



Drug Discovery and Characterization

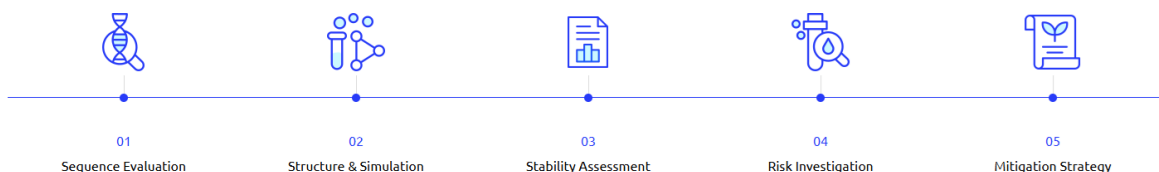
In your drug development journey, HiLand provides expert support in lead optimization to help achieve your candidate's design objectives. Through integrated druggability assessments, we de-risk early-stage biologics and complex molecules, enabling a smoother path toward clinical success.

The Complexity of Modern Biologics Requires Thoughtful Design

Innovative biologics face many development challenges. At HiLand, we bring clarity by aligning risk factors with targeted solutions.

Structural Integrity - Complex molecules (mAbs, BsAbs, fusion proteins) often suffer from poor structural stability. - This results in low expression yields and poor shelf-life.	Functional Complexity - Requires testing of multi-target affinity, internalization, and functional engagement. - Specialized systems (e.g., bioassay cell lines) are needed.
In Vivo Behavior - Risk of poor PK/PD or high immunogenicity can compromise development. - Requires early-stage modeling.	Optimization Requirements - Needs improvement in affinity, Fc function, or humanization. - Sequence-level changes can drastically alter manufacturability.

Workflow



Technical Platforms to Address Drug Development Risks

We have built six validated platforms to assess, optimize, and advance your therapeutic candidates.

	In Silico Prediction
<i>By using in silico analytical tools and powered by AI technologies, features of biomolecules are subject to evaluation of potential structural caveats.</i>	
pl_Protparam_Fv pl_Protparam_VH pl_Protparam_VL pl_Protparam_Intact Total Hydrophobic Patches_Fv Total Positive Patches_Fv Total Negative Patches_Fv Near CDR Hydrophobic Patches_Fv Near CDR Positive Patches_Fv Near CDR Negative Patches_Fv Protein Net Charge Total CDR Length Hot Spots in CDR	CDR Vicinity PSH Score CDR Vicinity PPC Score CDR Vicinity PNC Score SFvCSP Score Extra Thiol Extra N Glyco Site GRAVY (Hydropathicity) CamSol_VL (Solubility Score) CamSol_VH (Solubility Score) HVI SCM / DeepSCM Spatial Aggregation Propensity (SAP) Developability Index (DI)

	Biophysical and Structural Characterization
<i>Protein characterization allows structure information to be fully assessed which paves the way for understanding the behavior of the molecule both in the manufacturing process as well as in vivo.</i>	
Molecule Size and Purity by SEC-HPLC Molecule Size and Purity by rCE-SDS Molecule Size and Purity by nrCE-SDS Iso-Electric Point Solubility Viscosity Gel Stability	N-Glycosylation Site N-Glycosylation Analysis O-Glycosylation Site O-Glycosylation Analysis Glyco-Peptide Analysis Sialic Acid Content Assay CEX-MS

Thermo Stability	In-Gel Digestion
Particulates	Sequence Variants Analysis
Mass M.W.	Acid and Base Peak Characterization
Mass Peptide Mapping	Aggregates Characterization
Self-Interaction	BsAb Mis-Match Analysis
Hydrophobicity	HCP Non-Quantitative Analysis
Denatured Mass M.W.	High Risk HCP Non-Quant and Quantitative Analysis
Non-Denatured Mass M.W.	HCP Coverage Analysis
Amino Acid Analysis	Tween Degradation Analysis
Post Translational Modification Analysis	Epitope Analysis
Extinction Coefficient Analysis	High-Level Structure Analysis

	In Vivo Characteristic Modeling
<i>By running specifically designed assays in vitro, certain in vivo characteristics of the biomolecule can be revealed.</i>	
Non-Specific Binding PK Related Characters (Heparin binding, FcRn affinity at pH6.0 / pH7.4)	Immunogenicity Plasma Stability

	Primary Stability Assessment
<i>Bring stability study early into the lead optimization stage will greatly help to avoid serious issues during CMC development.</i>	
Stability at 45°C Illumination Stability Strong Oxidation Stability	Low pH Stability High pH Stability Freeze / Thaw Transportation Stability (rocking)

	Bioactivity Assay Development	
<i>Multiple assays need to be specially developed to assess functionality of drug candidates from various angles.</i>		
Receptor Occupancy Rate FcRn / FcγR / C1q Binding Activity Tumor Cell Surface Antigen Binding Bioactivity (growth inhibition) Bioactivity (cytotoxicity) Bioactivity (reporter gene assay) Cytokine Release	Endocytosis Assay ADCC / CDC / ADCP (Cell-Based Assay) By-Stander Effect (Cell-Based Assay) Cell Cycle (Cell-Based Assay) Plasma Stability (human, mouse, and monkey) Assay Cell Line Development and Gene Editing	

	Protein Engineering & Development	
<i>Modification of protein sequence and structure can lead to improved features of both protein stability and functionality.</i>		
Sequence Humanization	Hot Spots Removal	
Affinity Maturation	Hydrophobicity Patch Modification	
Fc Silence Modification	Electric Patch Modification	
ADCC Enhancement Modification	Aggregation Character Modification	
ADCP Enhancement Modification	High Viscosity Character Modification	
CDC Enhancement Modification	New Symmetrical and Nonsymmetrical BsAb Development	
Half-Life Prolongation (Fc mutation)	T Cell Engager Development	
Half-Life Prolongation (adding anti HSA VHH)	New Linker-Toxin Platform	
Fc Heterodimer Modification (Fc mutation)	BsAb-ADC Platform	
Conjugation Site Modification	BsAb-Dual Payload ADC Platform	
N-Glycosylation Site Removal		