KS-V PEPTIDE
The Peptide Experts

KS-V Peptide

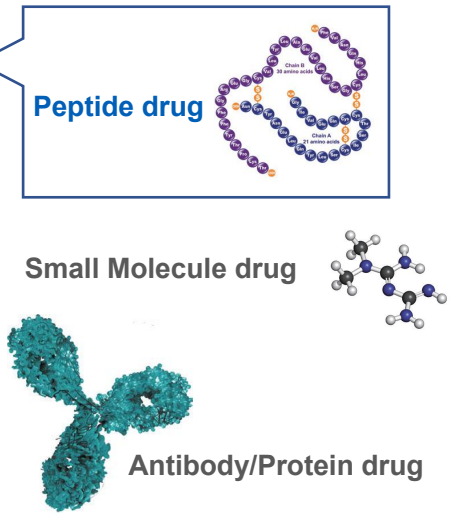
Peptide Drug Discovery & Development Services

Introduction to Peptide Drug

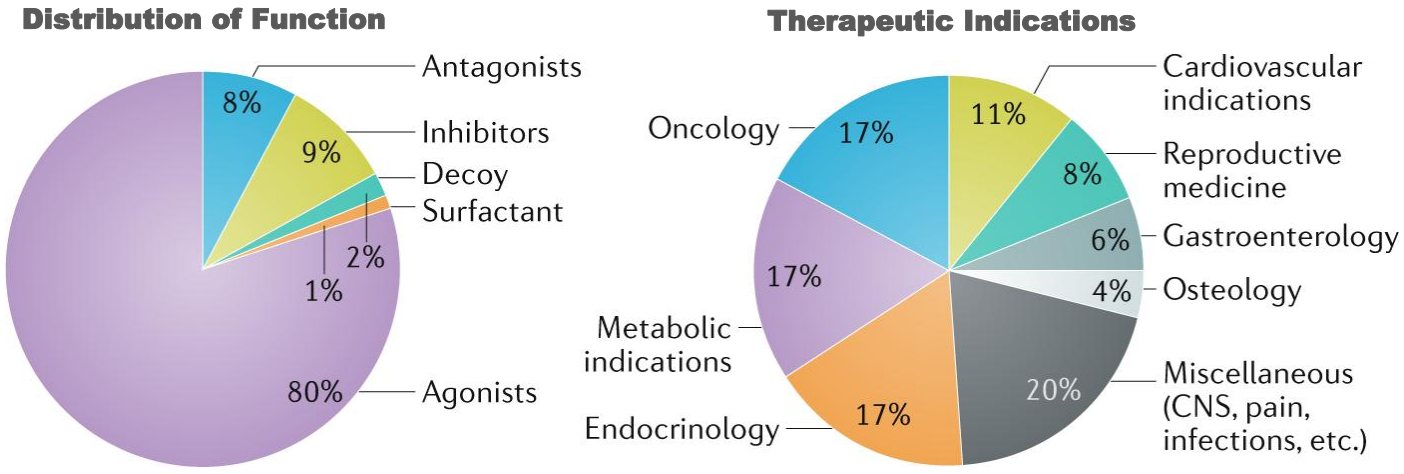
Peptide drugs are a unique class of pharmaceutical agents composed of a series of well-ordered amino acids. Peptide drugs have the advantages of both small molecule drugs and protein drugs and are increasingly attracting attention in the field of medicine. Currently, the marketed peptide drugs have covered multiple therapeutic areas such as oncology and immunotherapy, gynecology, digestive system, metabolism, and endocrine, with more peptide drugs in the development stage.

Advantages of Peptide Drugs

	Small Molecule	Protein	*Peptide*
Molecular Weight	< 0.5 kDa	>10 kDa	0.5-10 kDa
Stability	High	Low	Medium
Bioactivity	Medium	High	High
Target specificity	Low	Hgih	High
Immunogenicity	None	High	Low/none
Purity	High	Low	High
Cost	Low	High	Low



Indications and Fields of Applications for Peptide Drugs



Reference:
Nature Reviews Drug Discovery **volume 20**, pages309–325 (2021)
https://doi.org/10.1038/s41573-020-00135-8

