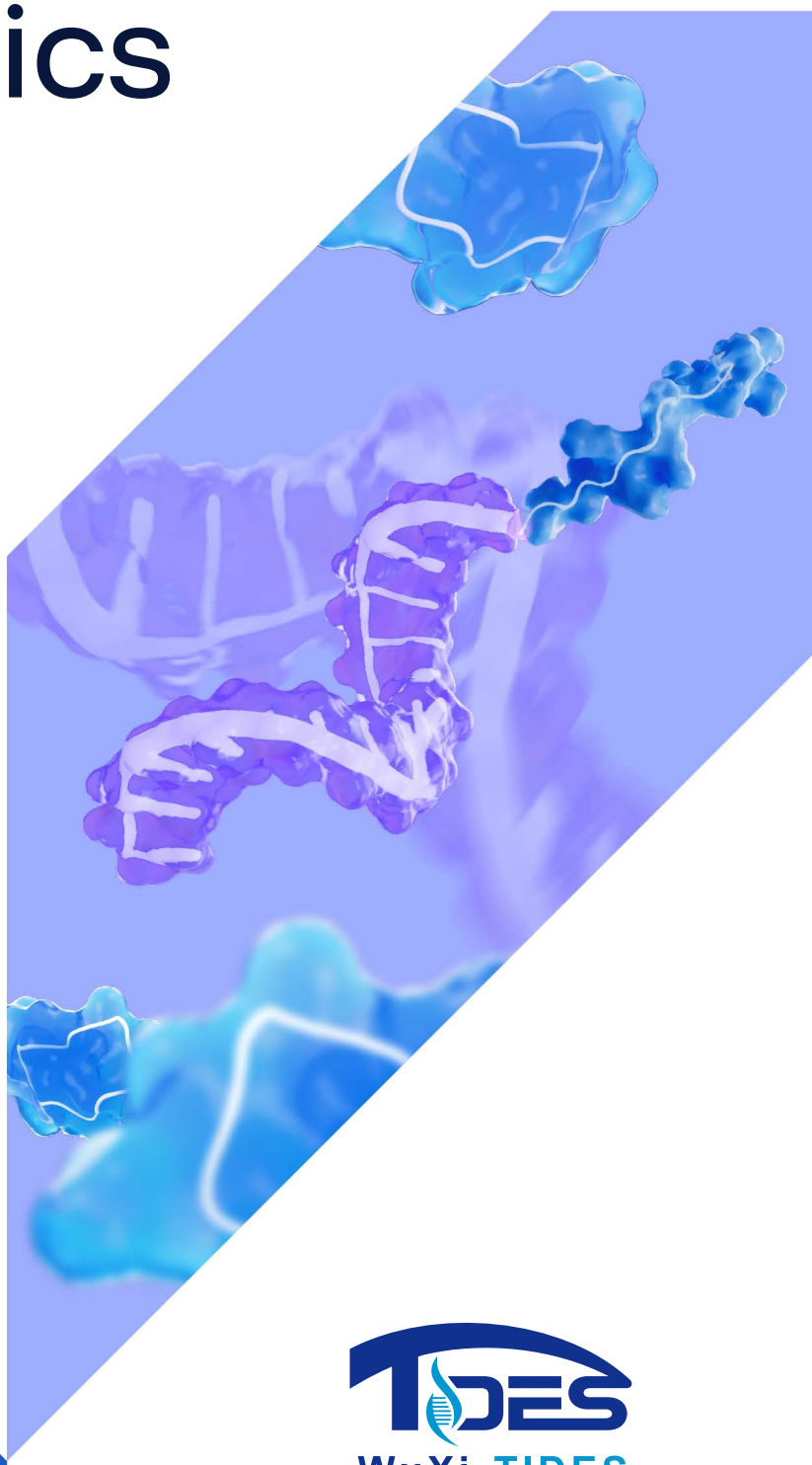
Oligonucleotide and Peptide Therapeutics



WuXi TIDES

Your complex challenges. Our precise solutions.

About Us

WuXi TIDES, part of Wuxi AppTec, is a unique Contract Research, Development and Manufacturing platform. WuXi TIDES offers our partners efficient, flexible, and high-quality solutions from discovery through the commercial supply of oligonucleotides, peptides and related synthetic conjugates ("TIDES" drugs).

We simplify the TIDES drug development process by providing all discovery, CMC development and manufacturing under one roof.

Our Capabilities at a Glance

Global Expertise

- Over 2,000 scientists across 10 R&D and manufacturing sites
- Continuous investment so our customers don't have to wait in line – we always have availability.

Comprehensive Chemistry Services

- Discovery compound screening and synthesis
- Process development and manufacturing of
  - Novel monomers, linkers, and ligands
  - Oligonucleotides and peptides
  - Complex synthetic conjugates
- Flexible scale-up from discovery to commercial manufacturing

Drug Product and Delivery Solutions

- Formulation development, manufacturing, labeling, and distribution
- Injectable dosage forms and multiple filling formats, including Lipid Nanoparticle (LNP) drug delivery platforms

