Kai LAB.

[Effective utilization of virus]

Infectious Disease Control Science

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Aiming for effective use of morbillivirus

Morbilliviruses, including measles virus, have the property of inducing strong immunity in the infected host, resulting in lifelong immunity. Kai LAB. is currently focusing on the following developments based on the accumulation of many years of morbillivirus research.

Vaccine development using morbillivirus

The Kai LAB. succeeded in constructing the first reverse genetics system that produces infectious virus from genes, and worked on the development of a bivalent vaccine against infectious diseases caused by various viruses, parasites and measles virus.

Nipah virus was first identified in Malaysia in 1997, causing acute encephalitis with a human fatality rate of 90%. Deaths due to infections and other complications caused by the virus have been reported mainly in Southeast Asia. As human beings are in the midst of fighting against the new coronavirus SARS-CoV-2 causing COVID-19, Nipah virus is also a pathogen with a risk of causing a large-scale health damage. In 2015, the WHO’s “Blueprint List of Prioritizing Diseases” has included Nipah as a disease with a great public health risk.

The Nipah virus vaccine using recombinant measles virus developed by the Kai LAB. was recognized to be a promising vaccine. With the large-scale support from the Coalition for Epidemic Preparedness Innovations (CEPI), our international joint research is making full-scale efforts toward the practical implementation and application of the world’s first Nipah virus vaccine.

Development of oncolytic virus using recombinant measles virus

We found that the HL strain of measles virus has a strong toxic effect on various tumor cells including breast cancer cells. We genetically modified the measles virus HL strain using reverse genetics to produce a recombinant virus (rMV-SLAMblind) that selectively targets only tumor cells and produces oncolytic activity without causing measles symptoms.

So far, rMV-SLAMblind shows remarkable antitumor effect in various tumor-bearing mouse models, suggesting that it is promising as a new cancer treatment method.

With funding and support from the Japan Agency for Medical Research and Development (AMED), translational research of the oncolytic measles virus is underway with an aim of starting a clinical trial.