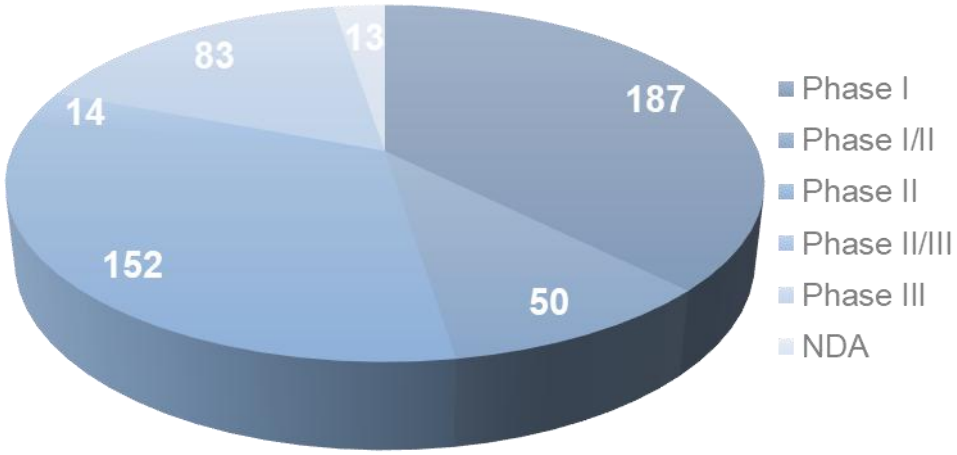
The size of the peptide therapeutics market in the US is currently valued at around $8 billion, and is expected to grow at a CAGR of around 6% during the forecast period of 2020-2025. Therapeutic indications for peptide therapeutics include a wide range of conditions, such as cancer, diabetes, cardiovascular disease, autoimmune disorders, and neurodegenerative diseases, among others. Peptides are also used as hormone replacement therapy, and as a means of addressing issues related to metabolic disorders, and as a way to address issues related to aging.

Introduction to Peptide Drug

Current Status in Peptide Drug Development

The number of peptide drugs is very limited due to complex development process. According to statistics, as of May 2022, a total of 118 peptide drugs have been approved and marketed worldwide (including diagnostic reagents and excluding inactive drugs), accounting for only about 2% of all drugs.

Stage of Global New Peptide Drug R&D



Challenges in Peptide Drug Development

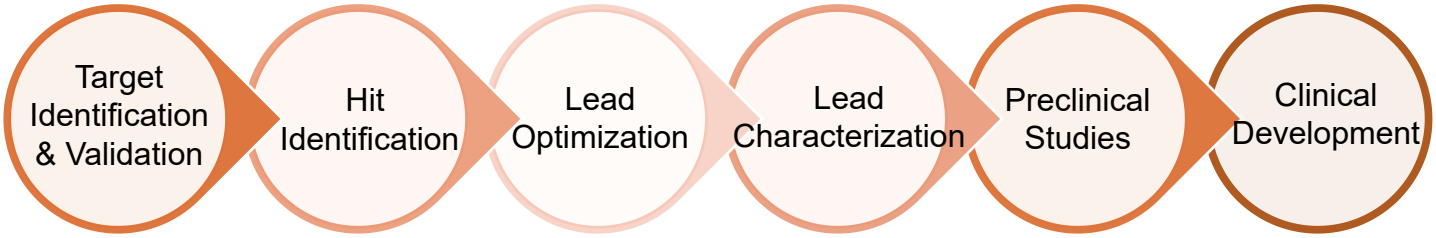
Inherent Drawbacks	Industry Challenges
Short half-life	Limited sources for discovering new peptides and peptide information databases.
Low stability	Low efficiency in designing peptide drugs and limited design tools.
High plasma clearance	Insufficient experience in modifying peptide skeleton structures.
Limited oral bioavailability	Difficulties in developing oral administration strategies.

OUR GOALS

Discover new peptide drugs
Iterate existing peptide drugs
Accelerate R&D of peptide drugs

Peptide Drug Discovery Platform

We have extensive experiences in peptide drug discovery and have established a streamlined and efficient peptide drug discovery and development platform. We provide one-stop services from target identification, hit screening, hit-to-lead development, lead optimization, and preclinical candidate development. We can offer comprehensive and tailor suited services for each project based on clients' demands, ensuring cost-effectiveness, high success and consistent product quality.