Robust Analytical Support

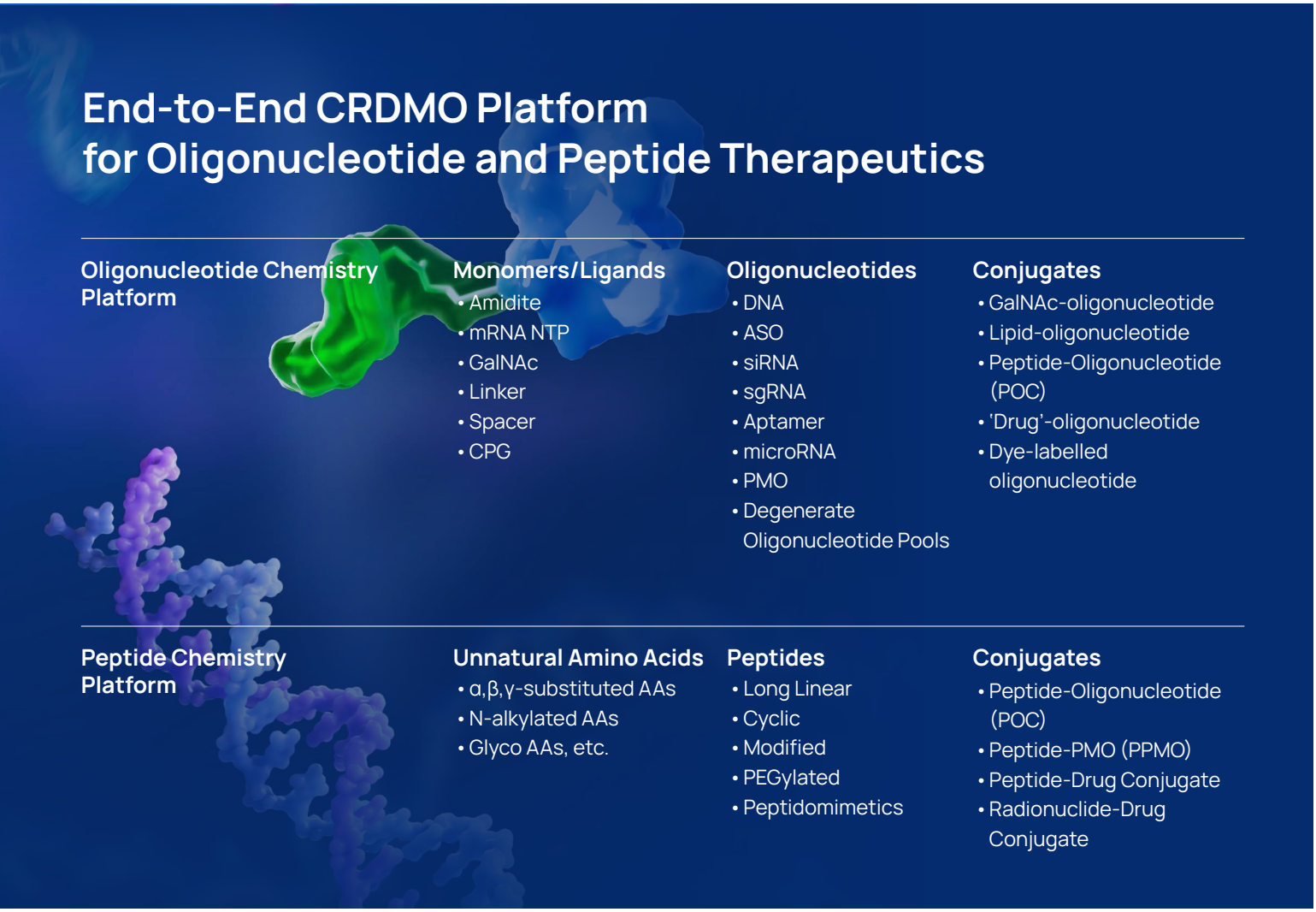
- Method development, validation, and testing
- Integrated analytical solutions supporting TIDES drug development from discovery through clinical and commercial stages

Regulatory Expertise

- Experienced Regulatory Affairs CMC team
- Preparation of comprehensive CMC dossiers to support global filings for TIDES new drug applications

Enabler of Innovation | Trusted Partner | Global Contributor

End-to-End CRDMO Platform for Oligonucleotide and Peptide Therapeutics



Oligonucleotide Chemistry Platform

Monomers/Ligands
- Amidite
- mRNA NTP
- GalNAc
- Linker
- Spacer
- CPG

Oligonucleotides
- DNA
- ASO
- siRNA
- sgRNA
- Aptamer
- microRNA
- PMO
- Degenerate Oligonucleotide Pools

Conjugates
- GalNAc-oligonucleotide
- Lipid-oligonucleotide
- Peptide-Oligonucleotide (POC)
- 'Drug'-oligonucleotide
- Dye-labelled oligonucleotide

Peptide Chemistry Platform

Unnatural Amino Acids
- α,β,γ-substituted AAs
- N-alkylated AAs
- Glyco AAs, etc.

Peptides
- Long Linear
- Cyclic
- Modified
- PEGylated
- Peptidomimetics

Conjugates
- Peptide-Oligonucleotide (POC)
- Peptide-PMO (PPMO)
- Peptide-Drug Conjugate
- Radionuclide-Drug Conjugate

Oligonucleotide and Peptide CMC Platform

	PRECLINICAL	PHASE I	PHASE II	PHASE III	COMMERCIAL
Drug Substance	PROCESS R&D AND MANUFACTURING (Monomer, Ligand, Oligonucleotide, Peptide, Conjugate)				
Drug Product	PRE-FORMULATION, FORMULATION DEVELOPMENT & MANUFACTURING (Oral, Injectable, LNP Delivery Technology)				
Analytical	ANALYTICAL DEVELOPMENT, QUALITY CONTROL AND STABILITY STUDIES				
Regulatory CMC	CMC DOSSIER PREPARATION TO SUPPORT GLOBAL REGULATORY FILING				

WuXi TIDES R&D and Manufacturing Network

Discovery

O P

Shanghai, China

Oligonucleotide and peptide discovery, preformulation and formulation development

O

Tianjin, China

Oligonucleotide, amidite, GalNAc discovery

P

Chengdu, Sichuan, China

Peptide, unnatural amino acid, payload & linker discovery

P

Wuhan, Hubei, China

Peptide discovery

API Development and Manufacturing

O P

Changzhou, Jiangsu, China

API process development and manufacturing

O P

Taixing, Jiangsu, China

API process development and manufacturing

O P

Singapore (2027)

API process development and manufacturing

Formulation Development and Manufacturing

O P

Wuxi City, Jiangsu, China

Formulation development and manufacturing

O P

Middletown, DE, USA (2026)

Formulation development and manufacturing

O P

Couvet, Neuchâtel, Switzerland

Drug product manufacturing

O Oligonucleotide
P Peptide

Maintaining the Highest Global Standard

Quality is at the core of our culture. WuXi TIDES follows the same quality and EHS system across all sites, with a proven track record of inspections from all major regulatory agencies and our global customers.

