

AI

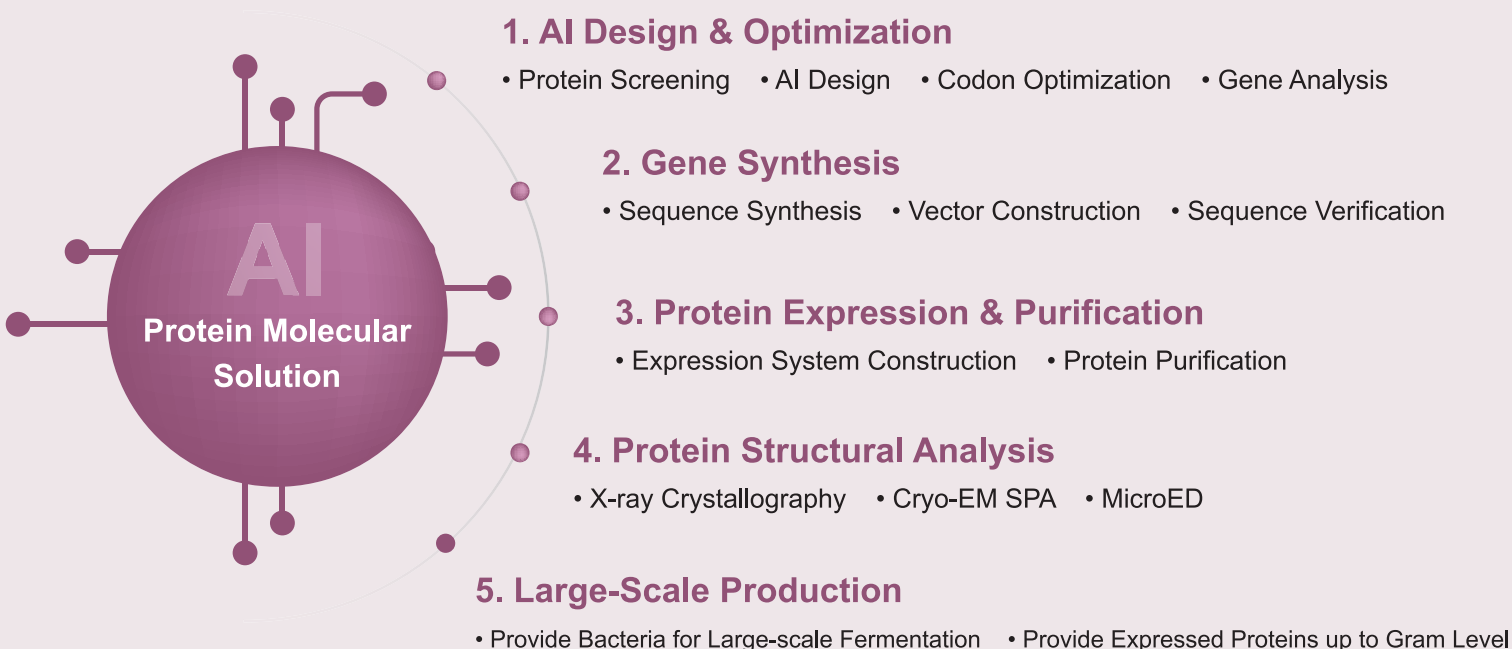
Protein Molecular Solutions

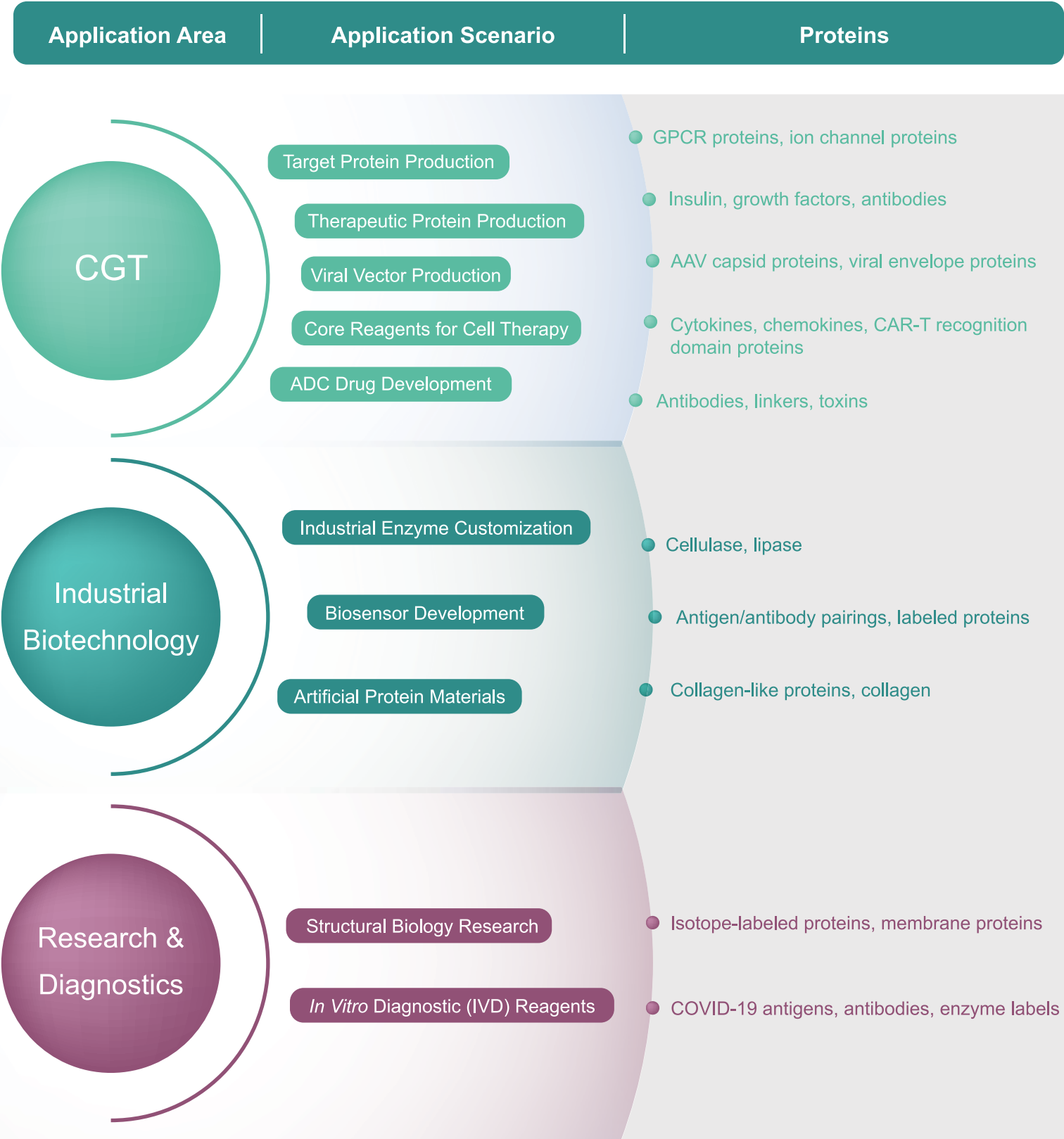
AI Molecular Manufacturing Technology leverages bioinformatics and advanced AI data models to provide innovative molecular services. Synbio Technologies, as a professional AI molecular service manufacturer, has an advanced AI design and manufacturing integration platform, life science service platform, and industrial R&D production platform.

We provide end-to-end solutions for protein molecules, from AI-driven gene design to protein synthesis, expression, purification, and structural analysis. Our highly customizable services address challenges like long and difficult gene design, large molecular weight protein expression, and structural analysis, effectively shortening service cycles and saving costs.

We have successfully synthesized and expressed proteins with molecular weights up to 180 kDa.

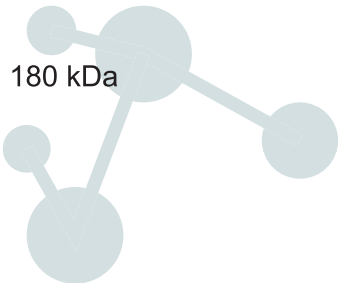
One-stop Solution





Service Advantages

- An AI-driven design and manufacturing integration platform that ensures precision and efficiency (patented technology)
- Capable of expressing and analyzing proteins with molecular weights exceeding 180 kDa
- Advanced protein structural analysis techniques
- Stage-based service fees, offering high cost-effectiveness