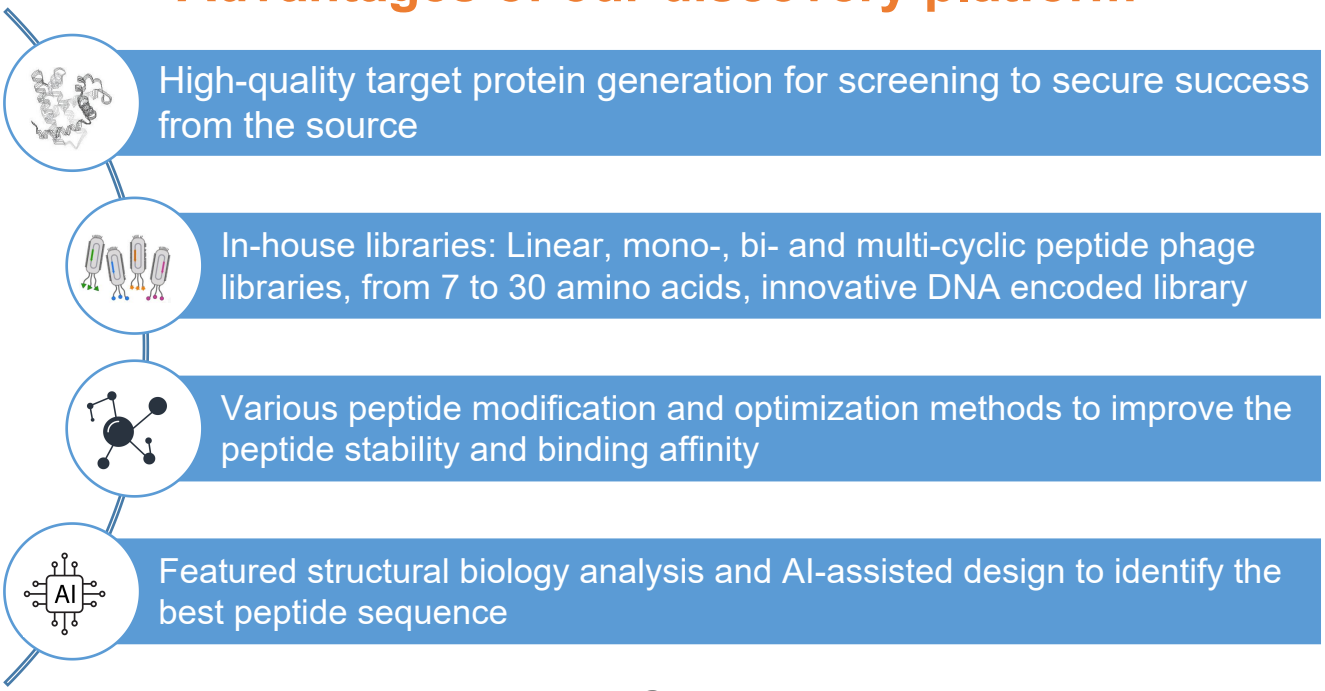
Discovery

- Target protein expression and purification
- Phage display screening
- Lead peptide synthesis
- Peptide validation
- Peptide modification and optimization
- Peptide characterization of affinity, specificity and activity
- AI-assisted drug screening and design
- NMR/Cryo-EM structure analysis

Development

- Toxicity tests in cells/animals
- In vitro and in vivo safety and efficacy evaluation
- Pharmacokinetic study
- Pharmacodynamic study
- Formulation study
- IND preparation

