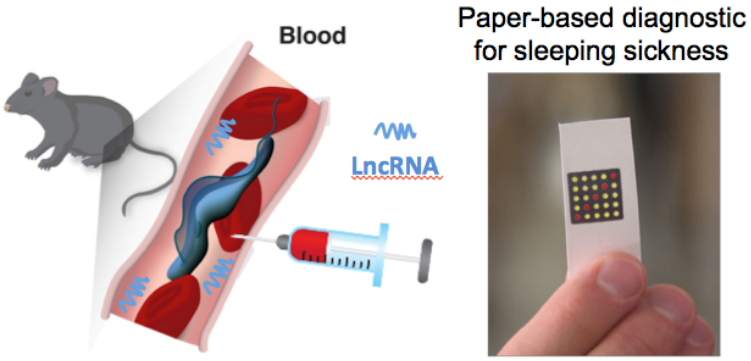
Instituto de Medicina Molecular

Master Project Proposal

lncRNAs in sleeping sickness in humans



Key questions:

1- Which long non-coding RNAs (LncRNAs) are secreted in body fluids during mouse infection ?

2 – Which LncRNA can be used as biomarkers of African sleeping sickness ?

Human African Trypanosomiasis (HAT), also known as sleeping sickness is one of the major neglected diseases. This fatal disease is caused by *Trypanosoma brucei*, a single-celled protozoan parasite. HAT is characterized by two clinical phases. In the first, parasites are present in the lymphatic system and blood and cause nonspecific symptoms, often confused with malaria. The invasion of the central nervous system by the parasites marks the second stage, causing an array of neurological disorders, leading to coma and death, if the patient is not treated. Current diagnostic of HAT is time-consuming, requires technical skills, and it is not appropriate for staging the disease. Therefore, future diagnostic tests must be affordable, easy-to-use, sensitive, rapid, safe and field-adapted.

Long non-coding RNAs (lncRNAs) are RNA molecules that do not encode for protein and are larger than 200nt. lncRNAs have emerged as master regulators of gene expression in all kingdoms of life and are implicated in tumour progression in a wide variety of human cancer conditions. Therefore, lncRNAs have emerged as important biomarkers in cancer diagnostics and therapeutics within the clinical setting. In our group, we have previously identified hundreds of lncRNAs transcribed in the bloodstream form of *T. brucei*. In a mouse infection, we have shown that lncRNAs are not equally expressed in parasites from blood or from tissues. We hypothesize *T. brucei* **lncRNAs ARE SUITABLE BIOMARKERS FOR A SIMPLE AND EFFICIENT DIAGNOSIS OF SLEEPING SICKNESS**. The goal of this thesis is to identify *T. brucei* lncRNAs that would be good biomarkers. For that, we will first use a mouse model to identify parasite lncRNAs present in circulating blood or urine or animals with an ongoing infection or recently treated with an anti-trypanosome drug. The next step is to confirm if such lncRNAs can also be identified in sera of HAT patients, thus validating these molecules as biomarkers in humans.

Bibliography: Franco, J. R., Simarro, P. P., Diarra, A., Ruiz-Postigo, J. A. & Jannin, J. G. The journey towards elimination of gambiense human African trypanosomiasis: not far, nor easy. *Parasitology* **141**, 748-760 (2014).

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This is a volunteer training. Students with an undegraduate degree in Biology, Biochemistry, Biological or Biomedical Engineering are preferred.
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