20 US FDA
2013 - 2025

11 EMA
2009 - 2026

92 China NMPA
2015 - 2026

17 Japan PMDA
2019 - 2025

4 South Korea MFDS
2022

6 SwissMedic
2018 - 2025

450+ Client audits
every year

Why WuXi TIDES

- ***Scalability***
  Discovery, development and commercialization in a single, integrated platform, powered by industry-leading capacity

- ***Cross-Functional Collaboration***
  Seamless collaboration among oligonucleotide, peptide and small molecule teams

- ***New Technology***
  Biocatalysis for sgRNA synthesis, Thin Film Evaporation (TFE), Continuous Flow Fhemistry, Reactor-in-series (with PAT data collection), Tangential Flow Filtration (TFF)/precipitation

- ***Global Quality Standard***
  One quality system across all sites approved by major regulatory agencies around the world

- ***Comprehensive Analytical Platform***
  Method development and validation, IPC and release testing, characterization, stability

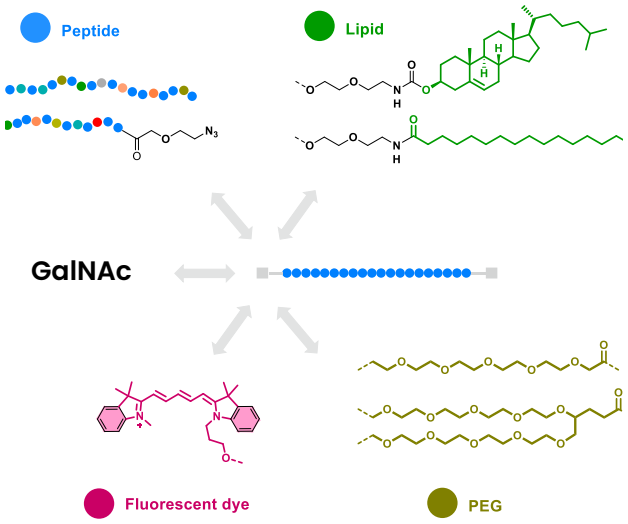
- ***Integrated CMC***
  API process R&D and manufacturing, formulation development and manufacturing, analytical, CMC dossier preparation and clinical supply services

Oligonucleotide Discovery Services

Comprehensive
Extensive experience in various modalities

Diverse
Large variety of linkers/conjugation strategies

Flexible
Customized solutions according to your application



Linker Chemistry	Topology
Amide coupling	3'- or 5'-conjugation
Thiol-maleimide addition	Base/backbone conjugation
Click chemistry:	Complex dual conjugation:
CuAAC I SPAAC	3',5'- I 3',3'- I 5',5'-
Broad selection of spacers	Multivalency:
Custom-tailored linkers	Mono- I di- I tri- I tetra

0.1 mg-200+ g Synthesis Capability

Produce 71,000+ Oligonucleotides Per Year

Up to 158-nt Long Oligonucleotides

Access to 300+ Modifications & Conjugations

Oligo Synthesis Capabilities

Comprehensive preclinical support to accelerate your drug discovery pipeline

Hit Identification
mg (nmol) scale

- High-throughput synthesis in 96-well plates
- 1-2 weeks turnaround for 100s of sequences (library synthesis)

Hit-to-Lead/Lead Optimization
mg (mmol) scale

- HPLC purification capacity >100 oligos/ day at mg scale

Pre-Tox/Tox Study
g to 100+ g scale

- Endotoxin control (0.01-0.5 EU/mg)
- 2-week expedited delivery available for any g scale

Experience with Modified Oligonucleotides

- ASO with all chiral phosphorothioates
- RNA with 3'/5'-GalNAc
- Custom 3'/5' and internal GalNAc conjugation
- Custom amidite modification and synthesis
- Linker synthesis (cleavable and noncleavable)
- Lipidation
- PEGylation (~40 kD), etc.


192-channel synthesizer

Peptide Discovery Services

Our quick turnaround time and greater than 95% success rate ensures that our customers advance their projects quickly and efficiently. Most peptides under 40 amino acids are completed within 2 weeks from order placement with MS and HPLC/UPLC analytics data. Flexible deliverables include on-resin, crude, as well as purified powder at desired purity up to 99%.

High-Throughput Peptide Discovery Synthesis

- mg to kg scale
- High quality – Over 95% Success rate
- High purity – Up to 99.9% Purity
- Fast delivery – 2 weeks turnaround time for most peptides under 30 AA at mg scale

Customized Peptide Synthesis

- Up to 200 AA modified peptide with ligation
- Up to 90 AA modified peptide with SPPS only
- Modification: Dye/Biotin | PEG | Isotope labelling Peptidomimetics | Peptoid | PNA
- Cyclic peptides: Thioether | Disulfide | Biocyclic | Lactam | RCM | Lactone | Click

Biotage Syro II

Automated Synthesis and Purification Platform

Automated solid-phase (Fmoc) synthesis provides efficient and reliable custom sequences up to 160 AA with over 80% purity. Our platform is equipped with a wide range of instruments to fit project requirements with a greater than 95% success rate.

2,500+

Unnatural amino acid catalog products

Broad range of instruments

- CEM liberty blue
- Biotage Syro II
- CSBio automatic synthesizer
- Gilson Prep-HPLC
- Agilent UPLC
- Symphony X

Peptide Drug Conjugate (PDC) Platform

With our integrated HPAPI capabilities, large linker library, and comprehensive chemistry platforms, we support Peptide Drug Conjugate (PDC) development from discovery to commercial.

Discovery Scale-Up Capability

Non-GMP scale-up service for quick material supply to support PCC identification & formulation development

Direct Scale-up

- Maximum batch size: 400–500 g product

Fast Timeline

- Typical timeline: 5–7 weeks

Tech Transfer

- Seamless transfer to development team
- Supported 20+ PCC projects in 2025

Various Reactions on Solid Phase

- Suzuki coupling
- Sonogashira coupling
- Heck
- Reductive amination
- Ugi
- Wittig
- Hoffman degradation
- Curtis rearrangement
- Reduction/Oxidation and more

Oligonucleotide API Process Development and Manufacturing

We have 27 lines that cover a variety of Oligonucleotide types including ASO, siRNA, Aptamer, Oligonucleotide conjugates, PMO and PPMO.

- Utilize various modified monomers (2'-H, 2'-OH, 2'-F, 2'-OMe, 2'-OMOE, LNA, cEt, LNA, etc.)
- Chiral oligo synthesis
- Modification at 3'-end or 5'-end with GalNAc, triphosphate, cholesterol, saccharides, peptides, maleimide, etc.

Our team supports oligonucleotide production from lab scale to commercial scale with more than 20 small- to mid-scale production lines and 4 large scale production lines up to 6.0 mol per synthesis run.

