

Summary of Case Studies

Track Record	Performance
How many properties can be optimized?	Up to 6 (average: 3)
How much probability to achieve properties better than WT can be expected?	100% in all 18 runs
How much elevation in expression levels can be expected?	<ul style="list-style-type: none"> - Example: mg/L expression in mammalian or bacterial expression system from undetectable levels in SDS-PAGE analysis - Example: 150 mg/L transient mammalian cell expression of an antibody from 50 mg/L
How much potentiation in enzymatic activity can be expected?	Have achieved 100-fold higher
Can create enzymatic activity to a non-native substrates	Proven experience
How much refinement of substrate specificity can be expected?	Have achieved 50-fold higher
How much enhancement in melting temperature (T _m) can be expected?	Have achieved +18 °C
What properties with proven experience?	<ul style="list-style-type: none"> - Expression level - Thermal stability - Solubility - Enzymatic activity - Substrate specificity - Half-life - Structural stability at stressful physiological condition - Functional stability at stressful physiological condition - Binding affinity - Immunogenicity risk mitigation - Post-translational modification (PTM) risk mitigation

Track Record	Performance
	<ul style="list-style-type: none"> - Stabilization of mono- or heteromer formation - Cell Cytotoxicity - Serum Half-life
Repeat clients?	One out of three clients
What proteins with proven experience?	<p><u>Enzymes</u></p> <ul style="list-style-type: none"> - Type of Catalytic reaction: Hydrolase, Lyase, Oxidase, Recombinase, Reductase, Synthase, Transferase - Type of Substrate: Aromatic amino acids, Natural amino acids, Ketone compound, Carbohydrates <p><u>Antibodies</u></p> <ul style="list-style-type: none"> - Monoclonal antibodies, Humanized Antibody - Next-Generation Antibodies: Bispecific antibodies, Multispecific antibodies, Low molecular weight antibodies (scFv, Fab, Diabody), Single-domain antibodies <p><u>Other Proteins</u></p> <ul style="list-style-type: none"> - Binding proteins - Fusion proteins

Result of Case Studies

Project	Modality	Area	Development Stage	Status	Result
RK001	Antibody (Nivolumab)	Therapeutics (Immunooncotherapy)	Technology development	Completed	5-Dimensional Protein Engineering - Solubility: Enhanced - Thermal stability: Preserved - Expression level: Preserved - Binding affinity: Secured - Immunogenicity risk (in silico): Mitigated
RK002	Antibody (Daratumumab)	Therapeutics (Oncology)	Technology development	Completed	3-Dimensional Protein Engineering - Thermal stability: Enhanced - Expression level: Elevated

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					- Binding affinity: Secured
RK003	Protein	Therapeutics (Rare Disease)	Undisclosed	Completed	Undisclosed
RK004	Protein	Undisclosed	Undisclosed	Completed	Undisclosed
RK006	Protein	Undisclosed	Undisclosed	Completed	2-Dimensional Protein Engineering - Bioactivity with substance A: Poteintiated - Bioactivity with substance B: Created from ZERO

Project	Modality	Area	Development Stage	Status	Result
RK007	Protein	Undisclosed	Undisclosed	Completed	2-Dimensional Protein Engineering - Bioactivity: Potentiated - Expression level: Preserved
RK008	Protein	Undisclosed	Undisclosed	Completed	6-Dimensional Protein Engineering - Solubility: Enhanced - Expression level: Elevated - Thermal stability metric 1: Enhanced - Thermal stability metric 2: Enhanced - Binding affinity to antigen A: Secured - Binding affinity to antigen B: Secured

Project	Modality	Area	Development Stage	Status	Result
RK009	Protein	Vaccines (Infectious diseases)	Research collaboration	Working	TBD
RK010	Protein	Undisclosed	Undisclosed	Completed	2-Dimensional Protein Engineering - Structural stability at stressful physiological condition: Enhanced - Functional stability at stressful physiological condition: Enhanced

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RK011	Protein	Undisclosed	Undisclosed	Completed	2-Dimensional Protein Engineering - Bioactivity: Potentiated - Expression level: Preserved
RK012	Protein	Undisclosed	Undisclosed	Completed	3-Dimensional Protein Engineering - Thermal stability: Enhanced - Expression level: Elevated - Binding affinity: Secured
RK013	Protein	Undisclosed	Undisclosed	Working	TBD

Project	Modality	Area	Development Stage	Status	Result
RK014	Protein	Undisclosed	Undisclosed	Working	TBD
RK015	Protein	Undisclosed	Undisclosed	Completed	2-Dimensional Protein Engineering - Bioactivity: Potentiated - Expression level: Preserved
RK016	Protein	Undisclosed	Undisclosed	Completed	TBD

Project	Modality	Area	Development Stage	Status	Result
RK017	Protein	Undisclosed	Undisclosed	Working	TBD
RK018	Protein	Undisclosed	Undisclosed	Working	TBD
RK019	Protein	Undisclosed	Undisclosed	Completed	<p>3-Dimensional Protein Engineering</p> <ul style="list-style-type: none"> - Immunogenicity risk (in silico): Mitigated - Post-translational modification (PTM) risk: Mitigated - Binding affinity: Tightened

Project	Modality	Area	Development Stage	Status	Result
RK020	Protein	Undisclosed	Undisclosed	Completed	3-Dimensional Protein Engineering <ul style="list-style-type: none">- Complex Formation: Enhanced- Cell Cytotoxicity: Enhanced- Serum Half-life: Extended