

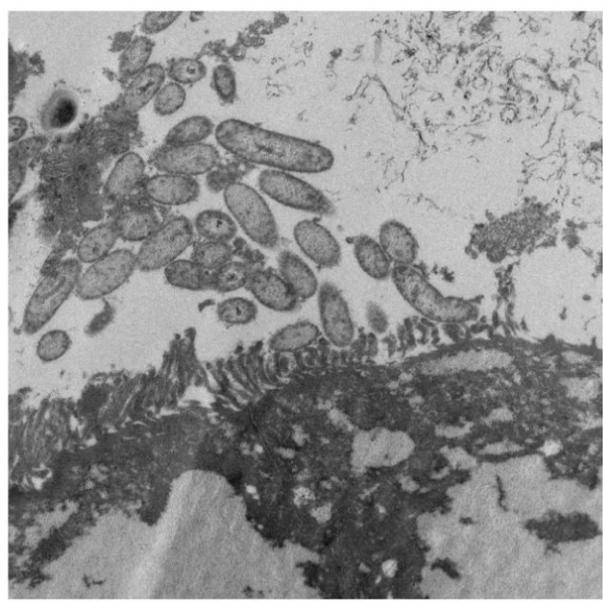
# Developing Novel Platforms for Infectious Disease Research

Principal Investigator Thomas Emil Andersen

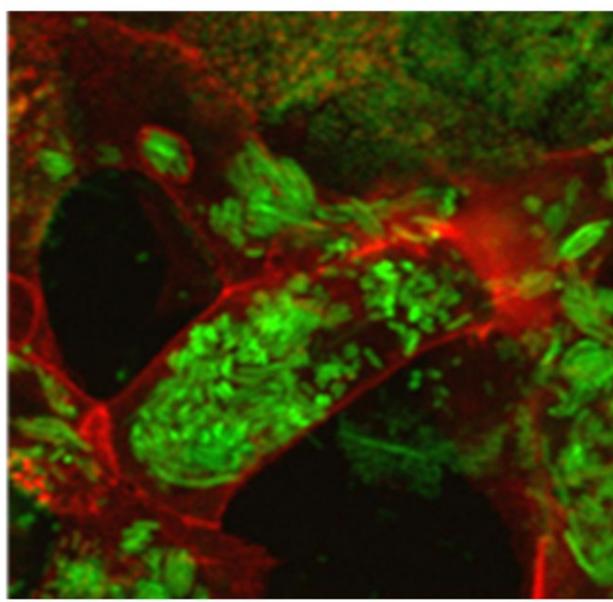
## Main research topics

The Andersen Lab is based at the Dept. of Clinical Microbiology, Odense University Hospital, and focuses on translating clinical and experimental research into new treatment regimens, diagnostic assays, and medical devices, in collaboration with hospital departments, university and industry partners.

We investigate host-pathogen interactions using in-house established in vitro cell culture models, including a suite of flow chamber models that simulate infection in the gastrointestinal tract, urinary tract, and intravascular environment. A comprehensive platform of animal models, including mouse, pig, and sheep, further supports our translational research and in vivo studies of infection pathogenesis.



Transmission electron microscopy of *C. difficile*-infected cell layers



Fluorescence microscopy of intracellular shiga toxin-producing *E. coli*

## The Andersen lab



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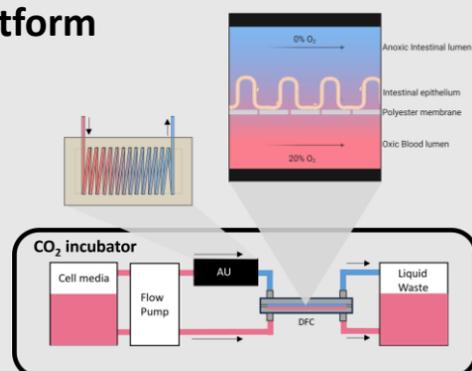


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Interested in doing a project  
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## Project examples

### Simulating host-microbiota interactions using a novel gut-on-a-chip platform



### Improving animal models for urinary tract infection (UTI) translational research



## Description

The human microbiota plays a fundamental role in maintaining health, regulating immune function, protecting against pathogens, and sustaining intestinal integrity. Disruption of this balance, known as dysbiosis, is linked to a wide range of serious conditions, yet existing laboratory models fail to replicate the key conditions of the human colon needed to study these interactions meaningfully. This project addresses that gap by utilizing a novel flow chamber system that supports stable, long-term co-cultures of living intestinal epithelium and obligate anaerobic bacteria under physiologically relevant conditions. *Using advanced microscopy, next-generation sequencing, microbial and standard molecular biological techniques, we investigate host-microbiota interactions and evaluate novel treatment strategies against anaerobic pathogens such as Clostridioides difficile.*

UTI is one of the most common bacterial infections worldwide, yet current animal models, primarily mice, do not always accurately reflect how the disease develops in humans. Pigs, on the other hand, more closely resemble humans in urinary tract anatomy and physiology, making them ideal for modeling urinary tract infection (UTI). The Andersen Lab developed the first porcine cystitis model, where inoculation with only a few bacteria of *E. coli* establishes a persistent bladder infection mimicking human disease. *In the project IMPACT, a cross-disciplinary team is now working to expand the diagnostic and immunological toolbox for this model, enabling more accurate preclinical testing and a better understanding of UTI pathogenesis.*