Morpholino Oligonucleotide (PMO) Development and Manufacturing

We have developed high loading solid-phase PMO synthesis process that can achieve >50% yield, >75% crude purity, >90% final product purity with <0.045 EU/mg endotoxin.

Our chemistry know how enables various PMO 5' modifications with improved cleavage & de-protection process.

We have customized PMO synthesis reactors up to 100 L to support large-scale production. Our team has successfully completed kilogram scale PMO development and manufacturing projects.

Latest Highlights

- 100% success rate, completed 4 PPQ campaigns and additional 7 PPQ enabling are on-going
- Robust supply chain - in-house amidites & solid supports plus multiple qualified sources for key raw materials
- 90+ molecules supported from preclinical to phase II as of Q4 2025
- 400 kg oligonucleotide delivered in 9 months

27 lines at various scales

Oligoprocess™
Changzhou, Jiangsu, China

Peptide API Process Development and Manufacturing

Fast-Growing Capacity to Meet Surging Global Needs

Customer-First Culture

Quickly Responding to Demand

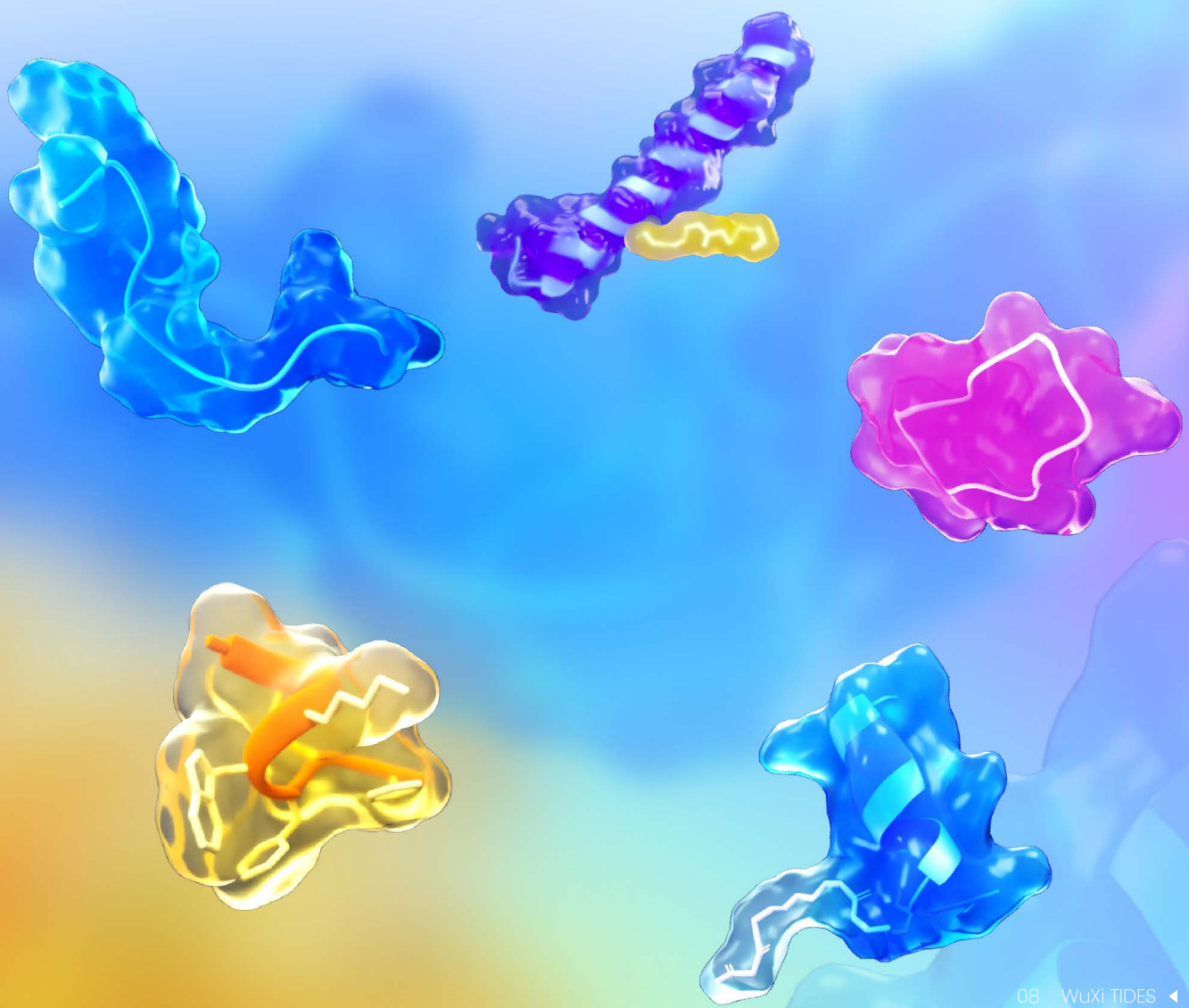
Maintaining Operational Excellence

- Long linear peptides
- Cyclic/Bicyclic peptides
- Modified peptides
- PEGylated peptides
- Peptidomimetics
- Branched peptides

We have built extensive experience with peptide-based conjugates including PPMO, Oligo-Peptide, Peptide-Toxin, and Peptide-Antibody.

Our Taixing site's peptide capacity has a total reactor volume of more than 100,000 L.

5,000 L peptide synthesiszer
Taixing, Jiangsu, China



Comprehensive Analytical Testing

General Required Tests for Oligonucleotides and Peptides

- Purity and assay
- Microbiology safety including endotoxin and bioburden
- Stability study

	Oligonucleotide	Peptide
Specialized Capabilities	• Sequence Confirmation by LC-MS/MS • Backbone Composition Analysis • Purity Assessment by LC-MS • Oligonucleotide Diastereomer Fingerprint • 2D LC-MS Impurity Profiling • Comprehensive In-House Method Portfolio for Characterization and QC	• Biologics License Application (BLA) Filing Readiness • Amino Acid Analysis & Enantiomeric Purity • Identity Confirmation via Peptide Mapping • Bio-ID & Bioassay Testing • Sequence Confirmation by LC-MS/MS • 2D LC-MS for Advanced Impurity Profiling

Our dedicated team of over 410 analytical R&D scientists, supported by 190+ QC analysts for GMP validation and release, ensures the capacity needed for comprehensive testing.

