

## LEPTOSPIRA INTERROGANS, L. BORGPETERSENII AND L. NOGUCHII ISOLATED FROM CATTLE SHOW DIFFERENT VIRULENCE CHARACTERISTICS TO ESTABLISH KIDNEY COLONIZATION IN A MURINE MODEL OF SUBLETHAL INFECTION

Ciuffo C<sup>1</sup>, García F<sup>1</sup>, Arévalo AP<sup>2</sup>, Perdomo Y<sup>3</sup>, Crispo M<sup>2</sup>, Giannitti F<sup>3</sup>, Buschiazza A<sup>4</sup>, Zarantonelli L<sup>1</sup>

<sup>1</sup>Unidad Mixta Pasteur+INIA (UMPI), <sup>2</sup>Unidad de Biotecnología de Animales de Laboratorio (UBAL), <sup>4</sup>Laboratorio de Microbiología Molecular y Estructural (LMM&E), Institut Pasteur de Montevideo, Uruguay; <sup>3</sup>Plataforma de Investigación en Salud Animal, INIA La Estanzuela, Colonia, Uruguay

ciuffo@pasteur.edu.uy

Leptospirosis is an endemic disease in Uruguayan livestock with economic consequences due to abortion, infertility, and death of young animals, in addition to the zoonotic risk. In a recent study, >1000 cows were sampled to characterize the leptospira strains circulating in Uruguayan cattle (1). Approximately 20% of these cows excreted pathogenic leptospires in urine, from which *L. interrogans*, *L. borgpetersenii* and *L. noguchii* were isolated. Here, we assessed the virulence and immunogenicity of autochthonous bovine *Leptospira* spp. isolates using a murine sublethal infection model that somewhat mimics the *Leptospira* infection cycle in the bovine host.

Adult C57BL/6J mice were challenged intranasally with four different *Leptospira* strains isolated from cattle: *L. interrogans* serogroups Pomona (LIP) and Canicola (LIC), *L. borgpetersenii* serogroup Sejroe (LBS) and *L. noguchii* serogroup Autumnalis (LNA). The infection kinetics in blood and urine was assessed by qPCR targeting the *lipL32* gene. The serologic humoral response was evaluated by MAT to detect anti-*Leptospira* antibodies. The inflammatory response in lung tissue at 2 days post-infection (dpi) was studied by quantifying pro-inflammatory cytokines expression by RT-qPCR. Renal colonization was assessed at 60 dpi by quantifying the bacterial load by qPCR and isolating viable leptospires using microbiological culture.

Both LIP and LIC were detected in blood and urine, colonized the kidneys and induced a humoral response. LBS and LNA also invaded the blood and induced a humoral immune response but failed to colonize the kidneys. Interestingly, LBS and LNA induced a higher inflammatory response in the lungs compared to *L. interrogans*, suggesting a distinct modulation of the host immune response likely occurring at the site of infection entry. These results, showing that different *Leptospira* species have different abilities to establish chronic renal colonization in mice, highlight the need for further research to understand how different pathogenic *Leptospira* interact with their diverse hosts.

### References

(1) Zarantonelli L, et al. (2018) <https://doi.org/10.1371/journal.pntd.0006694>