

Background

Polyamines are important molecules involved in cell growth, direct DNA interaction, TCA cycle, and in macrophages, they can play a function on activation and polarization in the response to pathogens. The mechanism to control *Leishmania* infection relies on a balance between the conversion of arginine into nitric oxide (NO) to kill the parasite and the arginine conversion into ornithine and subsequent into polyamines putrescine, spermidine, and spermine, necessary for parasite survival. **In this work, we ask whether polyamine availability can act in gene expression and immune response of BALB/c macrophages during 4 and 24 hours of infection with *L. amazonensis*.**

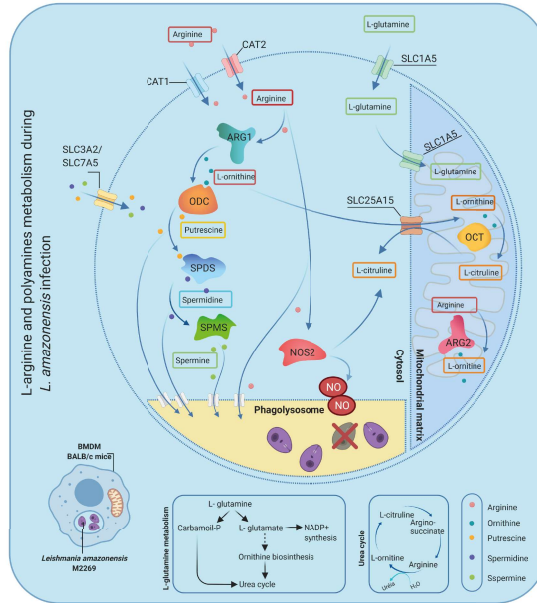


Figure 1: Arginine and polyamines pathways in macrophage and during *L. amazonensis* infection

Regarding some proinflammatory cytokines, the levels of *Il-1b* mRNA increased in uninfected macrophages supplemented with spermidine and spermine after 24h, but did not alter the expression of *Tnfa*.

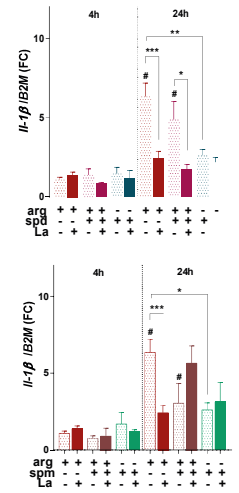


Figure 6: Expression of *Il-1b* mRNA in supplementation with Arginine (arg+) and/ or spermidine (spd+) and spermine (spm+). * : p<0.05, ** : p<0.005, *** : p<0.0001, **** : p<0.0001, #: p<0.05 for 4h vs 24h.

The host arginase 2 (*Arg2*) mRNA levels were increased in supplementation with putrescine in infected macrophages at 4h.

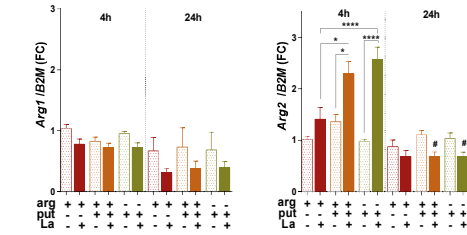


Figure 4: Expression of Arginases 1 and Arginase 2 mRNA in supplementation with Arginine (arg+) and/ or putrescine (put+). * : p<0.05, ** : p<0.005, *** : p<0.0001, **** : p<0.0001, #: p<0.05 for 4h vs 24h.

The levels of *Nos2* mRNA were increased in supplemented with putrescine and infected macrophages at 4h, which did not reflect in NO production.

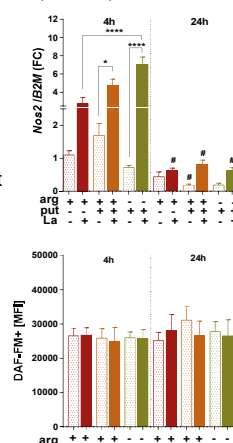


Figure 5: Expression of *Nos2* mRNA and MFI of macrophages in supplementation with Arginine (arg+) and/ or putrescine (put+). * : p<0.05, ** : p<0.005, *** : p<0.0001, **** : p<0.0001, #: p<0.05 for 4h vs 24h.

The levels of *Mcp1* increased in infected macrophages supplemented with arginine plus putrescine or putrescine only at 24h.

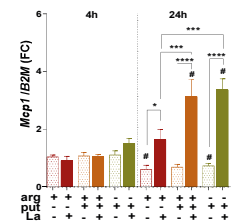
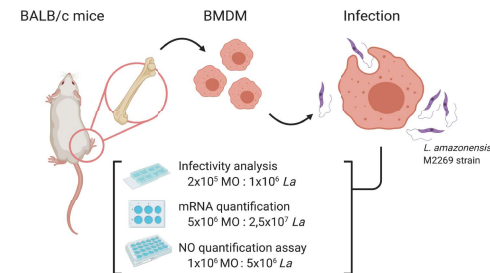


Figure 7: Expression of *Mcp1* mRNA in supplementation with Arginine (arg+) and/ or putrescine (put+). * : p<0.05, ** : p<0.005, *** : p<0.0001, **** : p<0.0001, #: p<0.05 for 4h vs 24h.

Related articles



Methodological strategy
Arginine deprivation or arginine supplementation for uninfected macrophages (MO) or infected (MO-La) with *Leishmania amazonensis*

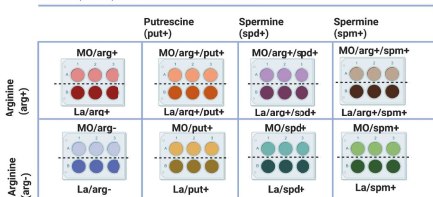


Fig 2: Methodological strategy

Transcripts of *Slc3a2*, a polyation transporter, reduced expression in uninfected macrophages supplemented with arginine plus spermidine or spermidine only after 24h, compared to arginine supplementation.

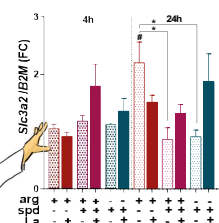


Figure 3: Expression of *Slc3a2* mRNA in supplementation with Arginine (arg+) and/ or spermidine (spd+). * : p<0.05, ** : p<0.005, *** : p<0.0001, **** : p<0.0001, #: p<0.05 for 4h vs 24h.

Levels of transcripts
Infectivity



The percentage of infected macrophages was lower in putrescine, spermidine and spermine supplementation than arginine supplementation, reducing the infection index.

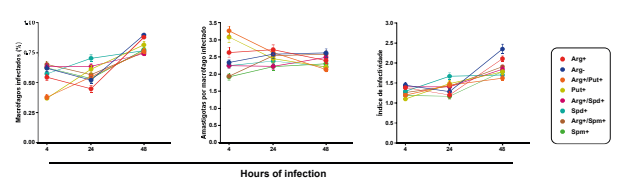


Figure 8: Infectivity levels in BALB/c macrophages in supplementation with Arginine (arg+) and/ or putrescine (put+), spermidine (spd+), spermine (spm+) in 4, 24 and 48h. * : p<0.05, ** : p<0.005, *** : p<0.0001, **** : p<0.0001, #: p<0.05 for the comparison between 4h vs 24h.

Results