Equipped with an extensive suite of chromatography, mass spectrometry, and physicochemical analysis instruments, we provide cutting-edge analytical solutions. Our capabilities include advanced UPLC with high-resolution MS for sequence and impurity analysis, NMR for structure elucidation, and sophisticated LC-MS/MS techniques for purity and sequencing. These technologies ensure precise, reproducible results that meet the highest regulatory standards.

QC Lab at Taixing Site

Formulation Development and Manufacturing Platform

Drug Product Offering

- Pre-formulation
- Formulation development
- Clinical & commercial manufacturing

Sterile Parenteral Formulation Manufacturing Platform

- Disposable bags
- Mixing-filtration-filing with sterile environment
- Containers in a fully isolated system
- Wholly automated, robotic operation
- High potency (HP) injectable drug manufacturing (Can handle OEB5 compound; OEL: 10 ng/m^3)

Dosage Forms

- Solution/Emulsion
- Suspension
- Lyophilized powder
- Liposome/LNP
- Hydrogel

Filling Capacity

- Vial
- Pre-filled syringe
- Cartridge

Lipid Nanoparticle (LNP) Platform

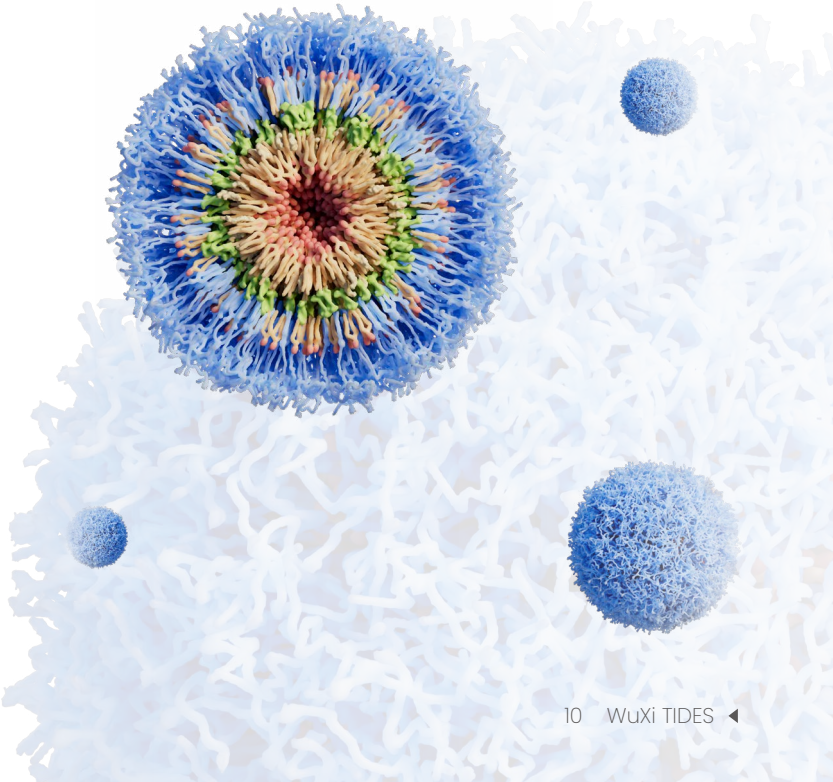
- Novel multi-channel mixing n-port provides robust scalability and reproducibility
- Novel lipid design and synthesis at any scale

Research & Development

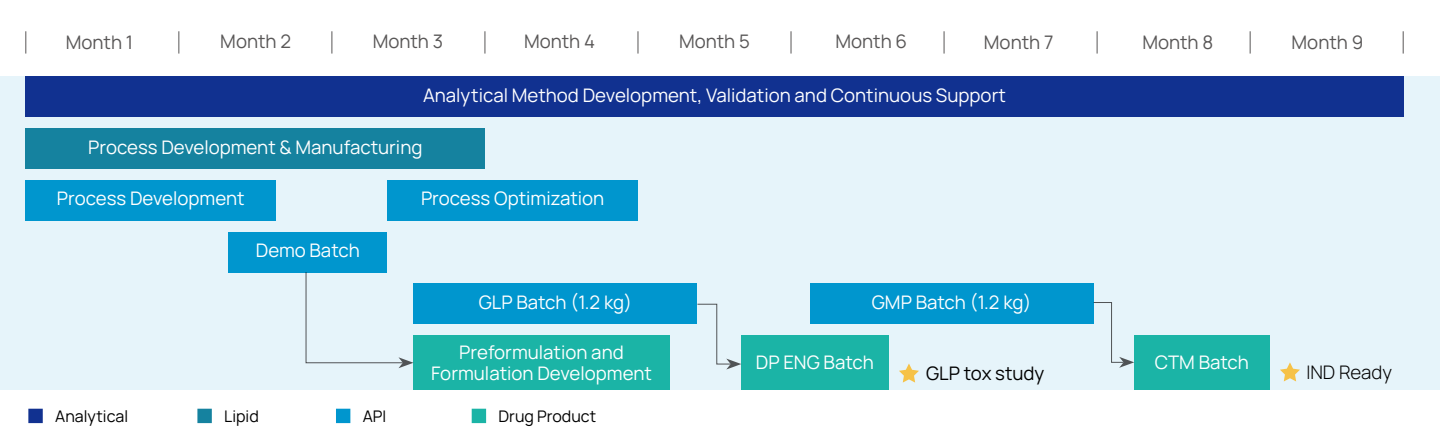
- Robust scalability and reproducibility (start from 5 mL)
- Small particle size (80~100 nm) and narrow PDI (< 0.10)
- Optimized ultrafiltration and sterile filtration process

GMP Manufacturing

- Modular designed
- Flexible scale, 0.5 L - 50 L per sub-batch



How a Lipid-conjugated siRNA advanced from PCC to IND, CMC Package-ready in 9 Months



Achievements

- Created a unique conjugation process that achieves up to 95% homogeneous reaction conversion, resulting in high purity and yield.
- Designed an effective purification process that consolidates two steps into one.
- Optimized the route design to enable parallel lipid synthesis and API production, saving 2 months.
- Developed an ultra-sensitive endotoxin detection method, achieving well-controlled API endotoxin levels (<0.05 EU/mg).

