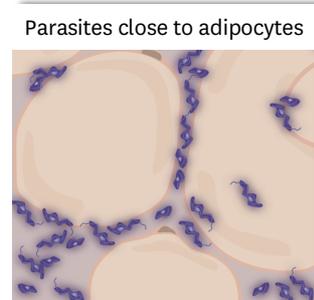


Master Project Proposal

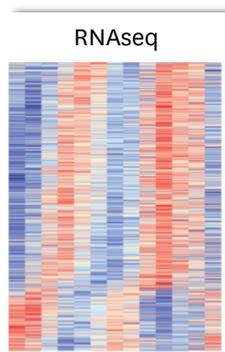
Title: Using computational biology to understand how parasites affect the host

Synopsis:

Our group at iMM-Lisboa has shown that the adipose tissue is a major parasite reservoir of the parasite that causes sleeping sickness in humans (*Trypanosoma brucei*). *T. brucei* are extracellular parasites and, in the adipose tissue, they live very close to adipocytes (the main cells of the adipose tissue, which store lipids). **How does the presence of parasites in the adipose tissue affect the transcriptome of the adipocytes?** Current efforts from our team have revealed that adipocytes lose their stored lipids by lipolysis. How is this change



accomplished at the molecular level? Do lipolytic enzymes become more abundant? And does the proximity of *T. brucei* parasites lead to other important changes in the function of adipocytes? **The goal of this dissertation is to use unbiased computational approaches to characterize how parasites affect the host cell function.** The student will compare the transcriptome of adipocytes



in infected versus healthy conditions at different times of the infection. Upregulated genes strongly indicate that a particular cellular function is activated in adipocytes, while downregulated genes indicate an inhibition. Ultimately, this RNAseq-based, big data analysis will tell us how parasites affect the host. Given that host cell modulation is the underlying basis of pathogenesis during disease, this project will allow us to better understand the symptoms of sleeping sickness and potentially identify ways of avoiding them.

In this dissertation, the student will learn how to analyse large data sets from RNAseq, using pre-existing tools and, if necessary, developing new ones in R, Perl, or Python.

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Co-Supervisor: Sara Silva-Pereira, *LFigueiredo Lab* ssilvapereira@medicina.ulisboa.pt

Bibliography:

- Trindade, S. *et al.* *Trypanosoma brucei* Parasites Occupy and Functionally Adapt to the Adipose Tissue in Mice. *Cell Host Microbe* **19**, 837-848 (2016).
- Tanowitz, H. B., Scherer, P. E., Mota, M. M. & Figueiredo, L. M. Adipose Tissue: A Safe Haven for Parasites. *Trends in Parasitology* **33**, 276-284 (2017). - review
- Rijo-Ferreira, F., *et al.* *Trypanosoma brucei* metabolism is under circadian control. *Nat Microbiol* **2**, 17032 (2017). – example of RNAseq study from our lab

Remunerated or volunteer training:

The student will be awarded a 10-month fellowship BI (bolsa de investigação), 752,38€/month.