Advantages of our discovery platform

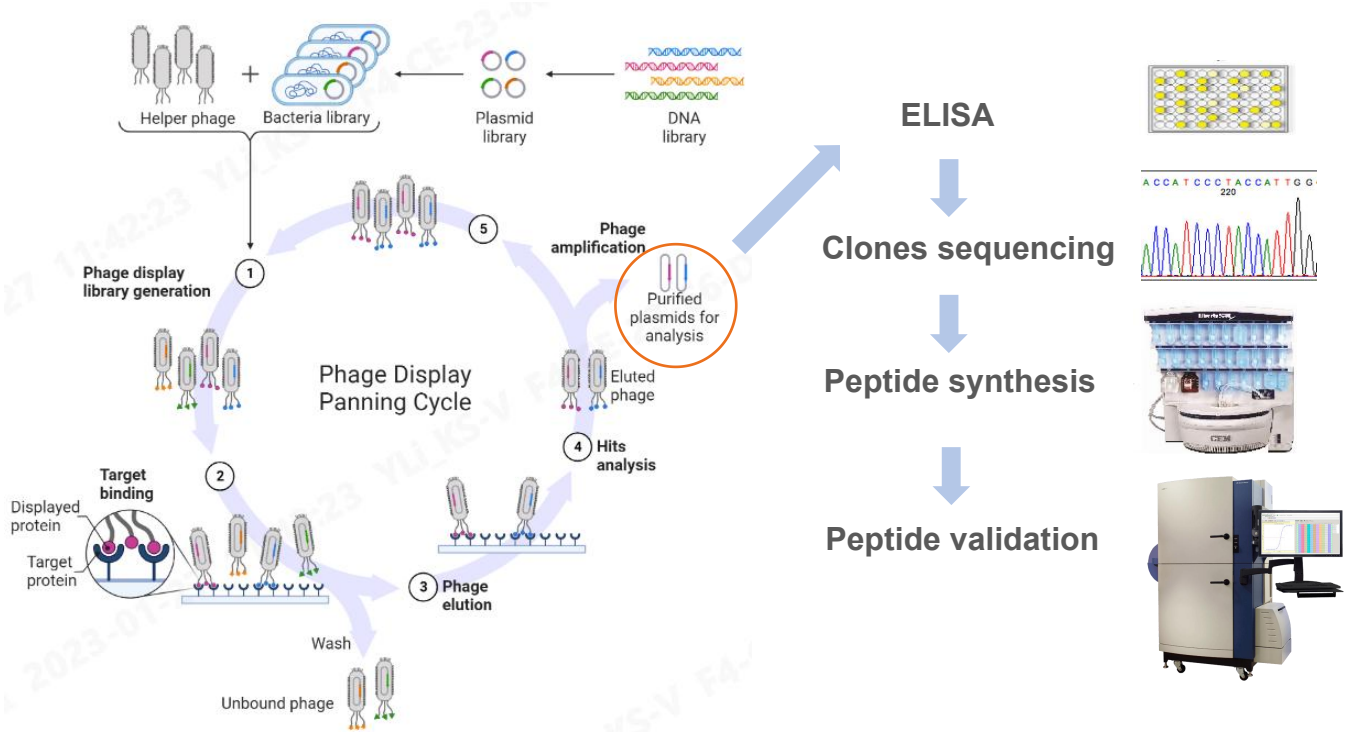


Peptide Drug Discovery Platform

Phage Display Technology

Phage display technology utilizes genetic engineering to insert a target gene into phages and display them (peptides, proteins or antibodies) on the surface of the bacteriophage while maintaining the structure and bioactivity. These displaying phages can be screened to select binding partners to desired targets. Phage display is one of the most powerful and widely used technique for the discovery of new peptide and protein ligands, the selection of antibodies, and the study of protein-protein interactions.

Phage display workflow



Advantages

- High diversity
- High specificity
- High throughput
- High sensitivity
- High success
- Cost-effective

Applications

- Tumor targeted drug therapy
- Enzyme inhibitor screening
- Protein-nucleic acid interaction study
- Diagnostic vaccine development
- Antibody/cDNA library construction
- Novel gene delivery system development

Peptide Drug Discovery Platform

Phage display services

We offer high-quality services for phage display library construction and custom phage display library screening. Our in-house developed peptide libraries include linear, monocyclic, bicyclic, and multicyclic peptides that contain 7-30 amino acids. We provide both solid-phase and cell-based screening services to identify peptides suitable for binders and targeted drug delivery. We can also draw on our extensive experience to construct custom libraries, and design selection and screening strategies to meet our clients' demands precisely.

No.	Process	Service Items	Duration
1	Target protein preparation	• Protein expression and purification • Send us your target	Depends on targets
2	Peptide phage library construction	Build a peptide library through phage display technique	1-2 weeks
3	Phage library screening	• 3-4 rounds biopanning • ELISA analysis for phage clones • Clones sequencing	1-2 weeks
4	Peptide synthesis & binding validation	• Synthesis of lead peptides • Binding affinity studies	1-2 weeks
5	Delivery	1-5 potent peptide sequences	1-2 weeks

Other services

- We can provide peptide structure modification and optimization.
- We can provide structure study of target and peptide complex through cryo-EM.
- We can offer a variety of in vitro assays and animal models to support biologics efficacy study and IND filing.
- We can customize your project based on your specific requirement.

