NRCPD-OUAVM Joint Research Report

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1. Principal investigator

Name: Batdorj Davaasuren
Position: Researcher
Affiliation: Institute of Veterinary Medicine

2. Project title:

Investigation of parasitic strategy, especially tissue parasitism of *T. equiperdum* on horse

3. Collaborating research group members at NRCPD

Name: Keisuke SUGANUMA
Position: Assistant Professor

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

01/04/2022 – 331/03/2023, 1 year

5. Purposes and objectives

Trypanosoma equiperdum primarily parasitizes the genital organs and causes dourine in equidae. Dourine is considered an economically important disease of horses in Mongolia. In the previous studies, we have collected autopsy samples from naturally infected horse. Autopsy sample from naturally infected horse provide only a window of information about infection at the time of euthanasia and it cannot provide dynamics of infection. Therefore, the objective of this study was to determine the parasitism of *T. equiperdum* by sequential sampling from *T. equiperdum* experimental infection in horses.

6. Outline of research process

1. *T. equiperdum* IVM-t1 strain was experimentally infected to 3 horses.
2. From two days the post infection, the infected horses' basic physiological parameters were measured, and also samples (blood, serum, milk and genital organ's swab) were collected.
3. Parasites were microscopically observed using thin blood smears.
4. DNA were extracted from blood, swab and milk samples.
5. The extracted DNA was analyzed by PCR assay using the parasite specific primers.
6. Serum samples were applied for ELISA and ICT to detect anti-trypanosome antibody.

7. Outline of research achievements

Results:

Horse 1 and Horse 2:

Physiological parameters were normal for 50 days post infection. In those horses, we made the experimental infection with $1x10^5$ and $1x10^6$ parasites by vagina. There is no detected parasite DNA in the blood and swab of those horses. When I analyze the horse's sera by ELISA and ICT tests which are based on recombinant antigens (rTeGM6), no detected any positive by both methods. Also, I didn't find any parasite from the blood smears.

Horse 3

In this horse, we made the experimental infection with dilution of the parasite $1x10^5$, by vein. For general blood parameters, the number of white cells has increased from 10th day post-infection. This means that inflammation has already developed in the horse. As for the PCR assay in blood samples, the positive bands have detected from the third day of post-infection in the horse. But no detected any positives from swab samples in this horse. Antibody titer has increased a little in the horse from 14th days of post infection was detected by ELISA test. But not detected any positive by ICT test. The antibody titer which against the parasite was increased a little in the horse's serum from 14th days of post infection was detected by ELISA test. But not detected any positive by ICT test and blood smear.

Discussion

In the horse, that only was made an experimental infection with *T. equiperdum* IVM-t1's culture ($1x10^5$) by vein, was detected as positive on the 3rd day post-infection only in blood by PCR, and at 14th days post-infection in serum by ELISA, respectively. But the ICT test did not show any positives. That means the parasite culture adapted to laboratory environment couldn't survive in vaginal condition compare to natural wild-type, while the culture is only able to survive in blood circle of the horse. The present study is the first time conducted experimental infection in a real host (horse) by the *T. equiperdum* IVM-t1 strain in Mongolia.

8. Publication of research achievements

None

Attach reference materials as necessary.

None