

AI-Protein Engineering *aiProtein*®

RevoAb™ Special Edition

RevoAb™ Delivers *aiProtein*®'s Core Technology Straight to You
In early access until March 2026

***aiProtein*®: RevolKa's innovative Machine Learning–driven protein engineering platform**

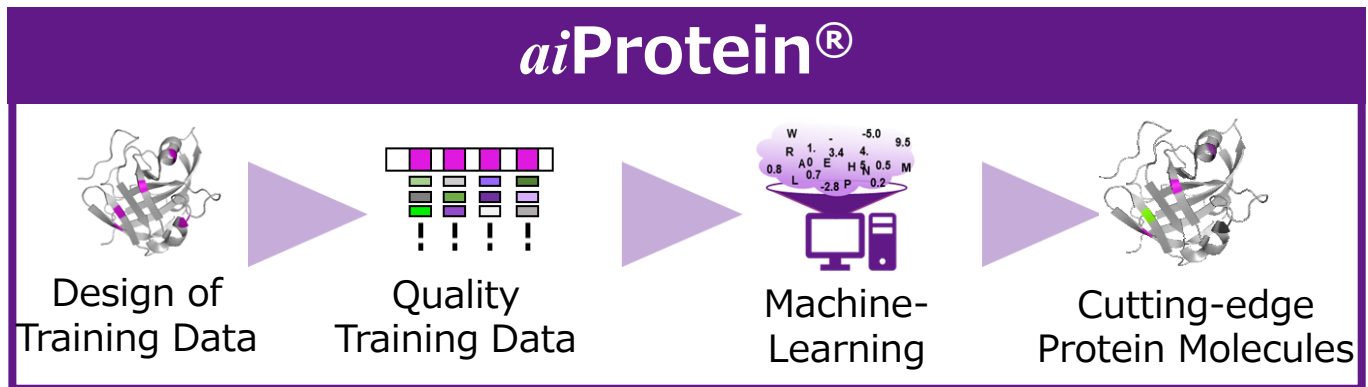


This service optimizes antibody properties, including protein yield (host expression levels), thermal/structural stability, solubility and more at little cost of antigen-binding potencies (affinity). The optimization is powered by RevolKa's advanced artificial-intelligence (AI)-driven protein engineering platform, *aiProtein*®. This innovative AI technology designs high-performance antibodies with a high probability of success. This service also offers multi-property optimization and supports a wide range of antibody modalities, including monoclonal IgG, scFv, and VHH can be optimized. Antibody humanization, as well as affinity recovery after humanization is also available.

◆ *aiProtein*[®]: RevolKa's innovative AI-driven protein engineering platform

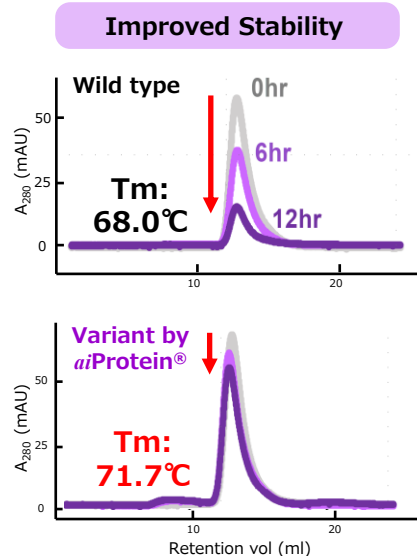
1. Design of training data set customized to a target protein
2. Quality training data by RevolKa's wet lab capability
3. Low-n, fine-tuned machine-learning technology