Service Details

Steps	Service Details	Deliverables	Turnaround Time
AI Design & Optimization	• Protein Screening • AI Design • Codon Optimization • Gene Analysis	• 2~5 µg lyophilized plasmid DNA • Sequencing chromatogram • 1- 5 mg protein products • COA report • the report and the structure factor data and structure atomic coordinate files that comply with the PDB database reception standards	3-5 Days
Gene Synthesis	• Gene Synthesis • Vector Construction		Start from 1 Week
Protein Expression & Purification	• Protein Expression Validation • Large-scale Cultivation & Protein Purification		Start from 2 Weeks
Protein Structural Analysis	• Protein Crystallization Optimization • X-ray Diffraction • MicroED • CryoEM-SPA		Start from 1 Month
Large-Scale Production	• Provide Bacteria for Large-scale Fermentation • Provide Expressed Proteins up to Gram Level		Quote



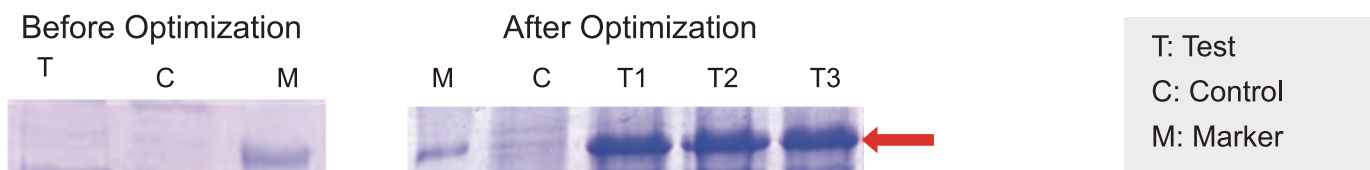
Why Choose Us

- ✦ - Leading AI biological molecular technology services
- ✦ - Mature protein service experience
- ✦ - One-stop solution

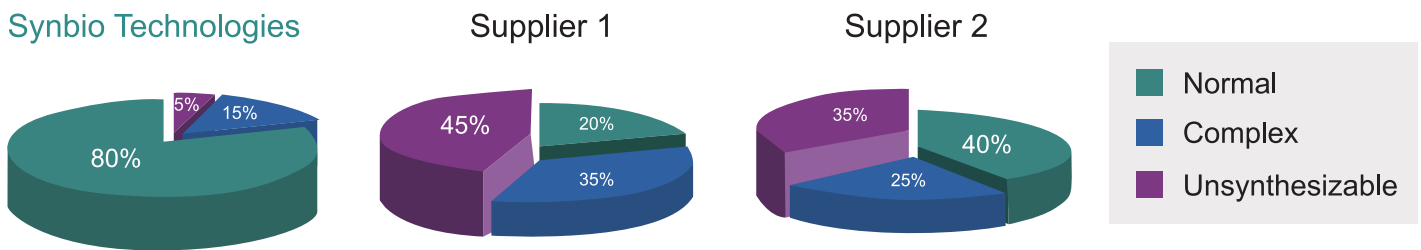
1. AI Design & Optimization

Synbio Technologies' AI sequence design & optimization platform integrates deep learning and advanced algorithms to refine the gene synthesis process. Through NG Codon technology, we improve the accuracy and efficiency of codon optimization, while the AI-TAT system forecasts production cycles with high precision. The Complexity Index (CI) system ensures 100% accuracy when synthesizing complex gene sequences, making the entire process faster, more reliable, and cost-effective.

