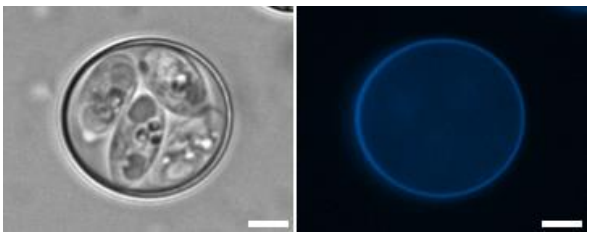
PhD POSITION AVAILABLE

Biophysical characterization and quantitative single-cell imaging of coccidian parasites



Duration: 36 months

Expected starting period: Oct / Nov 2022

Location
Laboratoire Adhésion et Inflammation (LAI) Inserm U1067 CNRS 7333 - Marseille - France
Laboratoire d'Hydrodynamique (LadHyx) CNRS 7646, Ecole polytechnique, Institut polytechnique de Paris - Palaiseau - France

Co-supervision
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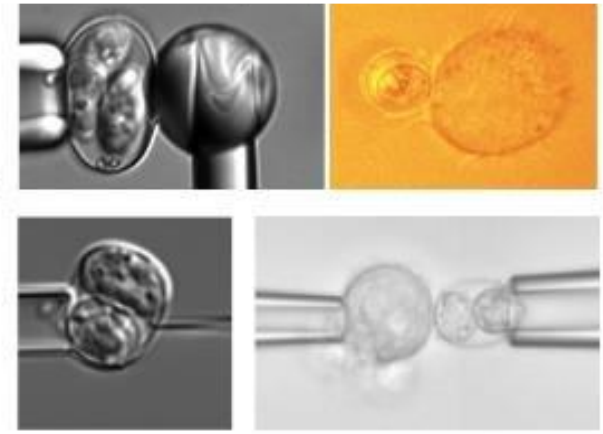
Project summary



Within the framework of the ANR *BreakingTheWall* consortium (PI A. Dumètre), this project is interested in the biophysics of the oocyst form of coccidia, a group of unicellular parasites that exhibit multi-layered walls to survive harsh environmental conditions including osmotic stress, temperature variations, and chemical disinfectants such as ozone or chlorinated products. To better understand how the walls determine the survival of *Eimeria* oocysts, a non-human pathogenic model of coccidia, the successful candidate will adapt / develop single-cell force measurement techniques (e.g. atomic force microscopy, optical tweezers, and micropipette aspiration techniques) coupled to imaging to characterize and quantify, at different scales, the structure, mechanics and adhesion of the walls under native and perturbated conditions. In particular, the candidate will lead the development of various micropipette techniques to investigate the properties of the oocyst walls, characterize the forces to deform and open them, and explore possible interactions between the oocysts and host cells in particular phagocytes, in the line of our previous works on the coccidian *Toxoplasma gondii*.

Requirements
MSc. with a solid background in cell biophysics. Previous experience on parasites is not mandatory, however individuals with additional working knowledge or strong interest in parasitology/microbiology are encouraged to apply. Excellent knowledge of English, good interpersonal and communication skills are also required.

Environments
The successful candidate will enrol at the doctoral school of life and health sciences (ED 62) at Aix-Marseille-University. He/she will be mainly hosted at the LAI (Marseille), with scheduled missions at LadHyx (Palaiseau) to develop certain micropipette experiments. LAI is located to Marseille-Luminy campus of science and technology, at the gate of the National Park of Calanques, an ideal place for hiking, climbing, and diving, and

few minutes by bus from the vibrant heart of Marseille city. LadHyx is located on Ecole Polytechnique campus, a world-class institution of higher education and scientific and technological research, within minutes from Paris downtown by public transport. These laboratories provide dynamic and collaborative environments and state-of-the-art equipment and technical platforms to achieve the project objectives. This project will benefit from collaborations of the other members of the ANR *BreakingTheWall* consortium (EA Escape Reims, Actalia St Lô, INRAE Tours) for parasite production, treatments, and assessment of their infectivity.

Salary

~1600 € / month, funded by ANR.

Contact

Please send a CV, letter of interest, MSc. thesis, and names and contact information of two references by email to Aurélien Dumètre (aurelien.dumetre@univ-amu.fr), Pierre-Henri Puech (pierre-henri.puech@inserm.fr) and Julien Husson (julien.husson@ladhyx.polytechnique.fr). Deadline: 1st October 2022.

Relevant references

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