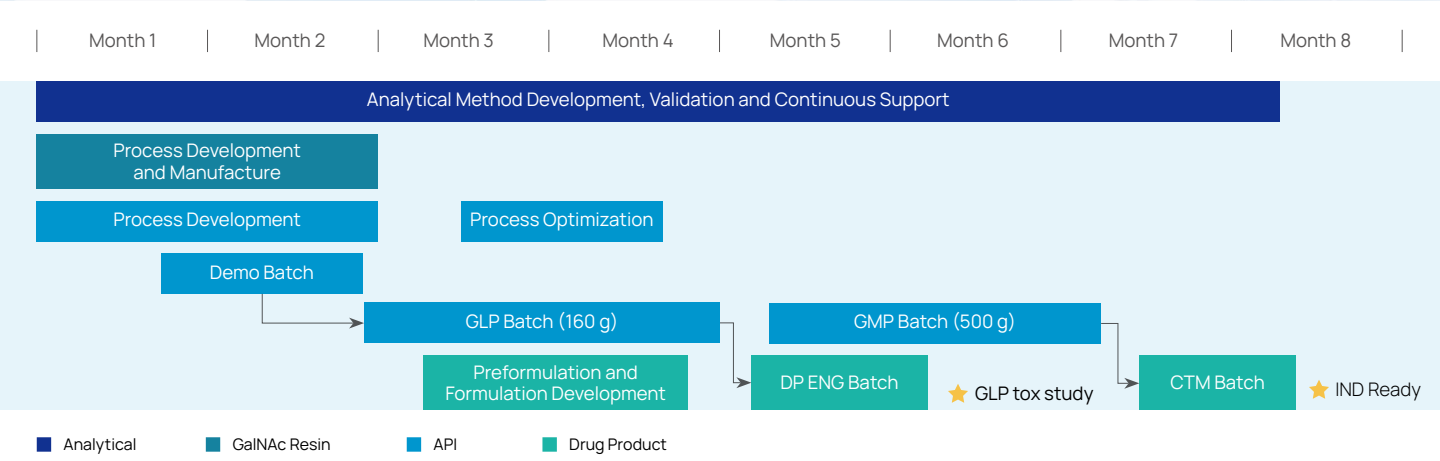
Crude Purity

71% → **85%**

Final Yield

46% → **55%**

A di-siRNA-GalNAc conjugate moved from PCC to IND, CMC package-ready in 8 months

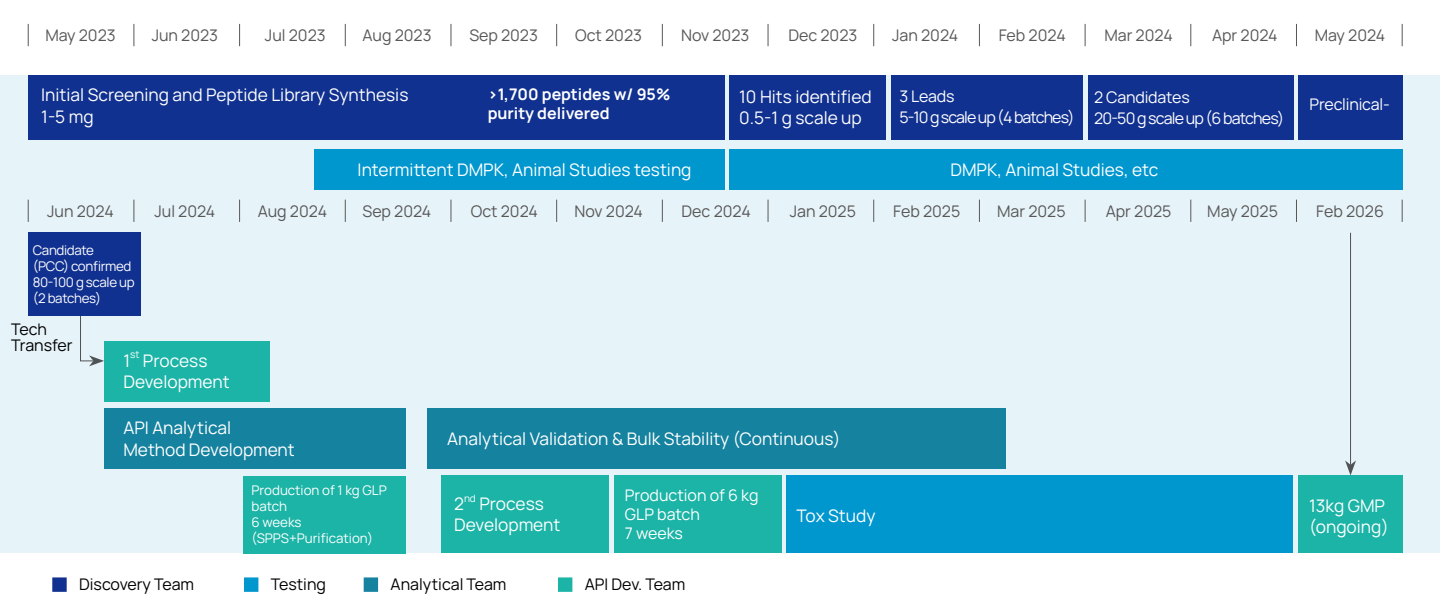


Parallel Activities | **Streamlined Process** | **Accelerated Timeline**

From Discovery to Development: Cross-Functional Acceleration of Oral Cyclic Peptide from Lead Optimization to GMP Readiness

Background

- To develop a non-GLP-1 pathway weight control peptide drug, aiming for oral delivery
- Lead molecule, now in API process development, was successfully scaled up through expedited timeline