Advanced AI Sequence Design | NG Codon Optimization



Order Cycle Prediction | AI-TAT System



Unlimited Gene Synthesis | CI System

Predicting Outcomes

Sequence Length: **2,000**

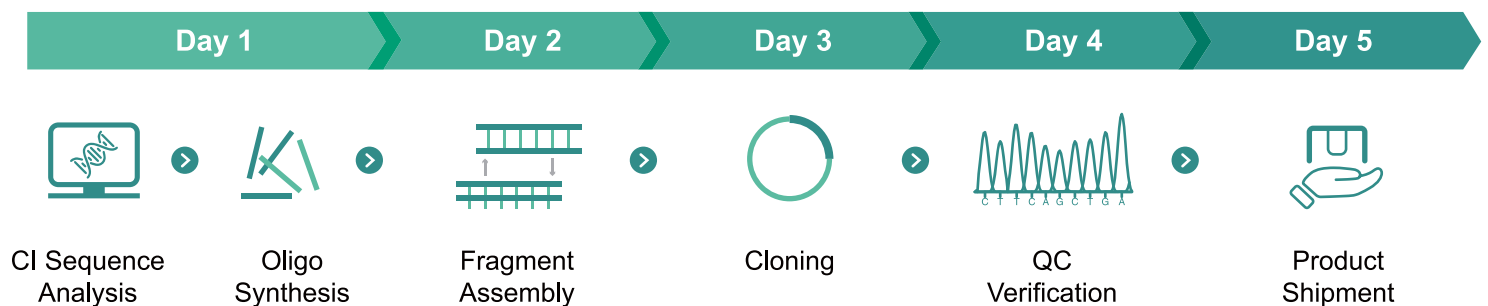
Turnaround Time: **10** Business Days

GOT IT

2. Gene Synthesis

Our AI-powered gene synthesis platform delivers high-fidelity, fully optimized genes tailored to your unique research needs. By harnessing three advanced AI systems-NG Codon Optimization, Complexity Index (CI), and AI-TAT-we streamline the entire synthesis process, enhancing accuracy, speed, and cost-efficiency.

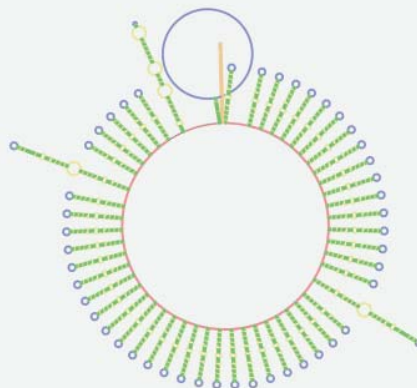
With over 10 billion bases synthesized and millions of codons optimized, we tackle even the most complex genetic challenges, including high and low GC content, repetitive sequences, and hairpin structures. We guarantee 100% accuracy in DNA synthesis, offering competitive pricing and fast turnaround times. Additionally, we provide free codon optimization, vector storage, and vector design to ensure your complete satisfaction.



Case Study

AI-designed, ultra-complex collagen protein gene synthesis

We successfully synthesized AI-designed recombinant collagen DNA sequence of 5121 bp in length containing 368 repeat units (20 nt).