= Cutting-edge protein molecules for industrial use

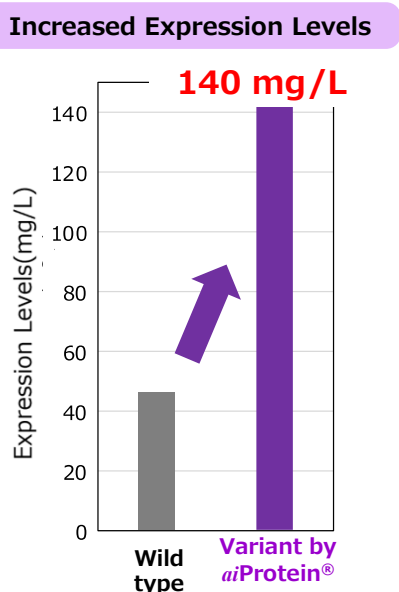


◆ Case studies of *aiProtein*[®] Full-Package Service

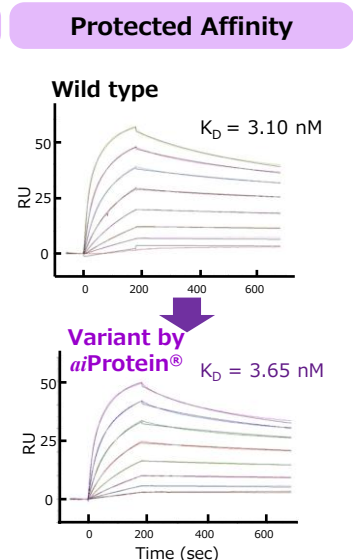
Case Study(1) : Improved Expression and Stability of Nivolumab



Thermal stability of nivolumab and an *aiProtein*[®]-optimized variant were tested at 60 °C for 0, 6, and 12 hours. Size-exclusion chromatography (SEC) analysis demonstrated extremely high stability of the *aiProtein*[®] variant.



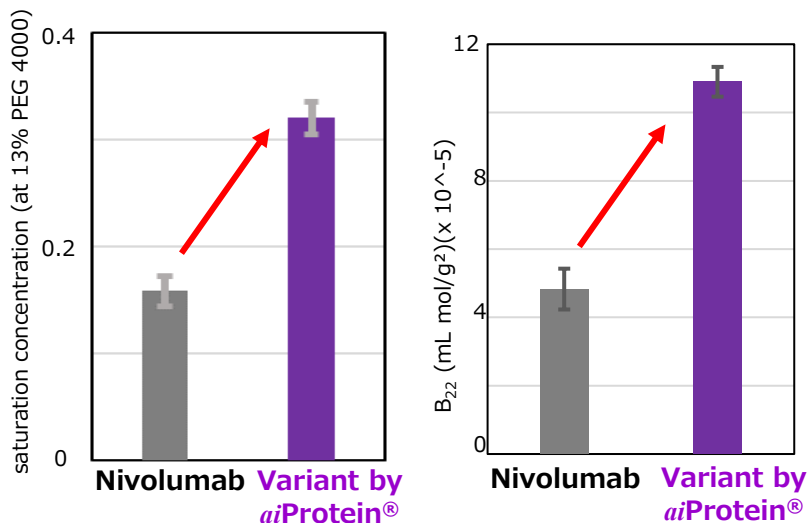
The nivolumab variant achieved a yield of 140 mg/mL (3-fold higher than nivolumab) in a transient Expi293F mammalian cell secretion system.



Nivolumab and the variant showed a comparable antigen binding and dissociation constant values in a surface plasmon resonance analysis.

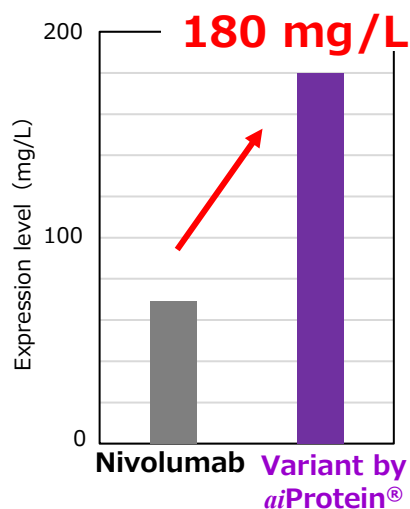
Case Study(3) : Improved Solubility and Yield of Nivolumab

Enhanced Solubility



Solubility of monoclonal antibody was tested by the polyethylene glycol (PEG) method. A Nivolumab variant generated by aiProtein® showed higher saturation concentration under a 13% PEG condition compared to Nivolumab (left). Consistent with this result, second virial coefficient (B_{22}), representing protein colloidal stability, was also higher for the variant than that of wild-type (right), suggesting that the variant can be potentially formulated at a high concentration. The binding affinity of the variant was comparable to that of wild-type.