Key features

In-house developed peptide phage display libraries

Fast turnaround time and competitive price

1 on 1 exclusive customer service and real-time project process reports

One-stop discovery platform for the generation, screening and validation

Peptide Drug Discovery Platform

Phage Display Technology

Case study

KS-V Peptide libraries screening results

➢ 15-AA Bicyclic peptide phage display library: $CXCX_5CX_5C$

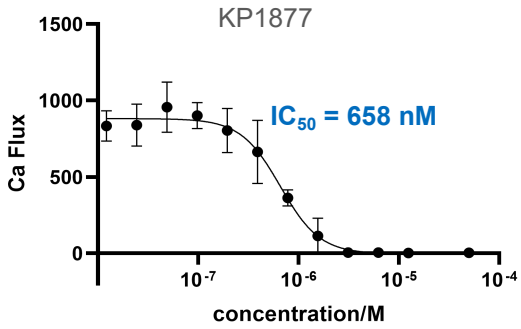
Positive sequences from ELISA

```
1          10   15
|--------+----|
CKCVPSEPCGNEDLC
CKCVPSEPCGNEDLC
CKCVPSEPCGNEDLC
CKCVPSEPCGNEDLC
CRCSHPPRCPPLRGC
CRCSHPPRCPPLRGC
CRCAHLIRCGVPPAC
CRCAHLIRCGVPPAC
CGCRGGGWCWARGGC
C.C.....Cg....C
```

Peptide synthesis

Peptide validation

Intracellular Calcium concentration detection

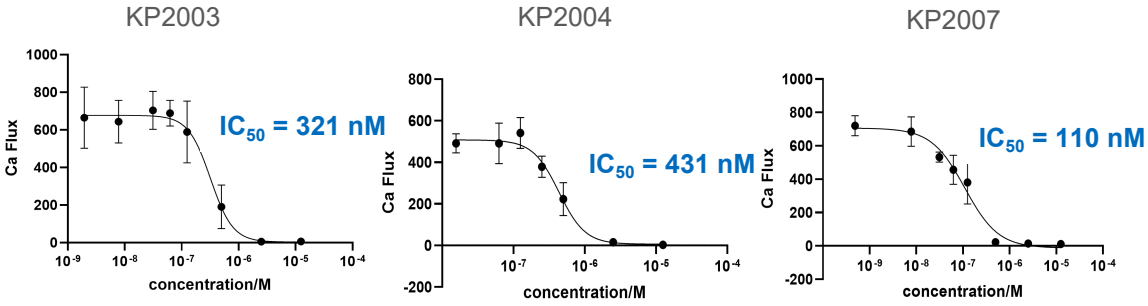


➢ 18-AA Bicyclic peptide phage display library: $X_2CCX_4CX_7C$

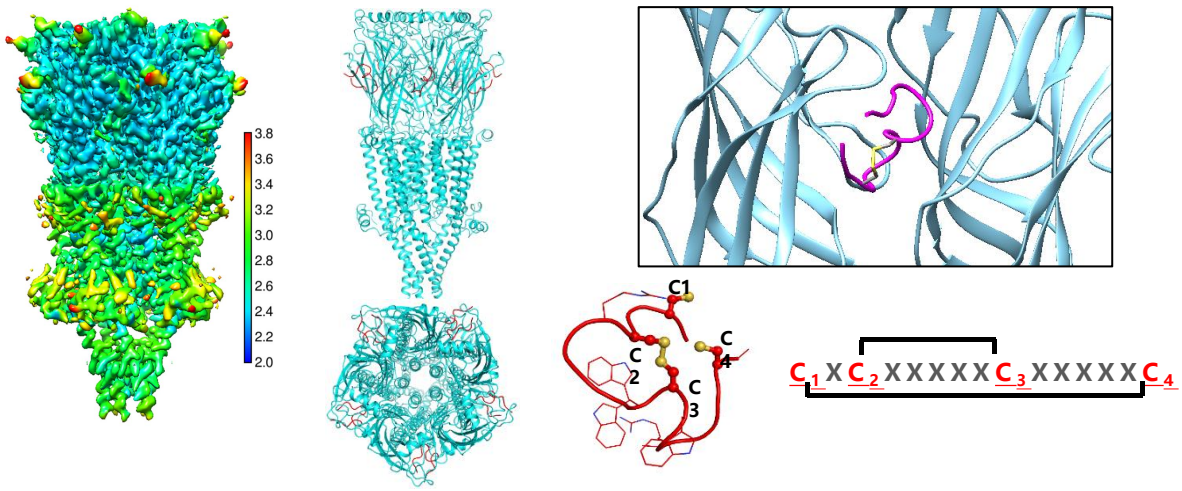
Positive sequences from ELISA

```
1         10        18
|--------+-------|
MWCCTGPFCLPSLEHRCG
AHCCKESWCLPAAAFLCG
RSCCLGHECPIPMFWLCG
GRCCWGHGCLPAELWYCG
YECCMHPACAWLRSRECG
HICCTHPACASIREDLCG
PACCEGNWCRWLRLDTCG
EFCCNPFFCKMSQSGGCG
..CC.g..C.......CG
```