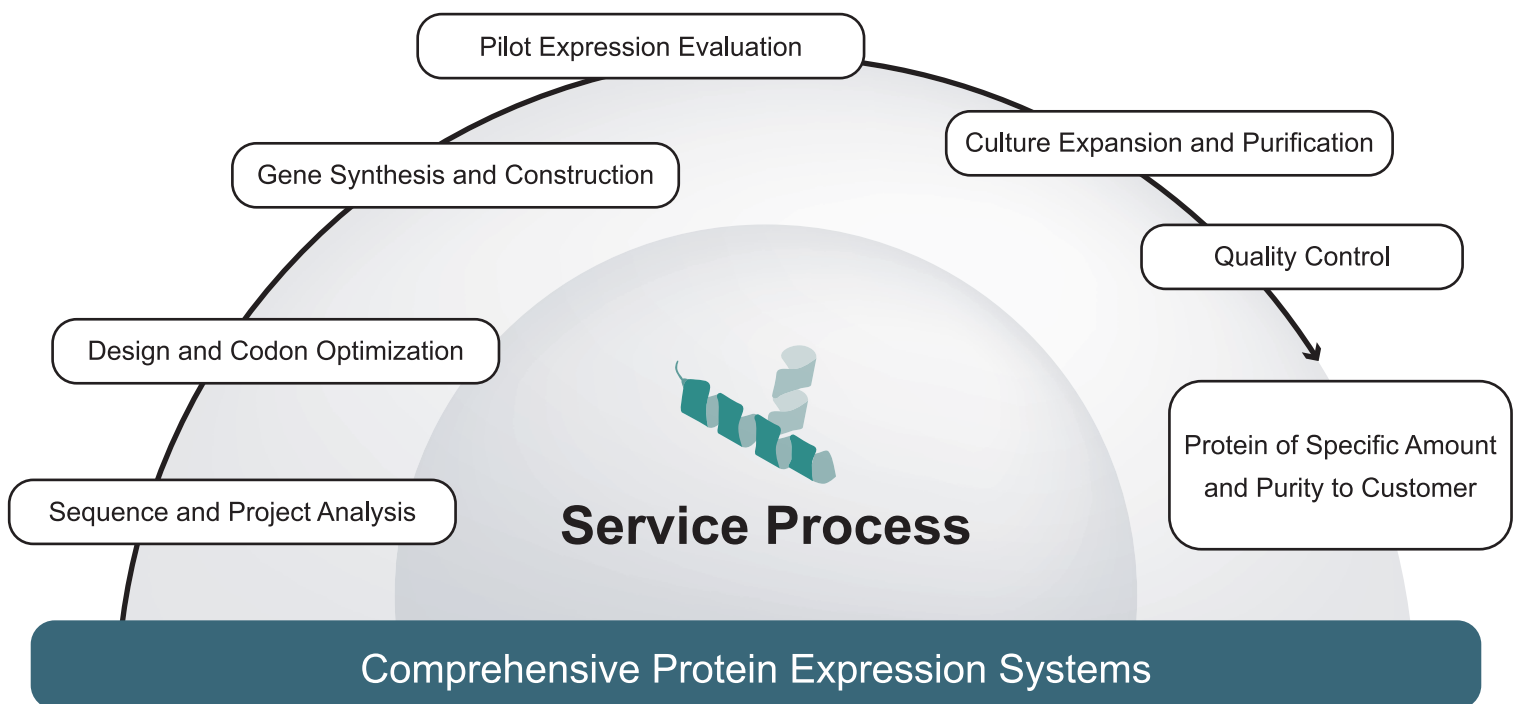


AI-designed Ultra-complex Collagen Protein Gene

- AI-Powered Innovation
- Complexity of the Sequence
- Potential of Application

3. Protein Expression & Purification

Synbio Technologies offers protein expression services across four systems: bacterial, yeast, insect, and mammalian. Whether producing milligrams or grams, our synthetic biology platforms and NG Codon optimization technology generate high-purity, active proteins to accelerate your research. By carefully selecting from a variety of expression vectors, hosts, and fusion tags, we deliver optimal results tailored to the nature of your protein and your specific project requirements. Our customized services empower scientists worldwide to achieve their research goals efficiently.



E.coli

Fast and cost-effective for high-yield protein production.



Yeast

Ideal for eukaryotic protein expression with post-translational modifications.



Mammalian

Best for producing complex proteins with accurate folding and glycosylation.



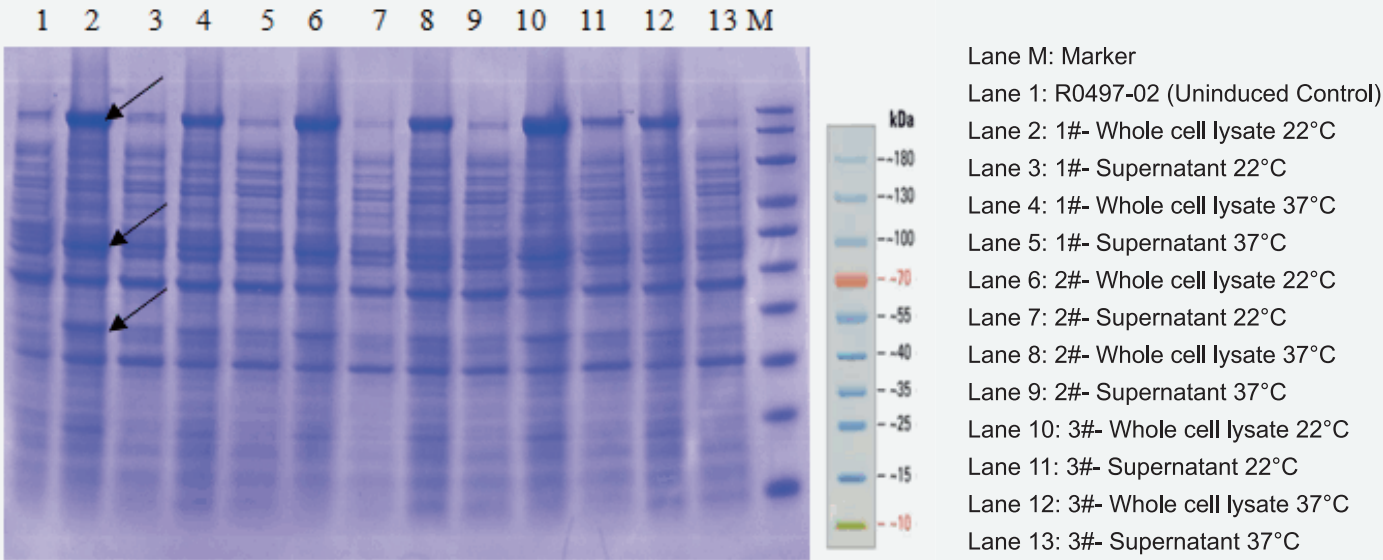
Insect

Efficient for expressing large, complex proteins with eukaryotic-like modifications.

