

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