Intracellular Calcium concentration detection



Cryo-EM structure study of target and KP1877 peptide complex



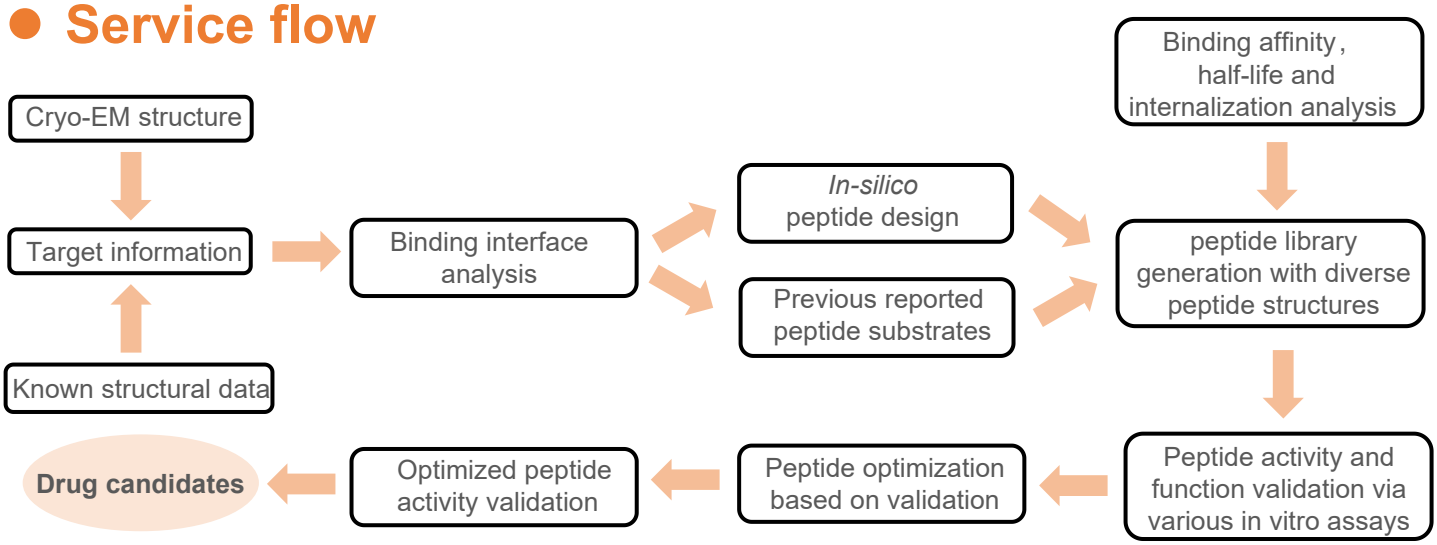
We can provide Cryo-EM services to study the structural interaction between target and peptide, and optimize the peptides based on the structural information.