Increased Expression Levels

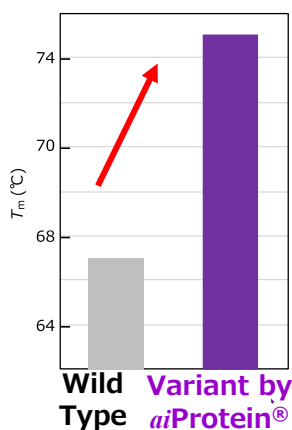
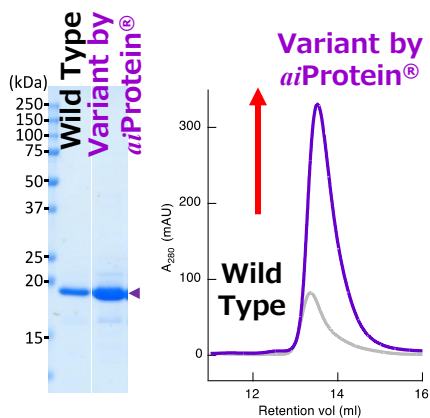


The Nivolumab variant antibody achieved a yield of 180 mg/L (3-fold higher than nivolumab) in a transient Expi293F mammalian cell secretion system.

Case Study(3) : Improved Expression and Stability of Humanized VHH

Increased Expression levels

Improved Stability

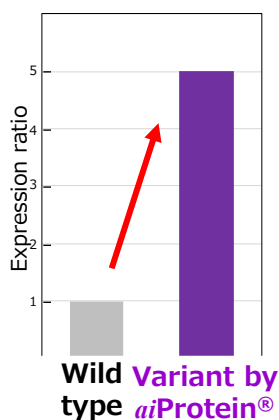


Denaturation temperature (T_m), representing structural stability of the protein, was measured using a thermal shift assay. The variant VHH generated by aiProtein® exhibited a significant increase in thermal stability of 6 °C.

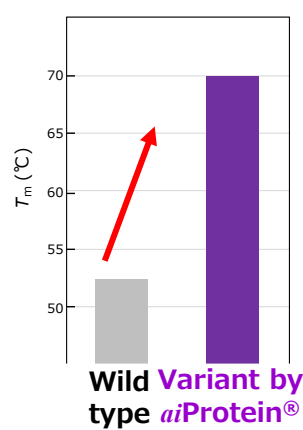
Case Study(4) : Improved Expression and Stability of Diabody

Increased Expression Levels

Enhanced Stability



A difficult-to-express diabody was optimized by aiProtein® to improve yields in *E. coli* BL21(DE3). Quantitative SDS-PAGE analysis showed a 5-fold increase in yield for the aiProtein®-generated variant.

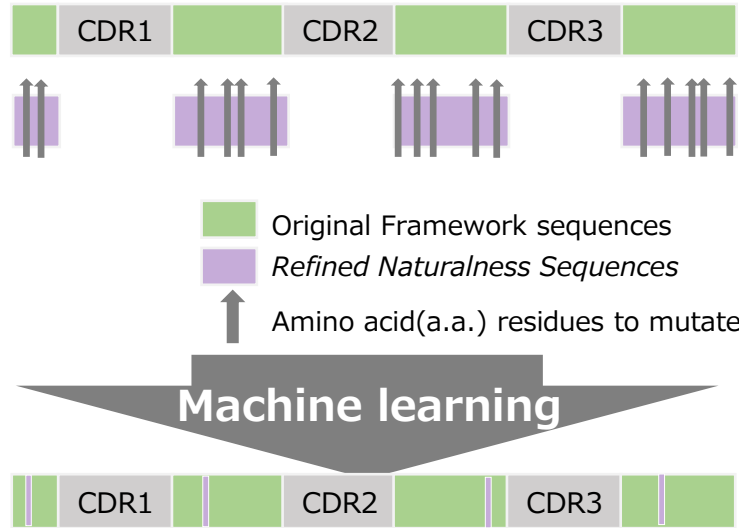


Denaturation temperature (T_m), representing structural stability of the protein, was measured using a differential scanning calorimetry assay. The variant VHH generated by aiProtein® exhibited a significant increase in thermal stability of more than 15 °C.

