

Achievements in Rabbit Monoclonal Antibody Discovery Using iBody technology

Successfully Developed Antibodies for a Pancreatic Cancer Marker with High Sensitivity and Broad Applicability

We recently received a request from Dr. Keisuke Taniuchi, CEO of Salus Science Corporation (Associate Professor of the Department of Gastroenterology and Hepatology, Kochi University School of Medicine) to prepare antibodies against novel candidate biomarkers for pancreatic cancer based on his research. Using the targets, we successfully obtained highly specific antibodies. We spoke with Dr. Taniuchi about the purpose of discovering these antibodies and their potential applications moving forward.



Left: Dr Keisuke Taniuchi, Representative Director and CEO Salus Science Corporation.
Right: Yo (MAX) Amakusa, CEO, iBody Inc.

? Could you tell us about the targets for antibody discovery and what led you to initiate this project?

The targets were podocalyxin (PODXL) and integrin β 1 (ITGB1), both of which are anticipated to serve as novel biomarkers for pancreatic cancer. PODXL has been identified as a potential diagnostic and prognostic marker, whereas ITGB1 has been implicated primarily as a prognostic marker (1), (2).

We had been conducting clinical studies on diagnostic markers for pancreatic cancer; however, we were unable to find suitable commercially available antibodies that met our requirements for specificity and usage conditions. In addition, for future clinical applications, it was essential to develop high-quality antibodies that we could thoroughly validate. These were our key motivations to initiate the project.

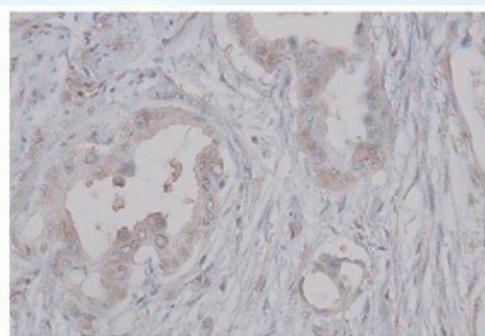


Figure 2. Immunohistochemical staining (paraffin sections) Staining was performed using surgically resected human pancreatic cancer specimens. Positive staining was observed in the tumor glands of pancreatic cancer tissue. Antibody dilution: 1:200.

? How would you evaluate the rabbit monoclonal antibodies you ultimately obtained?

We used various approaches to evaluate the antibodies, revealing strong specificity toward the targets. While commercially available antibodies and polyclonal antibodies exhibited considerable nonspecific reactions, the antibodies discovered by iBody showed highly specific reactions against the targets even in immunostaining of formalin-fixed tissue specimens, which had been a major concern. Enzyme-linked-immunosorbent assays (ELISA) also indicated high affinity for the targets.

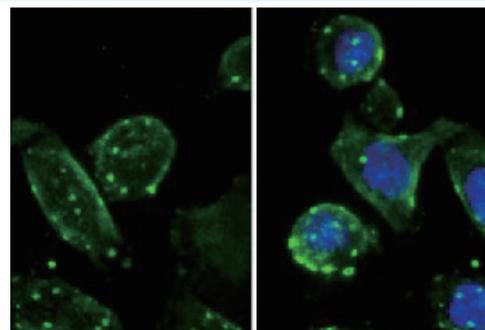


Figure 3. Immunocytochemical staining Immunocytochemical staining using S2-013 (human pancreatic cancer cell line). ITGB1 (green) / DAPI (blue). Antibody dilution: 1:1000.

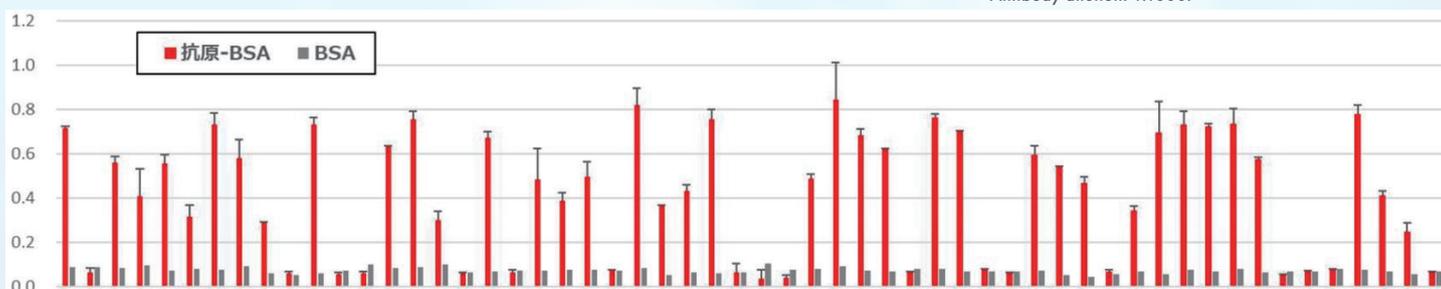


Figure 1. Analysis of antigen peptide binding of cell-free-expressed Fab by ELISA. The binding of cell-free-expressed Fab to antigen peptides immobilized on plates (red) or to bovine serum albumin (BSA; gray) was analyzed by ELISA. The vertical axis indicates the ELISA signal (absorbance).