Peptide Drug Discovery Platform

Peptide Modification and Optimization

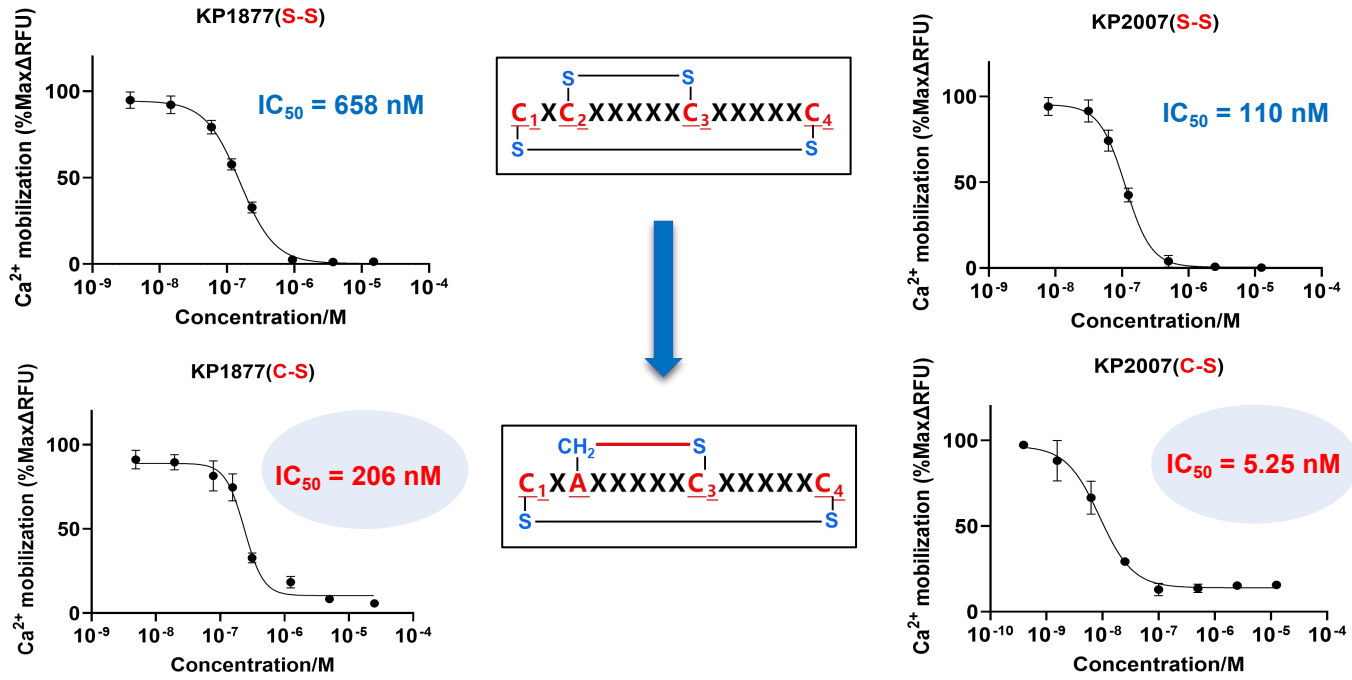
- The current challenges in peptide drug development include poor stability, short half-life, high plasma clearance rate, and other suboptimal pharmaceutical properties, as well as limited oral availability and poor patient compliance.
- To address these issues, KS-V Peptide provides a variety of peptide modification services to improve the druggability of the peptides while reduce the production cost.
- Our strategies include peptide backbone modifications and peptide side chain modifications, such as using unnatural amino acids, pseudopeptides, cyclized peptides, conjugation with fatty acids, polyethylene glycol, etc..

Service flow



Case study

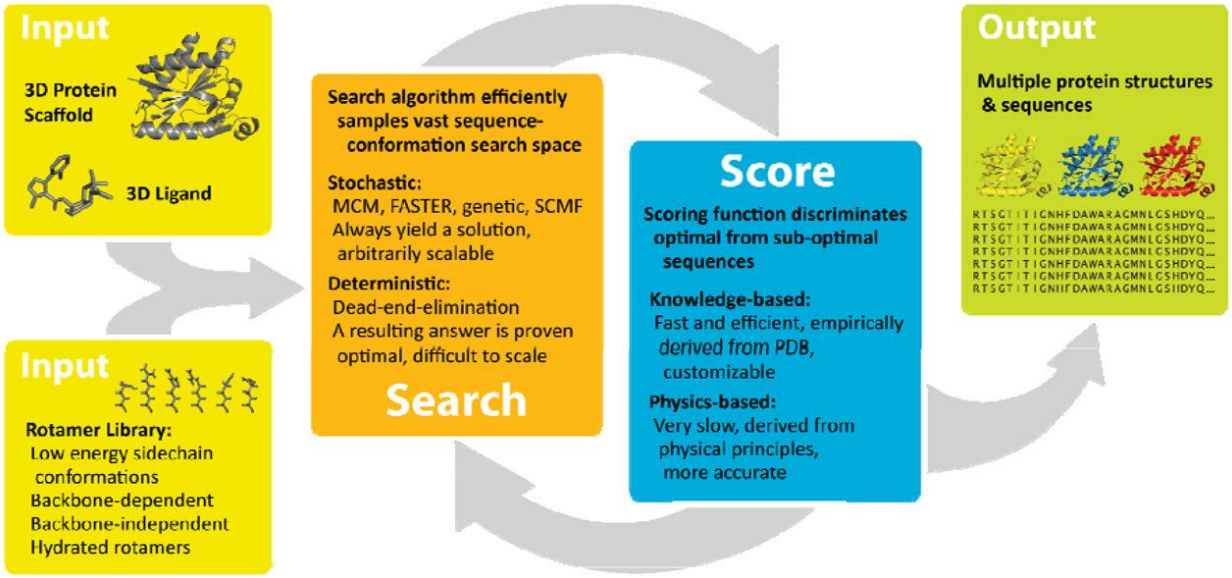
Peptide modification to improve binding affinity and therapeutic efficacy