◆ Core Technologies of *aiProtein*®

Core Technology -1

Framework Engineering
Driven by
Refined Naturalness Design

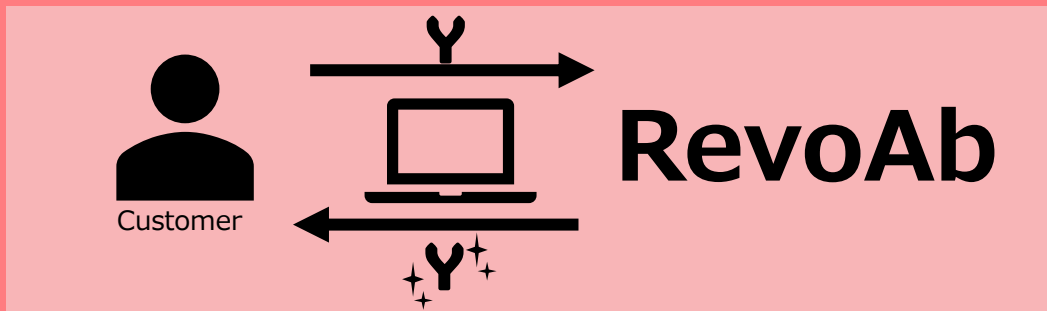


Core Technology -2

Low-n Machine Learning with
as few as 100 Training Data

Generation of promising antibody sequences
with optimized mutations

Bringing Core Technology -1 to You



In early access until March 2026



All you need

Submit target sequence



Delivery

≤ 2 weeks*²



What you can get

Up to 3 designs*¹ for
- Enhancing developability
- Protected affinity



Pricing

≤ \$700



IP

Remain with you



Design concept

Engineering frameworks
driven by RevolKa's
refined naturalness design



Confidentiality

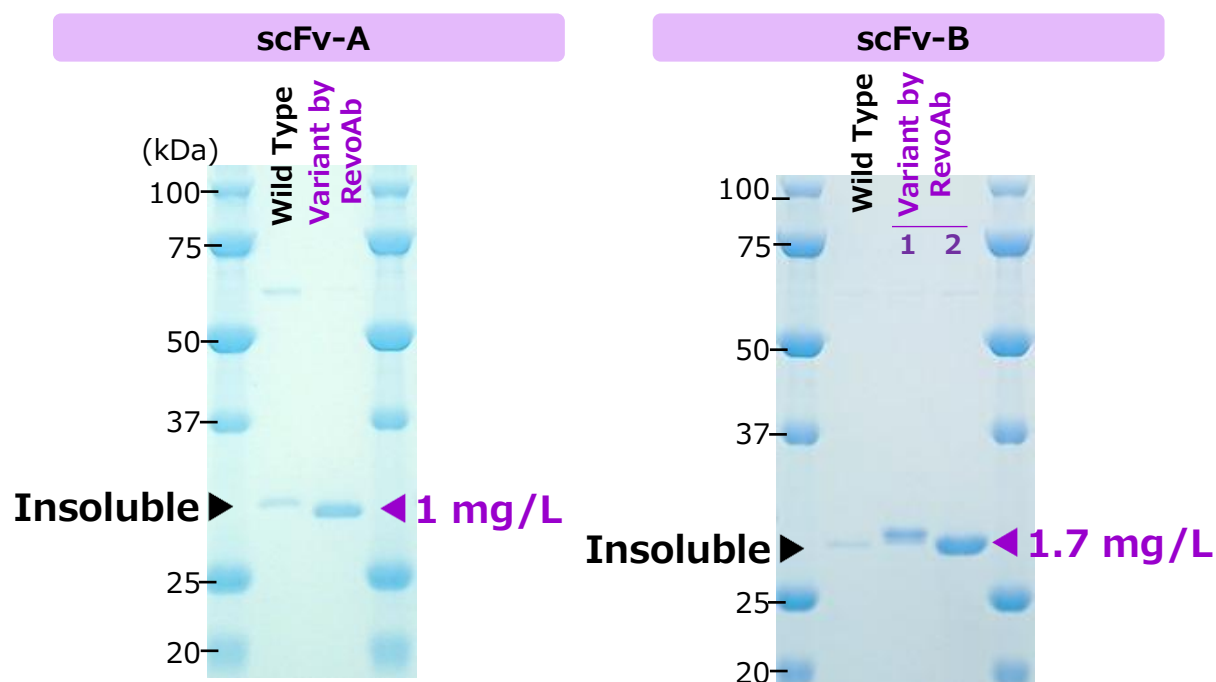
CDR-free design

*1) May be fewer than three depending on the target *2) May vary depending on the circumstances