Why did you choose rabbit monoclonal antibodies rather than the more common mouse monoclonal antibodies?

Biopsy specimens collected in the hospital undergo formalin fixation for pathological diagnosis. Because our aim was to use remaining biopsy samples for analyses, we needed to perform immunostaining on formalin fixed paraffin embedded (FFPE) tissues. We also planned to develop a sandwich ELISA using the same antibodies. To achieve these goals, highly functional antibodies were essential. Rabbit-derived monoclonal antibodies generally show superior affinity and specificity to those of mouse monoclonal antibodies and therefore were considered these a most suitable option.



What are your future plans for the antibodies generated by iBody?

Advancing efforts to address challenges in pancreatic cancer treatment

For patients with resectable pancreatic cancer, neoadjuvant chemotherapy (NAC)-gemcitabine plus S-1 (GS) therapy is administered preoperatively. However, when the therapy is ineffective, patients may no longer be eligible for surgery. Thus, predicting the treatment response is an urgent and unmet clinical need. In our market feasibility study, we found that nearly all pancreatic cancer specialists recognize a strong need for biomarkers capable of predicting the effectiveness of NAC-GS therapy, precisely the type of marker we are developing. Moving forward, we plan to provide these antibodies as part of a pathology-based tissue staining kit that can be used by pancreatic cancer specialists in routine practice. By confirming that the kit supports clinical decision-making, we ultimately aim to secure insurance reimbursement and bring the technology into broader clinical use.

Establishing a New Standard for Research and Clinical Diagnostics

Our aim is for the monoclonal antibodies developed in this project to become widely adopted in pancreatic cancer research and to become a new standard in clinical diagnostic testing. Through this initiative, we hope to expand the possibilities for early detection and treatment of pancreatic cancer and, ultimately, to contribute to the establishment of more effective therapeutic strategies.

■Literature cited

1) Taniuchi K et al. *Onco Targets Ther* 11:1433-1445, 2018. doi: 10.2147/OTT.S155367.; Taniuchi K et al. *Nihon Shokakibyō Gakkai Zasshi* 118:235-244, 2021. Japanese. doi: 10.11405/nisshoshi.118.235. 2) Taniuchi K et al. *PLoS ONE* 17:e0265172, 2022. doi:10.1371/journal.pone.0265172.



Among the many available monoclonal antibody discovery platforms, what led you to choose iBody?

As noted earlier, we were introduced to iBody's technology by a representative from Cosmo Bio, an authorized distributor of iBody. Traditional mouse spleen methods typically obtain a small number of clones, and sequencing hybridomas can be costly. The iBody platform enables comprehensive antibody discovery by analyzing B cells at the single-cell level and expressing antibodies in a cell-free system. Using this approach, it is possible to obtain several dozen antigen-reactive clones. From these, we were able to select ten clones, and sequencing costs for those ten clones were included in the basic service plan, an aspect we found particularly appealing.



What were your impressions after working with iBody?

Having access to the sequence information for the antibodies was extremely valuable. In addition, we were able to generate a large number of clones, and the reactivity data for each clone were presented in clear, easy-to-interpret graphical formats. The rights related to the deliverables were also clearly defined, allowing us to proceed with confidence.

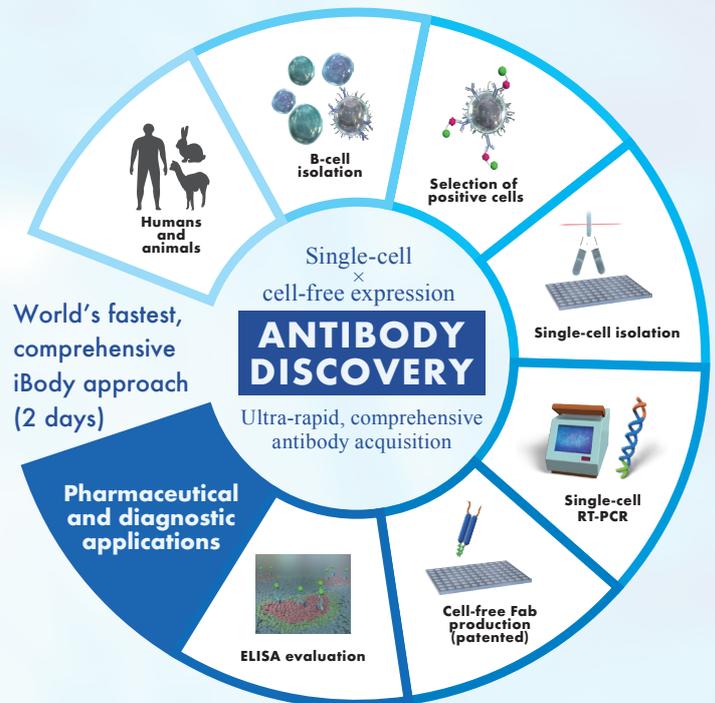


Figure 4. Workflow for antibody discovery and evaluation

or inquiries regarding our antibody development services or to request additional information, please contact us via our contact form.



iBody, Inc.

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

Nagoya Life Science Incubator (NALIC) #417
2-22-8, Chikusa, Chikusa-ku, Nagoya, 464-0858, Japan



in Linked-in



X



f Facebook



iBody