Peptide Drug Discovery Platform

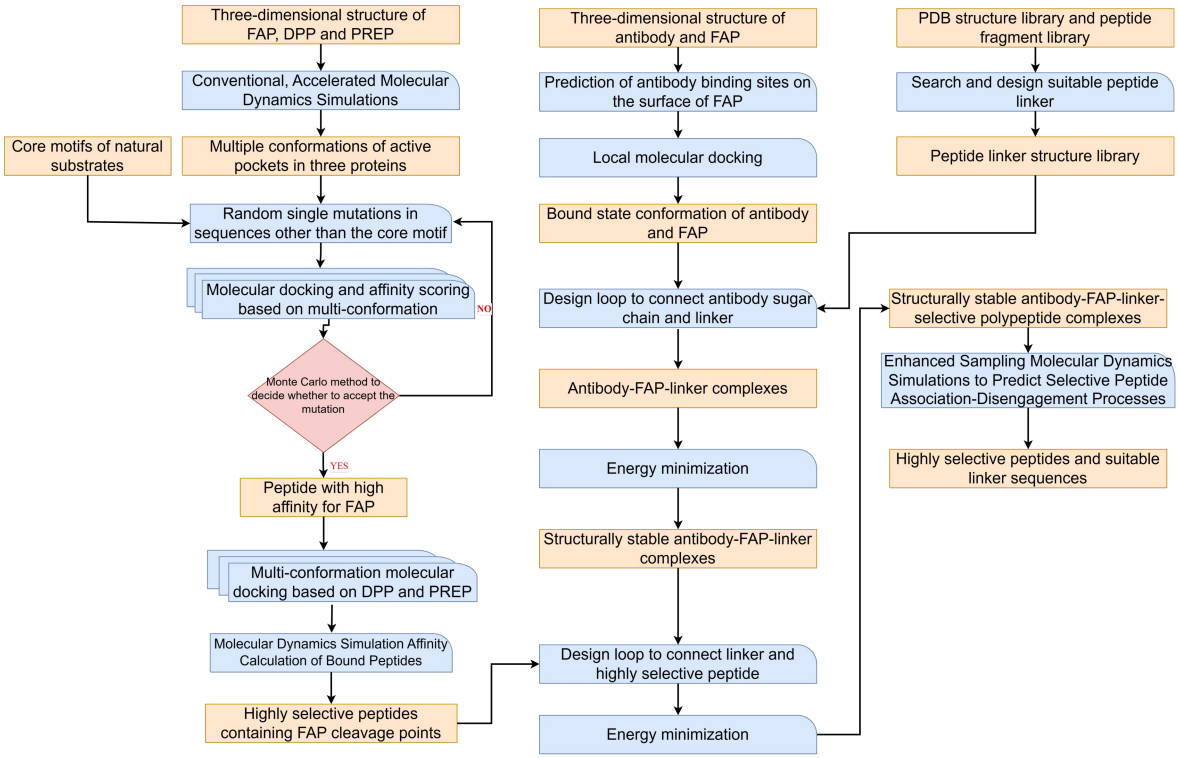
AI-assisted Drug Discovery

Docking peptides to the target and scoring the binding conformations, retaining the results with the best scores, and continuing to search for better sequences based on previous results. Repeating the process until the scoring does not change significantly, finally obtaining the target molecule. Combining AI-assisted drug discovery with lab automation, high-throughput screening, and other technologies can further enhance the drug discovery process by increasing its efficiency and reducing the time and costs involved.



Case study

Virtual design of ADC targeting FAP



Partial list of our partners

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Innovation To Help Drug Research And Development

Cooperation To Promote Healthy Life