Leishmaniasis is a vector-borne parasitic disease caused by over 20 Leishmania species. It affects approximately 12 million people worldwide, with over 1 million new cases every year. Visceral leishmaniasis (VL), the most severe form of the disease, is fatal if left untreated. VL is mainly associated with *L. infantum* or *L. donovani* infection, as these parasites can infect the host internal organs, particularly the liver, spleen and bone marrow. Clinical atypical presentations are often reported and involve lung pathology and colonization by the parasites. Our group has shown using whole-mouse in vivo imaging that following blood dissemination Leishmania parasites can be detected in the anatomical regions of the lungs, liver and spleen. However, parasites persistence remains associated with liver and spleen. Based on these findings we are now exploring the host response mechanisms that efficiently eliminate parasites in lungs and that might be dysregulated in hosts with atypical clinical presentations. To do that, mice were infected with luciferase-expressing *L. infantum* amastigotes and the presence of parasites was confirmed by in vivo bioluminescence imaging of the whole body and the isolated organs of interest. At fifteen minutes post-infection the bioluminescent signal in the lungs corresponded to about 40% of the whole body and to 94% of the isolated organs. This signal drops to less than 5% at day 3 post-infection. Tissue preparations were analyzed using immunofluorescence microscopy. For this analysis, an anti-luciferase antibody is being used to label parasites and anti-F4/80, anti-CD11c and anti-ly-6G/Ly-6C antibodies to label the different phagocytic cells. With this project, we expect to contribute to better understand *Leishmania* host tissue tropism.

**Animal Infection and In Vivo Imaging**

- **L. infantum** mice infection
- In vivo imaging at 10min and D1 post-infection
- Collection of lungs, liver and spleen
- In vivo imaging

**Detection of Leishmania Parases and Phagocytic Cells in Host Tissues by Immunofluorescence**

- Fixation: 20min ice-cold acetone
- Blocking: 5%BSA for 3h RT
- Incubation with secondary antibodies: 1 hours RT in the dark
- Incubation with primary antibodies: 2 hours RT in the dark
- Mounting: Fluoroshield with DAPI medium
- Imaging acquisition: Axiovision 4.8 software

**Conclusions**

- Following *L. infantum* inoculation, parasites accumulate in the lungs and are rapidly cleared. Their survival remains associated with the liver, spleen and bone marrow.
- Suggestion of neutrophils involvement in lungs efficient parasites clearance.

**References**