【International Leading Research】

Promotion of comprehensive interdisciplinary virology for the post-COVID era

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Purpose and Significance of the Research

●The aim of this international research

The WHO and CDC alarm that the COVID-19 pandemic is not the last in human history. In fact, since the 21st century, there have been periodic outbreaks of various viruses, including SARS (2003), H1N1 influenza (2009), MERS (2012), Ebola virus disease (2014), and monkeypox (2022). To respond immediately to novel viral infections that may lead to a new pandemic, we will collaborate and share information with overseas virologists and public health scientists. Additionally, there is a risk of new outbreaks of novel virus infections specific to Japan. Tick-borne encephalitis and severe febrile thrombocytopenia syndrome are infectious diseases caused by tick-borne flavivirus and bunyavirus infections, respectively, and have already occurred sporadically in Japan. Novel pathogenic viruses have also been discovered in ticks and mosquitoes worldwide, including Japan. Furthermore, with the progress of global warming, Japan is becoming increasingly subtropical. This increases the risk of tropical infectious diseases, such as dengue fever (caused by flavivirus), in Japan year by year. Altogether, to prepare for the risk of new pandemics in the post-COVID era, we will work on these projects: (1) establishing a domestic platform that can immediately initiate the research to combat novel virus infections when new outbreaks and pandemics occur and (2) fruitfully collaborating with overseas researchers, not only for basic science but also for maintaining a safe, healthy, and stable social life.

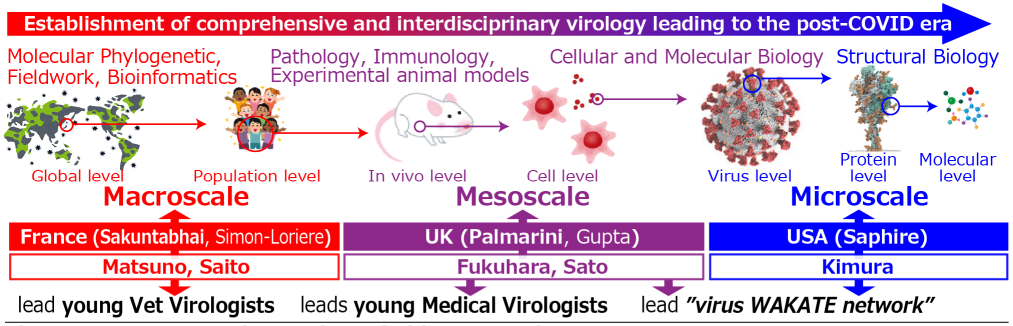

Figure 1. Concept and Overview of This Proposal.

Organization of the Project Team

●Comprehensive and international collaboration research led by young researchers (41.2 yo on average)

To facilitate the expansion of international collaborative research with the United Kingdom, France, and the United States, this project focuses on strengthening overseas partnerships and interdisciplinary cooperation, primarily led by key members of G2P-Japan (Sato, Fukuhara, Matsuno, Saito). Furthermore, Kimura will address the micro-scale analysis of viral proteins. This aims to deepen the structural understanding of viral proteins and pursue drug development targeting emerging viruses that could serve as causes for the next pandemic or epidemic.

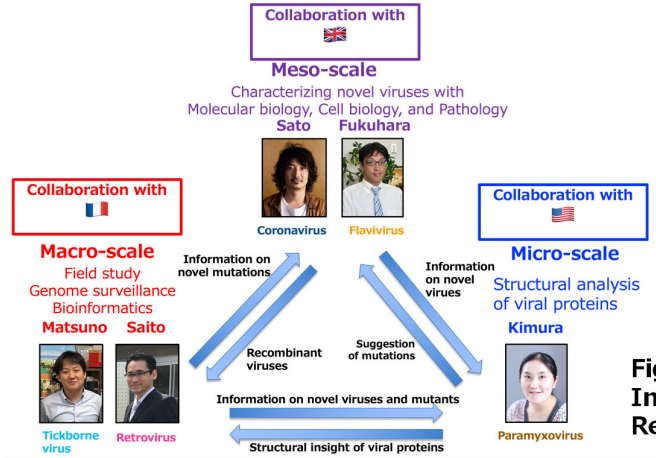

Fig.2. International Collaborative Research Framework

Plan for Fostering Early-career Researchers (ECRs)

●Domestic Internship Program (3~5 people, few weeks to months/year)

- ✓ Supporting the acquisition of technical skills
- ✓ Dispatching ECRs to labs conducting research on scales different from them
- ✓ Training **generalists** with expertise in diverse area of virology as well as both experimental/bioinformatics skillsets

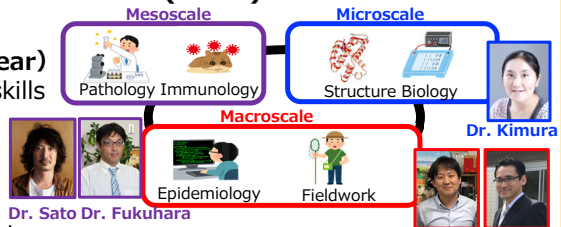

Fig.3. Domestic Internship

● Double Mentoring System (12 people: 50%~ women、0.5~few years)

- ✓ Seeking guidance from world-class experts to further advance research on ECRs' specialized field
- ✓ Training **specialists** with high expertise

Fig.4. Double Mentoring

● International Virology Summer Camp (30 people , once/year)

- ✓ Organizing a research workshop with domestic and overseas ECRs
- ✓ Supporting ECRs to enhance international leadership, communication skills, and management abilities
- ✓ **Establishing of international networks among ECRs who will be future PIs**

Fig.5. International Virology Camp

Homepage Address, etc.	https://www.ims.u-tokyo.ac.jp/SystemsVirology/