

Project/Meeting title

Using Insect Specific Viruses for Arbovirus Control in Mosquitoes (applied category D and accepted in category C)

Members

Principal investigator:

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Report

Our original plan was set to visit Ehime University for the LaMer Special Seminar series, entitled "Using Insect Specific Viruses for Arbovirus Control in Mosquitoes". However, the planned meeting and symposia were unable to be held due to the covid-19 pandemics.

Despite this roadblock, our collaborative research project continued from the LaMer grant 2022 and moved forward. We had several online meetings to discuss the related topic that is insect-specific viruses (ISVs) in mosquito vectors. Mosquitoes harbor commensal ISVs, which are not infectious to vertebrates. Several studies have shown that ISVs can suppress the replication of arboviruses in cell culture and in vivo. However, the mechanisms underlying anti-arboviral effects remain still unclear. In addition, there are few studies on the biology of ISVs in mosquitoes. We exchanged ideas on how we could tackle these questions about ISV biology. Our collaborative work aimed to understand the fitness costs of ISV infection in mosquito vectors. Dr. Suzuki have worked on the project using *Aedes aegypti* mosquito lines and its major ISV, cell-fusing agent virus (CFAV), both of which

we provided. The preliminary results showed as followings:

1. CFAV replicated in *Aedes aegypti* female and male mosquitoes and established persistent infection.
2. *Aedes aegypti* mosquitos' life span was not affected by CFAV infection even the virus efficiently replicated in the mosquitoes.
3. CFAV-infected mosquitoes showed higher human host-seeking ability in a particular condition but not in most cases.
4. The fecundity and fertility of *Aedes aegypti* were not affected by CFAV infection.

Most of the results suggest that the infected mosquitoes can compete with uninfected ones in the field, and it support the use of ISVs in arbovirus control. However, the potential enhancement of the human host-seeking ability of the mosquitoes by CFAV infections has to be considered. Our work demonstrates the importance of assessing the fitness costs of ISV infections in the mosquito vectors, which is often ignored in the related studies. In addition, we have shed light on ISV biology in mosquito vectors. These results were presented in the conference below during this fiscal year.

- The 45th Annual Meeting of the Molecular Biology Society of Japan
- The 69th Annual Meeting of the Japanese Society for Virology
- Pasteur Japan 2022 Symposium: France-Japan Cooperation on Health

As mentioned above, due to the restrictions imposed by the Covid-19 pandemia, we could not visit Ehime University and organize the seminar during this fiscal year. However, the LaMer grant gave us an excellent opportunity to launch and advance our international collaborative work.