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High-throughput neutralization assay for flaviviruses

Researcher Information

- Ryosuke Suzuki
- Department of Virology II, National Institute of Infectious Diseases
- Collaborating Institutions: Osaka University, MyCAN TechnologiesCo., Ltd.

Research ideas and technological seeds

- Utilizes DNA-based replicons, no need for RNA synthesis (simple).
- Considered non-pathogenic due to single-infection nature (safe).
- Infection mode similar to live viruses (can be used in ADE assay).
- Infection can be quantified using luciferase activity (high-throughput).
- Various chimeric flavivirus SRIPs can be generated using only prME sequence information.

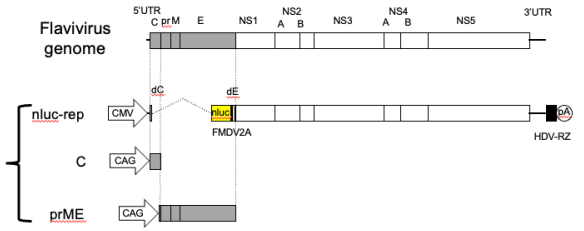
Suzuki R. et al., Virol. 2014
Yamanaka A et al., Vaccine 2014
Yamanaka A et al., JVM 2017
Matsuda M. et. al, Sci Rep. 2018
Yamanaka A. et. al, mSphere 2021

Background and the issues to solve

- Neutralization test of serum is crucial for the diagnosis and epidemiological investigation of flaviviruses such as JEV, TBEV, and dengue virus due to the problem of cross-reactivity. However, neutralization test of flaviviruses that require containment facilities or are difficult to obtain is challenging, and testing using pathogenic viruses is time-consuming and labor-intensive. Therefore, we have established a safe and high-throughput flavivirus neutralization testing system.

Research overview

- The viral genome is divided and introduced into cells to generate a sing infectious virus.



Future plans

- Antibody evaluation in vaccinated individuals, vaccine performance evaluation.
- Development of diagnostic systems for unknown flaviviruses.
- Seroepidemiological surveys of wild animals in Brazil.