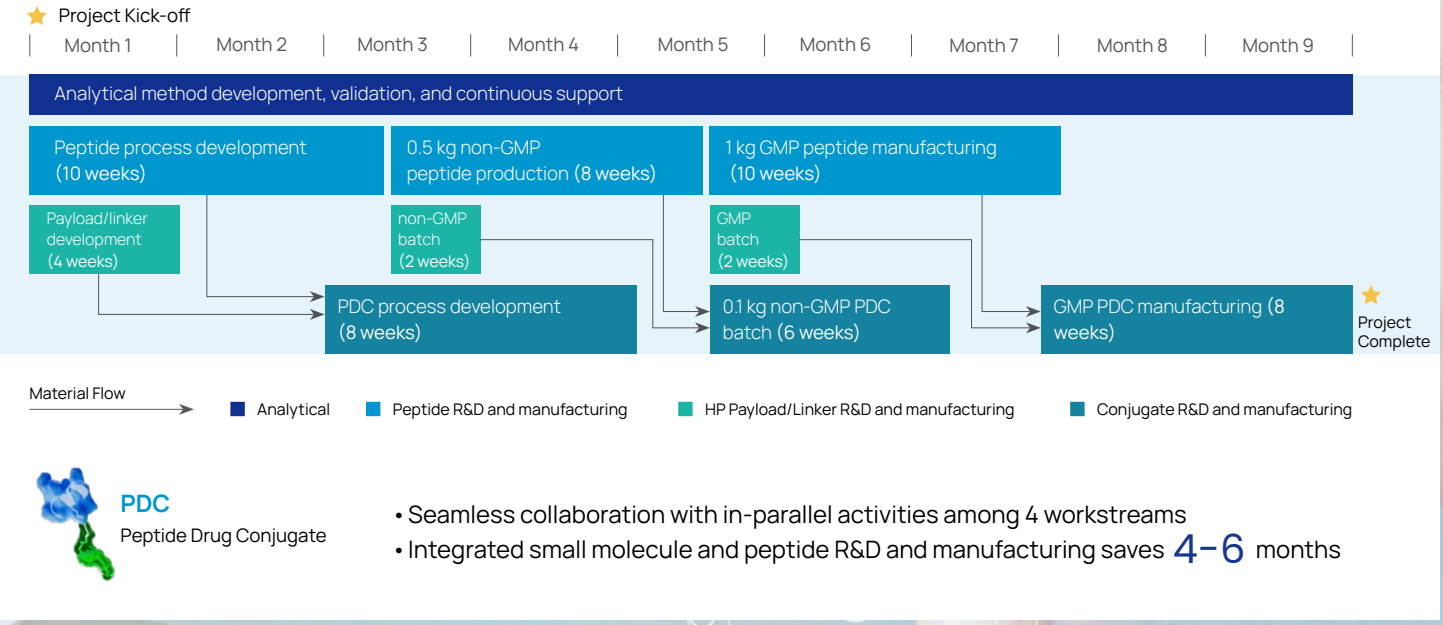


Lead Compound Scaling Enabled by Discovery-Driven Process Optimization

Zero-Downtime Tech Transfer from R to D

BU-Integrated Critical Path Management

PDC Drug R&D and Manufacturing in 9 Months



PDC
Peptide Drug Conjugate

- Seamless collaboration with in-parallel activities among 4 workstreams
- Integrated small molecule and peptide R&D and manufacturing saves 4–6 months

Regulatory Affairs CMC Platform

864

CMC submission packages written to support global IND and NDA filings since 2019

Streamlined CMC writing integrated as part of the project team

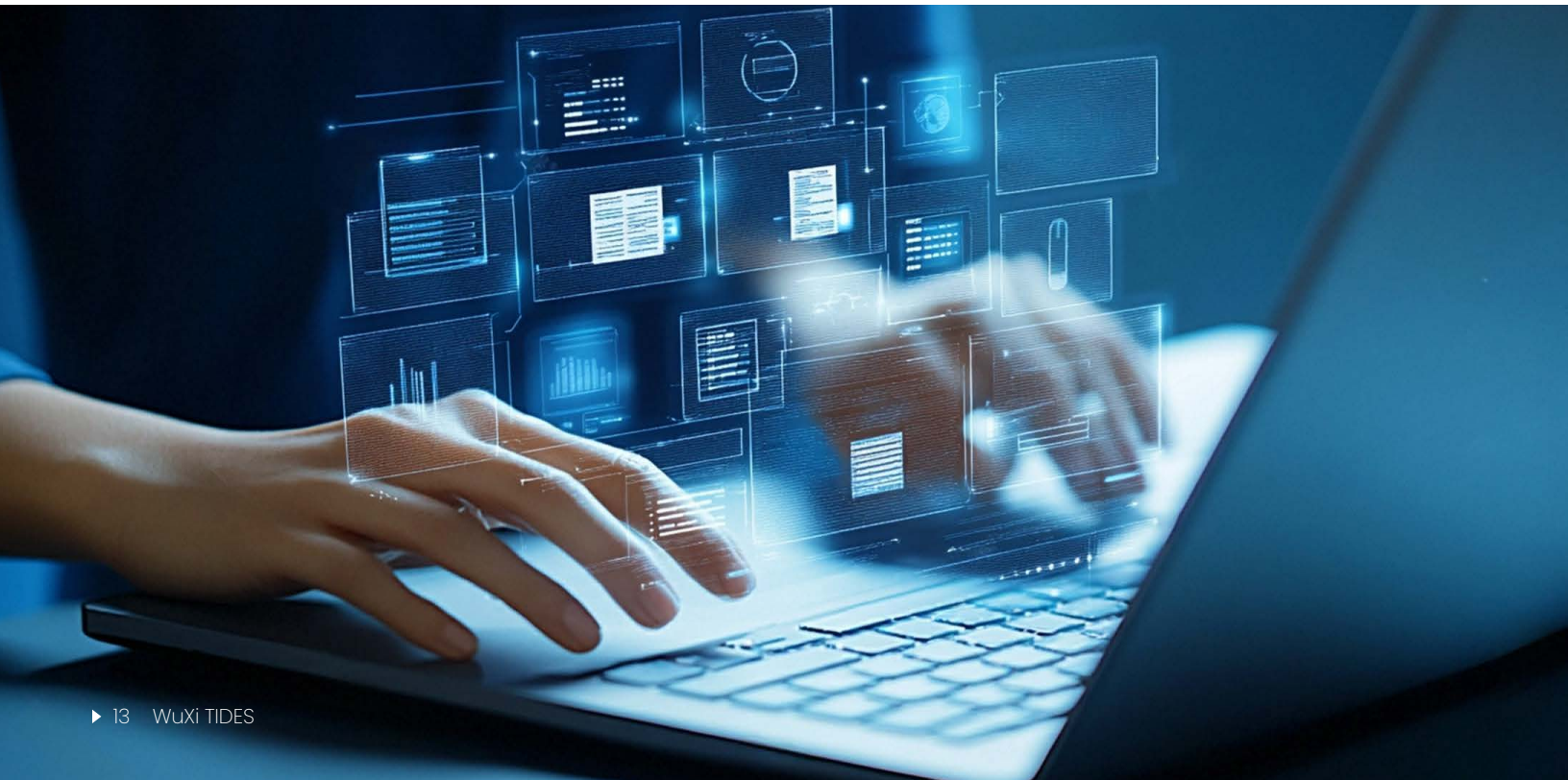
Project Initiation
Provide RA consultation for phase and modality appropriate, country specific project scope and strategy