Case Study

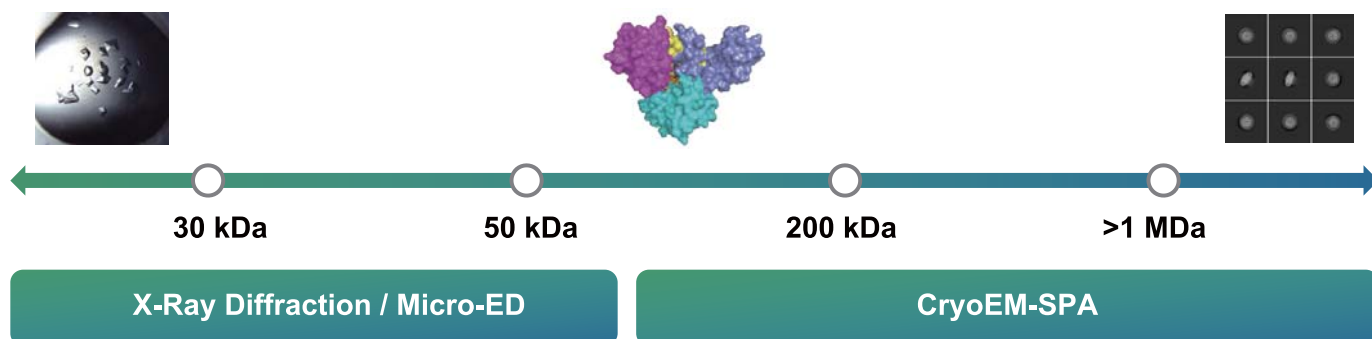
Successful Expression of 180 kDa Multi-Enzyme Complex + Chaperone Proteins

AI-driven codon optimization significantly enhanced the co-expression efficiency of a large multi-enzyme complex (180 kDa) and two chaperone proteins in *E. coli*, overcoming the molecular weight limits of traditional expression systems. Compared to traditional methods, the soluble fraction was increased by more than 35%.



180kDa Multi-Enzyme Complex + Two Chaperone Proteins

4. Protein Structural Analysis



X-Ray Diffraction

- Wide range of protein MW
- Highest resolution, typically <2Å
- Suitable for soluble proteins, membrane proteins, protein complexes

Cryo-EM SPA

- No crystallization
- Closer-to-native state
- Minimal sample consumption
- Suitable for large MW proteins, such as membrane proteins and large protein complexes

MicroED

- Proteins with diverse MW
- Minimum crystal requirement
- No need for crystal optimization
- High resolution, <3Å

