

Achievements in Rabbit Monoclonal Antibody Discovery using Ecobody technology

VOL. 1



Successfully Developed a Highly Sensitive Antibody for Phosphorylated Peptide:

A Breakthrough After 5 Years of Challenges with Other Technologies

Our company has worked to discover rabbit monoclonal antibodies that specifically react with phosphorylated peptide, for use in a diagnostic device for a certain disease currently under development by our client. The desired antibodies were obtained in a short period. Dr. Takahito Kawano, who was in charge of the practical development of the diagnostic device at the Center for Advanced Medical Open Innovation of Kyushu University, shared insights regarding the objectives, the process leading to success, and his evaluation of our services.

Client: Dr. Takahito Kawano, Center for Advanced Medical Open Innovation, Kyushu University
Agent: Cosmo Bio Co., Ltd.



Left: Dr. Takahito Kawano at Kyusyu University
Right: Yo Max Amakusa, CEO at iBody

? Can you tell us about the objective of discovery the monoclonal antibody and the target (antigen)?

We are developing a diagnostic device to detect a biomarker for a certain disease, and the peptide corresponding to this biomarker is the target of this project. As the peptide undergoes phosphorylation, we aimed to discover high-potency, high-sensitivity monoclonal antibodies capable of clearly distinguishing between the presence and absence of phosphorylation.

? What type of trial and error process did you go through to obtain the desired monoclonal antibody?

This project had a strict deadline, so it was crucial to generate highly functional antibodies in a short period, which made speed a top priority. We had previously worked with other companies, but the mouse monoclonal antibodies did not show sufficient function and were far from the ideal antibodies we sought. For approximately 5 years, we tried various technologies to obtain antibodies that met the required functions, but this was the first time we were able to achieve an antibody that met our requirements.

? Can you tell us about your evaluation of the rabbit monoclonal antibody and how it differs from the antibodies obtained using other technologies?

The rabbit monoclonal antibodies obtained met our expectations because of their high potency and specificity in distinguishing the presence or absence of phosphorylation. Additionally, iBody provided us with sequencing information about the antibodies, which eliminated the issue of batch-to-batch variation often observed with polyclonal antibodies.



How did you become interested in Ecobody technology and why did you choose to use our service? Can you share your thoughts on the service?

The diagnostic device that we are developing is very sensitive to antibody potency, and we have been struggling with the stability and reproducibility of the target detection because of batch-to-batch variations in polyclonal antibodies. Even when we found high-quality antibody batches, we faced the concern of running out of stock, which could have halted development. We started considering switching to monoclonal antibodies. After learning about iBody's Ecobody technology through an agency, I received detailed information about the technology and work schedule. First, I had the impression that the service might be expensive; however, the performance of monoclonal antibody we obtained and its quick delivery exceeded our expectations. Furthermore, the sequencing information provided eliminated the frustration of batch-to-batch variation, and even if we run out of stock, we can quickly receive the same batch based on the sequencing information, which has been incredibly helpful. The fact to transfer all intellectual property and rights was also an attractive feature, especially as we aimed for commercialization.

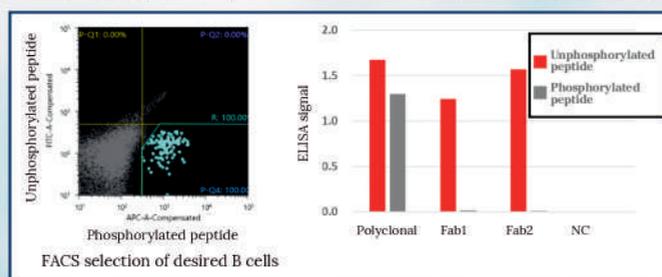


Figure 1: Antibodies (Fab1, Fab2) that selectively react with the target phosphorylated peptide.



Can you tell us about your future plans for the antibodies you have obtained?

We aim to develop an in vitro diagnostic device using the obtained antibodies. While we cannot share detailed information, we aim to develop the device that can easily detect biomarkers in a short time with high sensitivity and that is accessible to anyone.

About Ecobody Technology

iBody's proprietary technology, which integrates single-cell and cell-free antibody expression technologies (patented technology), efficiently discover monoclonal antibodies. This process involves amplifying antibody-encoding genes from individual B cells using single-cell reverse transcription polymerase chain reaction and expressing Fab antibodies in a cell-free system.

By conducting all steps in a cell-free environment, Ecobody technology enables the comprehensive and rapid exploration of the desired antibodies.

※In vitro antibody expression technology

In antibody expression using cell-free protein expression systems, there are challenges, such as insufficient expression levels and improper association of the expressed heavy and light chains.

Ecobody technology addresses these issues by adding an SKIK tag at the N-terminus to enhance expression levels, and a leucine zipper (LZ) tag at the C-terminus to promote the association of the H and L chains, enabling efficient production of Fab antibodies in vitro.

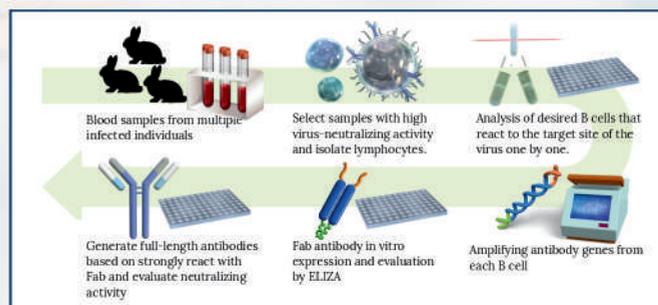


Figure 2 : Flow of Antibody discovery and evaluation

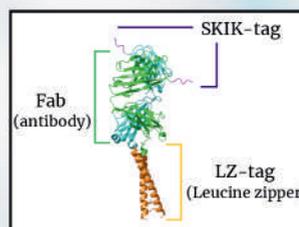


Figure 4: Patent information on the addition of SKIK and LZ tags to antibodies. This figure is based on public information from the Protein Data Bank (PDB ID: 6B9Y).

Patent Information

iProtein Expression Method (Japan Patent No. 6681625; U.S. Patent Number: 10975376; European patent No. EP3312278)

- Tagged antibody (Japan Patent No. 6744670)

For inquiries on monoclonal antibody generation, contact us.



<https://www.ibody.co.jp/en/>

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