◆ RevoAb™ : Case Study

Improved Expression of Difficult-to-Express scFv

Two examples of scFv (left : scFv-A, right : scFv-B)



Two difficult-to-express single-chain variable fragments (scFvs): scFv-A (left) and scFv-B (right), were optimized by *aiProtein*® to improve yields in *E. coli* BL21(DE3). The scFv-A and scFv-B variants generated by *aiProtein*® (scFv-A: 1 variant, scFv-B: 2 variants) exhibited a significant increase in yields. Binding affinity to the antigen of the two scFv-B variants was comparable to that of the wild-type. Affinity of the scFv-A variant was not tested.

◆ RevoAb™ + aiProtein®:

A Complete Antibody Optimization Pipeline

RevoAb™ identifies the candidate mutations, then *aiProtein*®'s AI finds the perfect combinations for next-level antibody performance!

✓ **Next-Gen, Multi-Properties Optimization**

10% OFF for projects with the same antibody as RevoAb™!

Don't miss your chance!

Request Form : [RevoAb : Request Form](#)

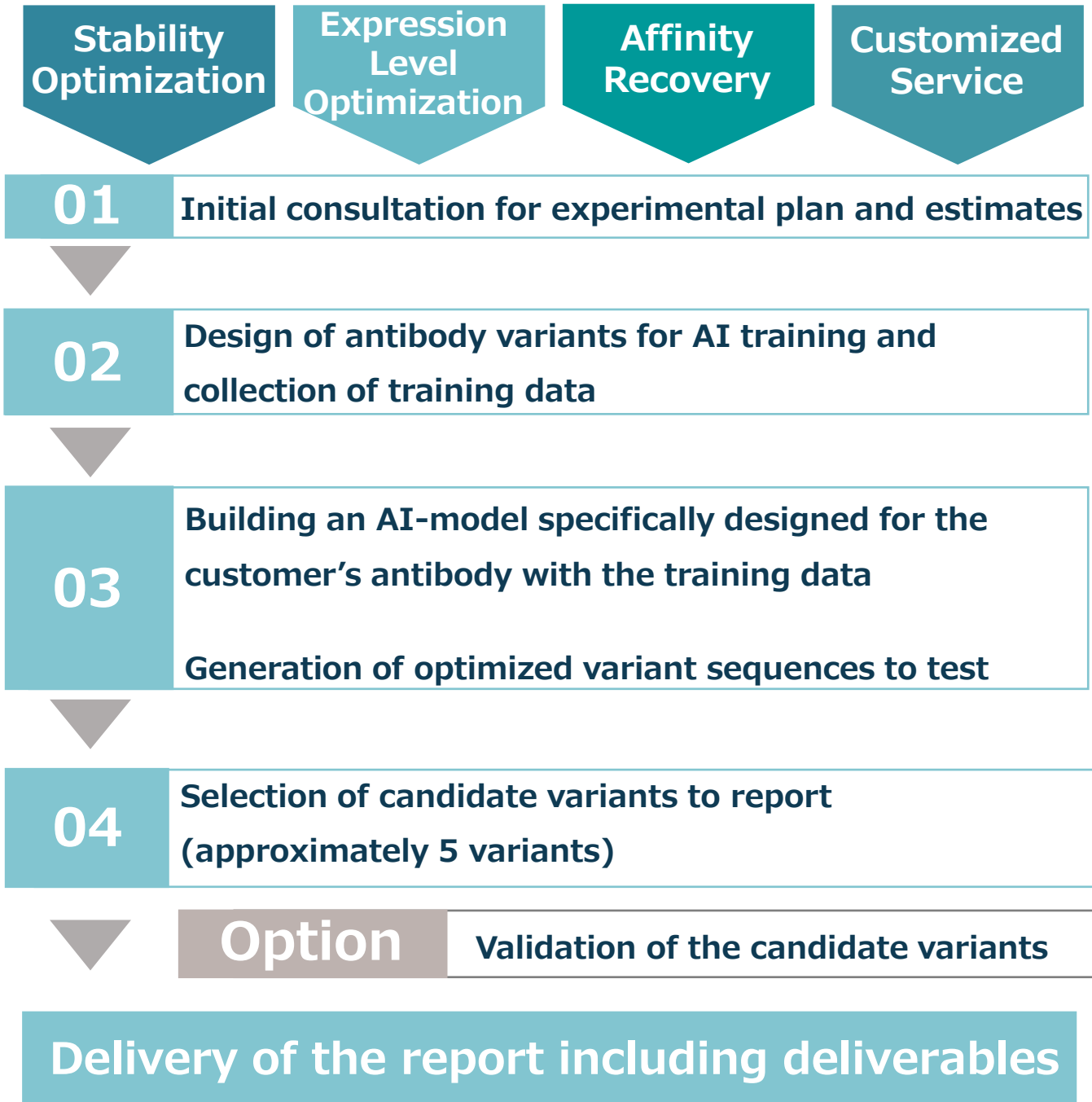
Contact us : support-revotune@revolka.co.jp

