NRCPD-OUAVM Joint Research Report

Date: May 23, 2022
Project no: 2021-joint-18

1. Principal investigator

Name: RNDr. Daniel Sojka, Ph.D.
Position: Research Scientist – Laboratory of Molecular Biology of Ticks (previously Laboratory of Vector Immunology)
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2. Project title:

The development of a DiCre recombinase-expressing strain of Babesia for the creation of conditional gene knockouts.

3. Collaborating research group members at NRCPD

Name: Prof. Shin-Ichiro Kawazu and Dr. Masahito Asada
Position:

4. Research period (in mm/dd/yyyy, and total number of years)

01/04/2021 -31/03/2022
1 year

5. Purposes and objectives

The major objective of this project is the development of novel functional genomic tools for tick-borne Babesia parasites, namely the creation of a stable transgenic DiCre recombinase-expressing strain(s) of Babesia. DiCre conditional recombinase system enables functional analysis of indispensable parasite genes where conventional non-inducible knock-out systems cannot be used. This technique has been previously applied to Apicomplexa model species *Toxoplasma gondii* and *P. falciparum* but Babesia recombinase-expressing strain has not yet been introduced.

The individual objectives of this project include (i) the design and cloning of Babesia plasmid constructs allowing for the integration of both Cre subunits into the same genomic locus of selected Babesia species, (ii) generation of “parental” DiCre parasite line(s) incl. optimization of transfection strategy for Babesia, (iii) implementation of the loxP sites into the parasite via the both episomal and intra-genomic approaches to verify recombinase activity, and (iv) performance of conditional knock-out(s) of selected Babesia target genes.

6. Outline of research process

no progress (no visit) due to COVID-19 related restrictions in 2021

7. Outline of research achievements

no progress (no visit) due to COVID-19 related restrictions in 2021

8. Publication of research achievements

no progress (no visit) due to COVID-19 related restrictions in 2021