Project Execution
Provide filing template, collect data once testing completed. Finish section writing along different phases and perform timely data review with clients to mitigate potential risks

Project Completion
Complete submission-ready CMC dossiers

Phase appropriate RA CMC filing strategies tailored to oligonucleotide and peptide drug characteristics

Adopt principles of ICH Q3 (impurities) and Q6 (specifications) to oligonucleotide and peptide based on our experience with O&P IND and NDA



Industry-Recognized ESG Excellence

Improved to "AAA" rating by MSCI in 2025

Consecutive "Gold" rating by EcoVadis Sustainability in 2024-2025

"A" rating in CDP Water Security for 2 consecutive years in 2024-2025

Improved to the highest "A" rating in CDP Climate Change in 2025 for the first time

Recognized as a top global sustainability leader in pharmaceutical services for four consecutive years (2021-2024)

Awarded as Industry and Regional Top-Rated company consecutively in 2023-2025 by Morningstar Sustainalytics

FTSE4Good Index (2023-2025) Recognized for meeting stringent ESG criteria and commitment to sustainable growth

First awarded "Prime" status in ISS ESG corporate rating

Green Peptide Manufacturing

Measurable Impact on Process Mass Intensity (PMI)

	Peptide PMI – Industrial Benchmark	Peptide PMI – WuXi TIDES
Commercial Manufacturing	13,063	3303 (API) 663 (Fragments) PMI/AA: 85 (vs. 875 industry average*)

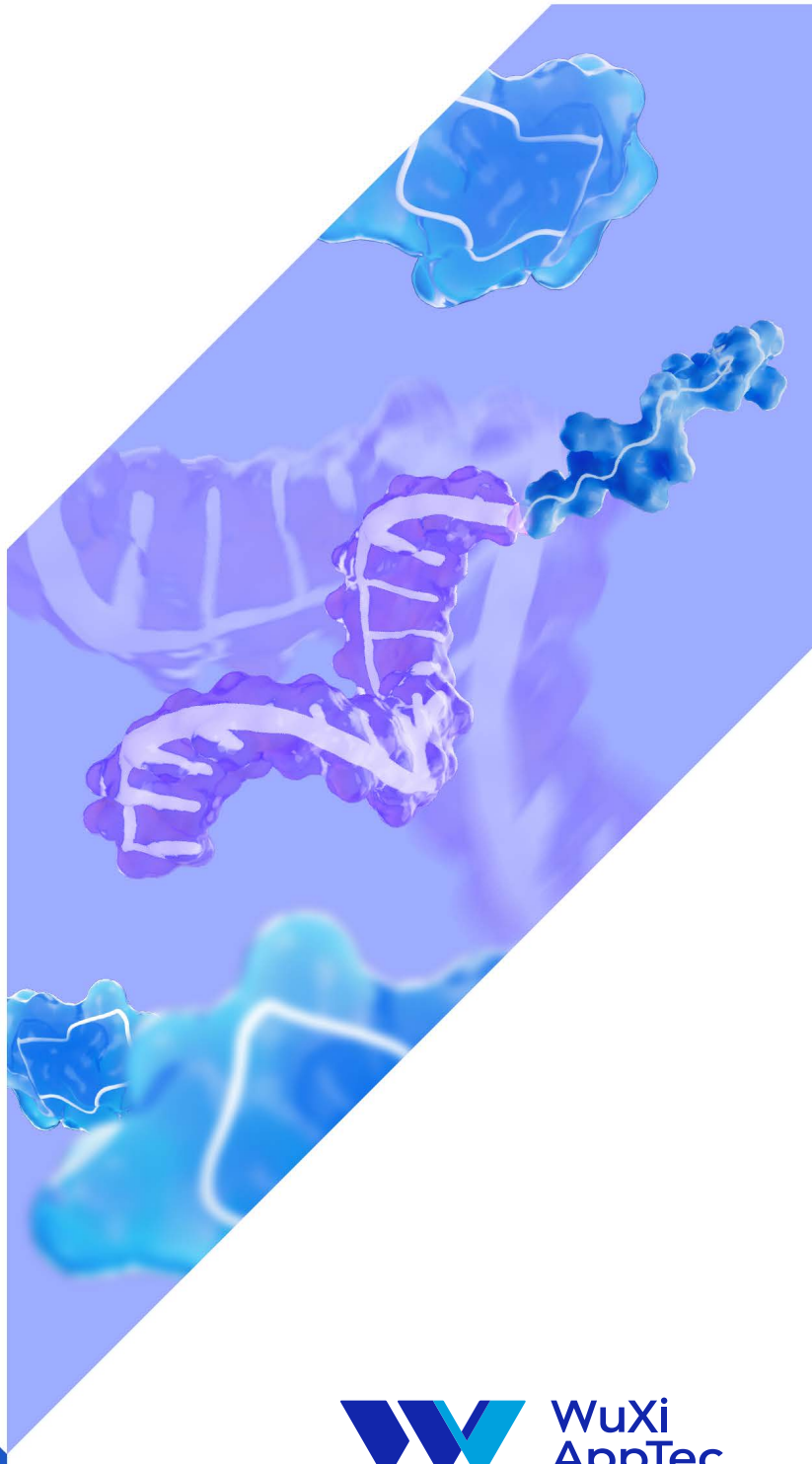
** Reference: J. Org. Chem. **2024**, 89, 4261)*

Measurable Impact on Process Mass Intensity (PMI)

Upstream Enhancements*
- Volume optimization
- Solvent replacement
- Streamlined washing
- New coupling reagents

Downstream Enhancements
- Injection optimization
- Method optimization
- Simplified purification

*Crude peptide purity increased significantly



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