X Ray Diffraction Case Study

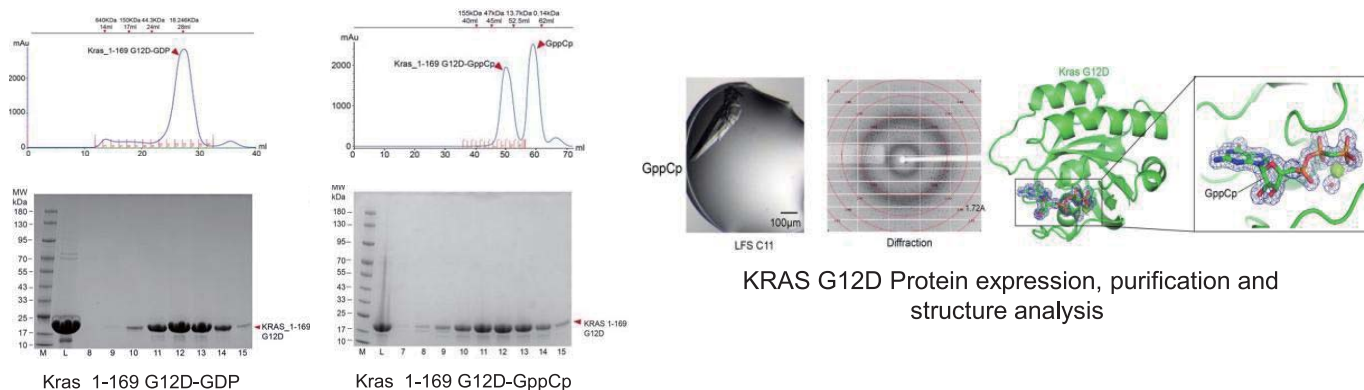
► KRAS G12D

Technical difficulty:

- KRAS binds to GTP and is in an activated state; when it binds to GDP, it switches to an off-state. The conversion of GTP to GDP is an extremely rapid process, making it difficult to obtain the activated state of KRAS bound to GTP.
- To study this target, it is necessary to obtain the protein in both the activated and off states.

Solution:

- We degraded the GDP bound to KRAS using an enzyme, then added GppCp and incubated it with the KRAS protein to obtain the activated state of the KRAS protein. Finally, we solved the high-resolution structures of KRAS G12D-GDP/GppCp and KRAS G12D-GDP-1133 (~1.8 Å).



MicroED Case Study

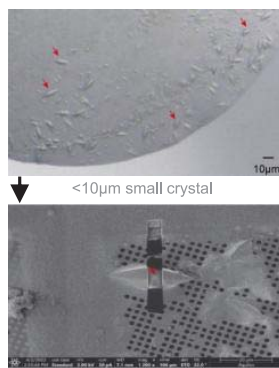
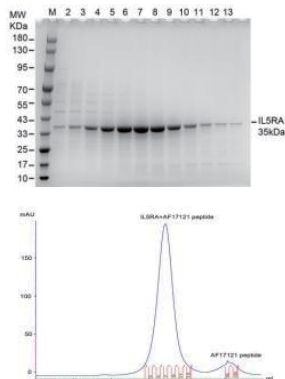
► IL5RA

Technical difficulty:

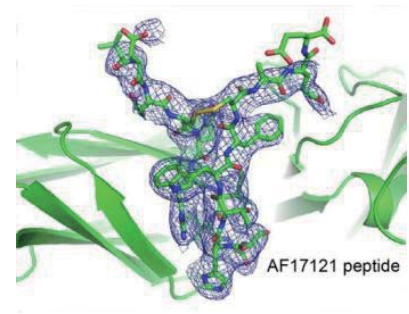
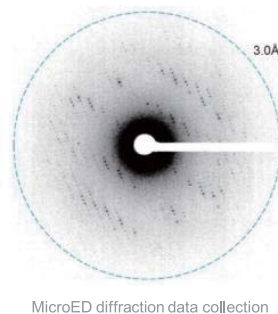
- IL5RA is highly prone to forming inclusion bodies during protein expression, typically appearing in an insoluble form.
- The cocrystals of IL5RA and peptides are extremely small ($<10\ \mu\text{m}$), making it very difficult to optimize and obtain larger single crystals ($>50\ \mu\text{m}$).

Solution:

- We purified IL5RA inclusion bodies and refolded the protein to obtain soluble IL5RA with $>90\%$ purity.
- We mounted the crystals on copper grids, prepared 200 nm-thick sections using Cryo-FIB, and collected diffraction data via MicroED. The structure was solved at 3 Å resolution, with clear electron density for the AF17121 peptide.



The crystals are laid on a copper net and cut into 200nm thick slices with FIB



Cryo-FIB & MicroED

IL5RA structure determination

Cryo-EM SPA Case Study

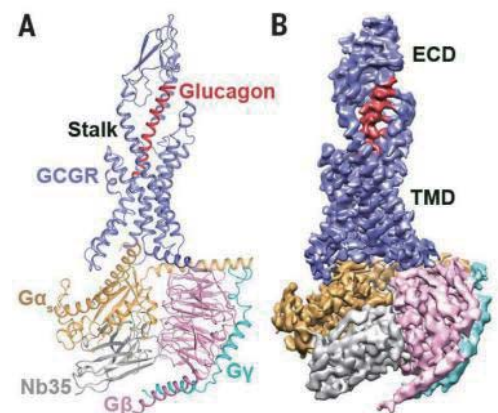
► GPCR – GCGR

Technical difficulty:

- The transmembrane regions of membrane proteins possess extensive hydrophobic surfaces, making them difficult to stabilize in polar aqueous solutions after dissociation from the membrane.
- The protein expression level of GCGR is extremely low, which prevents the completion of subsequent purification.
- In the protein sample preparation stage, the protein samples mostly adhere to the supporting film on the grid rather than being embedded in the ice layer within the holes of the supporting film.
- The protein samples exhibit significant preferential orientation.