FAQ : <https://revoab.revolka.com/>



Request Form 5

◆ Flow of *aiProtein*® Full-Package Service



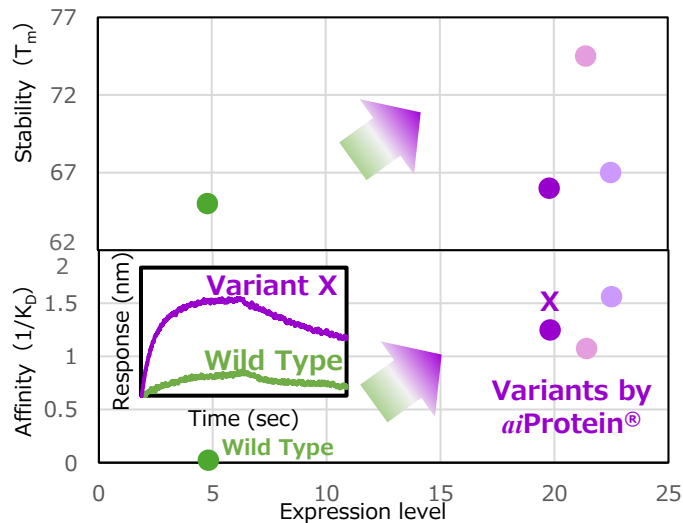
Service and Deliverables

- A preliminary technical consultation will be placed before starting a project to share customer's antibody information and properties of interest.
- The lead time from the submission of the customer's antibody protein sequence to the delivery of optimized antibody sequences is 8 to 11 months depending on requirements in experiments, such as protein expression system.
- The deliverables include approximately 5 protein sequences of optimized variants and experimental data regarding improved properties. All of the variants will be experimentally validated by RevolKa.

◆ *aiProtein*[®]: ML-guided-Versatile, Multi-Properties Engineering

*Please note that the following examples are outside RevolAb™'s scope. For inquiries, kindly contact RevolKa. biz-contact@revolka.co.jp

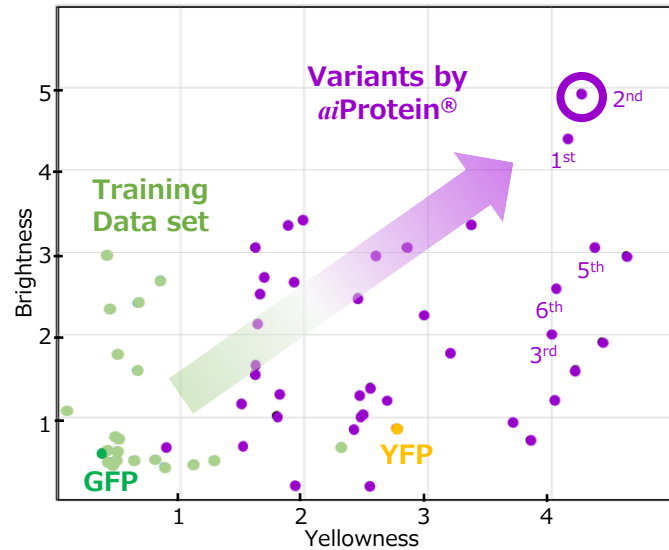
Case Study(5) : Improved Affinity, Expression and Stability of Anti-COVID-19 Antibody (VHH)



