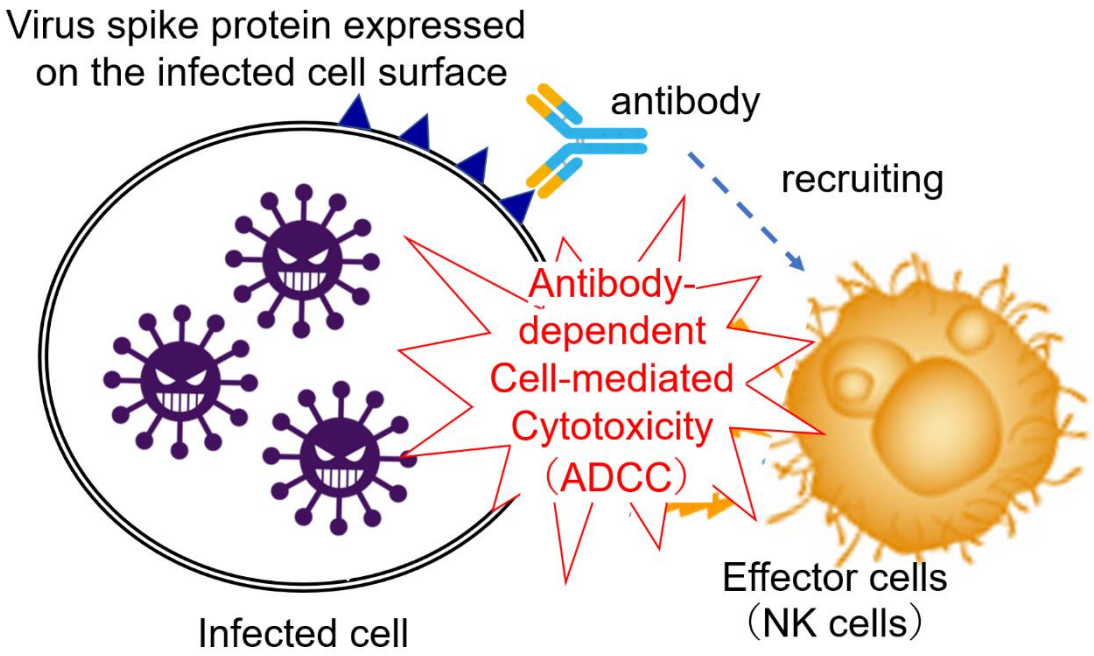
Research flow

NIBIOHN and Shionogi & Co., Ltd. are engaged in joint research seeking to identify an effective therapeutic antibody drug that exhibits broad cross-reactivity against associated coronaviruses in addition to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

The research group has also pursued antibodies that show efficacy through a mechanism different than antibody neutralization[1].

Using NIBIOHN's "epitope-normalized antibody panel"[2,3] technology, the researchers have successfully identified a group of antibodies that prioritizes ADCC activity[4] and recognizes structures within the virus spike (S) protein expressed on infected cells.



❖ **Glossary**

[1] Neutralizing antibody

An antibody that inhibits the infectivity of a virus. Neutralizing antibodies bind to the receptor-binding domain (RBD) of vital spike protein and thereby block the virus entry into the cell.

[2] Epitope

A target site to which an antibody binds. Generally, an epitope is a small part of the antigen molecule. Individual antibodies bind to their specific epitope and exhibit different functions depending on the epitope.

[3] Epitope normalized antibody panel (ENAP; NIBIOHN patented technology)

ENAP is an antibody panel with a minimal number of members that encompasses all of the epitope groups on a target's accessible surface. This technology allows exploration and identification of antibody functions with a minimal number of antibodies.

Website: https://www.nibiohn.go.jp/cddr/research/project02.html

[4] Antibody-dependent cell-mediated cytotoxicity activity (ADCC activity)

When a virus infects a target cell, viral spike antigens appear on the cell surface upon virus replication. Antibodies that bind to these antigens on the infected cells recruit host effectors cells such as natural killer (NK) cells via Fc-portion of the antibody constant domains. As a result, the recruited effector cells become activated and destroy the infected cell; this sequence of events is the ADCC..

❖ **The National Institutes of Biomedical Innovation, Health and Nutrition**

The Institutes were established on April 1, 2015, integrating the National Institute of Biomedical Innovation (NIBIO) and the National Institute of Health and Nutrition (NIHN). The laboratories have expertise in a broad range of research from medicine to the health sciences and were designated a national research and development agency to ensure the most significant results for research and development in the public interest, as provided through means such as enhancements to the level of science and technology in Japan, leading to the robust growth of the national economy.

Website: https://www.nibiohn.go.jp/

❖ **Background of the Researchers**

NAGATA Satoshi: Ph.D., Science University of Tokyo 1992-. Assistant professor at Science University of Tokyo. 1996- Assistant Professor, University of Tokyo, 1999- Research Fellow at NIH (USA). 2007- Associate Scientist at Sanford Research (USA). Returned to Japan in Fall 2015, currently Project Leader, Antibody Design Project, Center for Drug Design Research, National Institute of Biomedical Innovation.

KAMADA Haruhiko: Ph.D., Graduate School and School of Pharmaceutical Sciences, Osaka University Assistant professor at Faculty of Medicine, Mie University (2000). Guest Researcher at ETH (Eidgenössische Technische Hochschule) Zürich (2007). Invited Professor at Osaka University (2014). Collaborating Professor at Graduate School and Faculty of Pharmaceutical Sciences, Kyoto University (2020). Affiliated with National Institute of Biomedical Innovation since its founding in 2005, currently Project Leader, Laboratory of Biopharmaceutical Research.