Solution:

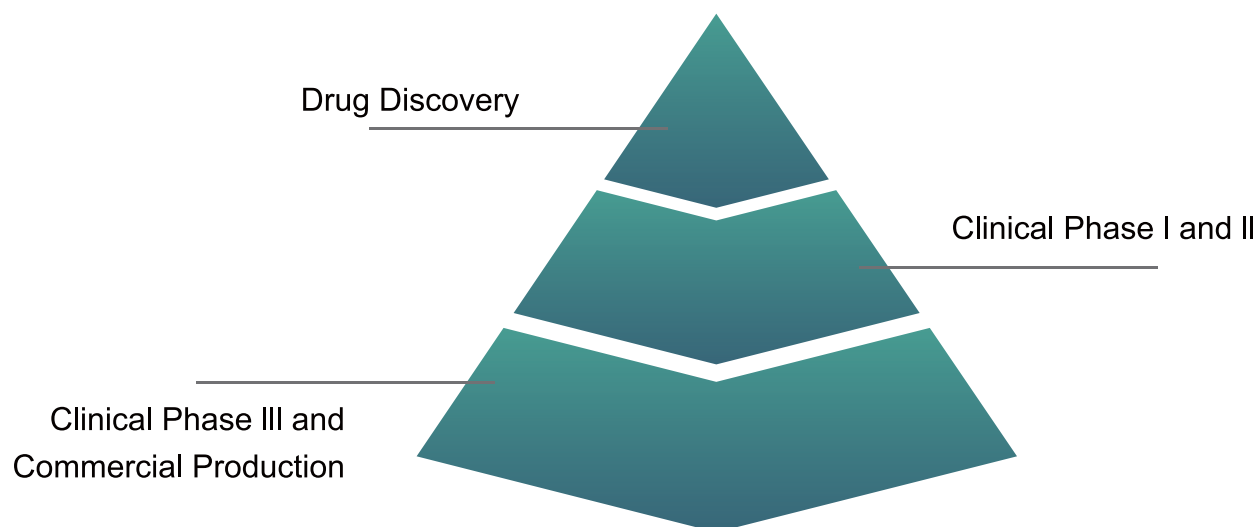
- We changed the expression vector and protein expression system to increase protein yield, and added monoclonal fragments during expression to enhance the stability of the complex.
- During the protein sample loading process, we adjusted the protein concentration and tried other types of grids, eventually achieving a higher number of protein particles embedded in the holes.
- Increased the thickness of the vitreous ice layer and applied a carbon film on the grid to average the number of particles in different orientations, thereby improving the preferential orientation of the protein particles.



GCGR CryoEM result

5. Large-Scale Production

Our CRDMO services offer comprehensive solution for your entire project lifecycle, from analysis and development to full CMC services and raw material production.



One-stop Biomolecular Solutions CRDMO

Manufacturing Capability



Synbio Technologies

Your One-Stop Partner for DNA, RNA, Protein & AI Molecule Solutions

Turn Complexity into Speed and Savings

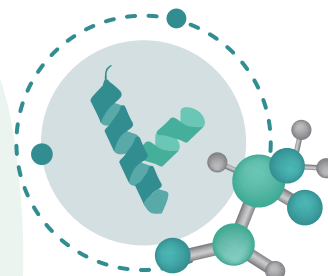
Founded in 2013, Synbio Technologies empowers innovation in life sciences through integrated solutions for DNA, RNA, protein, and AI-designed molecules. With cutting-edge synthesis platforms and AI-powered bio-design tools, we support researchers, biotechs, and pharma companies in accelerating discovery and development. Trusted by over 20,000 clients in 70+ countries, we turn complexity into speed and savings.



Molecular Diagnostics



Antibody Discovery



Protein and Enzyme Engineering



Agriculture and Breeding



Synthetic Biology



DNA Data Storage



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