Promising variants with variations in affinity, stability, and yield

Ito et al., unpublished data

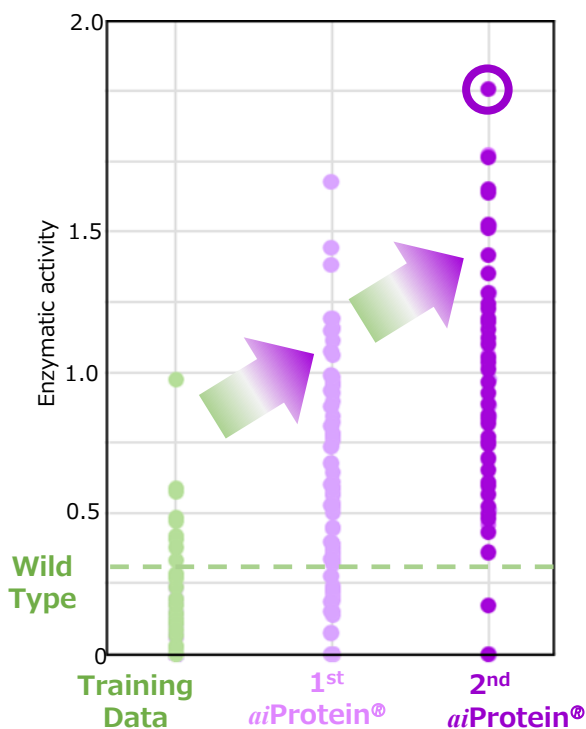
Case Study(6) : At a 30-year variant, created in 7 days



Dramatic improvement through prediction of all variants

Saito, Y. et al. (2018) ACS Synth. Biol. 7, 2014-2022.
DOI:10.1021/acssynbio.8b00155.

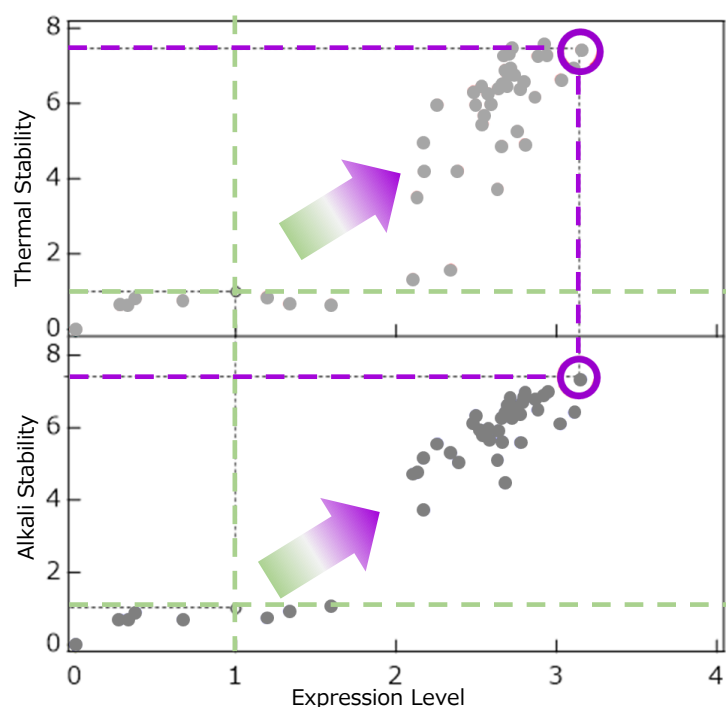
Case Study(7) : Improved Expression and Stability of SortaseA



6× Higher Activity with Improved Expression

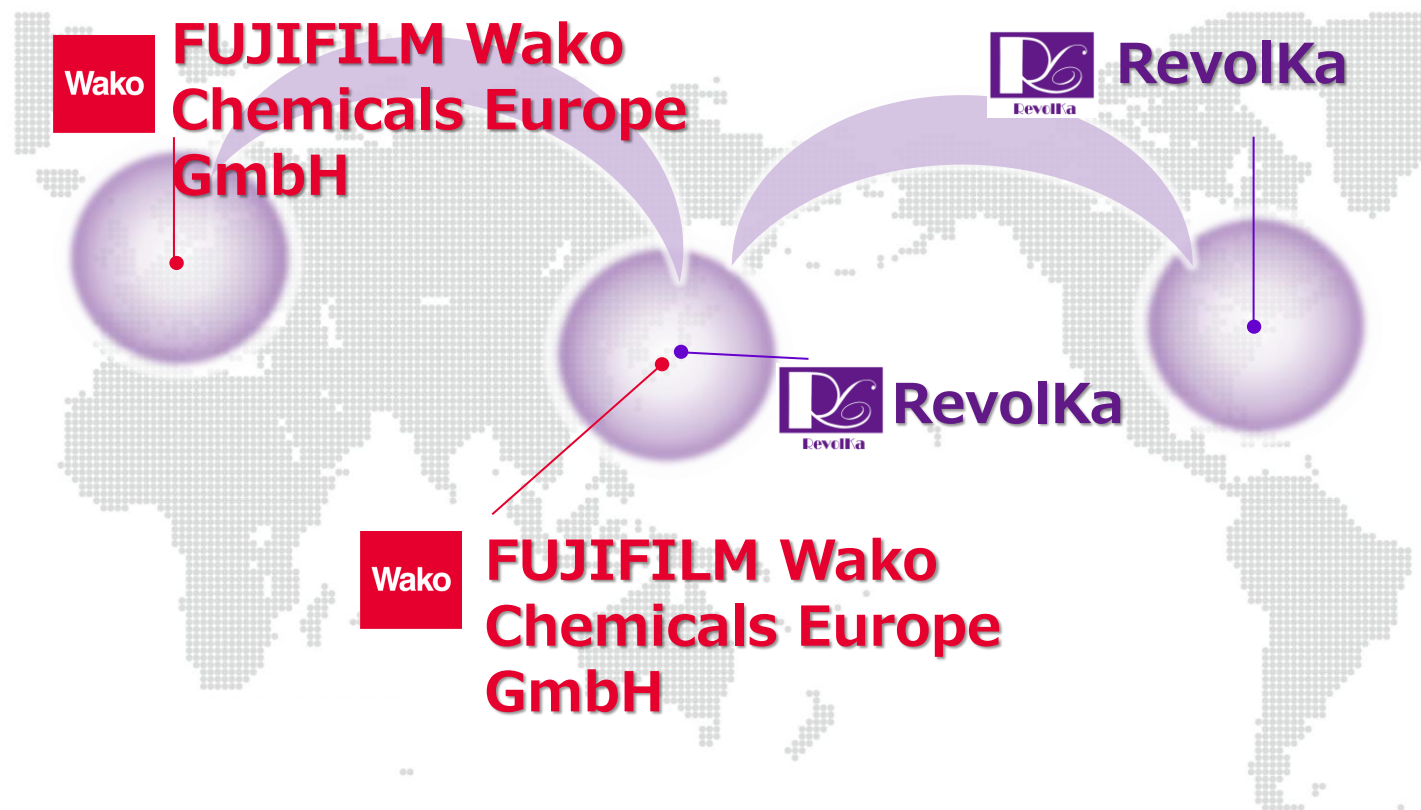
Saito, Y. et al. (2021) ACS Catal. 11, no. 23, 14615-14624. DOI:10.1021/acscatal.1c03753

Case Study(8) : Improved Expression, Thermal and Alkali Stability of Industrial Enzyme



3.3× Expression,
7.5× Thermostability,
7.5× Alkali Stability

◆ Contact



FUJIFILM
Value from Innovation

Wako

US : <https://labchem-wako.fujifilm.com/us/category/95358.html>
EU : <https://labchem-wako.fujifilm.com/europe/category/95358.html>



RevolKa

<https://www.revolka.com/index.html>

Contact : biz-contact@revolka.co.jp



United States



Europe



RevolKa