Рекомбинантные белки и ферменты, ч. 1

Технические характеристики

Виды товаров: Ферменты, связанные с синтезом мРНК, модификации фермента, ингибиторы фермента обратной транскриптазы, РНК, лигаза, фосфатаза, киназа, пирофосфатаза, нуклеаза, топоизомераза, ДНК/РНК-полимераза, ферменты изотермической амплификации и лигазной цепной реакции, ферменты для ПЦР ферменты для синтеза РНК.

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Recombinant Protein & Enzyme

mRNA Synthesis Related Enzymes

Modification Enzyme

Reverse Transcriptase/RNA Enzyme Inhibitor | Ligase | Phosphatase/Kinase | Pyrophosphatase | Nuclease/Topoisomerase DNA/RNA Polymerase-->

Isothermal Amplification and Ligase Chain Reaction Enzymes | Enzymes for PCR | Enzymes for cDNA Synthesis | Enzymes for RNA Synthesis

Products>Recombinant Protein & Enzyme>mRNA Synthesis Related Enzymes

Cat.No.	Product Name	Spec.
G3402-5000U	T7 RNA polymerase	5000 U
G3414-10KU	RNase Inhibitor	10 KU
G3423-10KU	RNase Inhibitor, Murine	10 KU
G3424-10KU	RNase Inhibitor, Human	10 KU
G3437-1000U	T4 RNA ligase I	1000 U
G3453-500U	Poly(A) Polymerase	500 U
G3454-500U	Vaccinia Capping Enzyme	500 U
G3455-2000U	mRNA Cap 2´-O-Methyltransferase	2000 U
G3460-100U	Inorganic Pyrophosphatase (Yeast)	100 U

Products>Recombinant Protein & Enzyme>Modification Enzyme

Products>Recombinant Protein & Enzyme>Modification Enzyme>Reverse Transcriptase/RNA Enzyme Inhibitor

Cat.No.	Product Name	Spec.
G3414-10KU	RNase Inhibitor	10 KU
G3415-10KU	SweScript Reverse Transcriptase I	10 KU
G3416-10KU	SweScript Reverse Transcriptase II	10 KU
G3423-10KU	RNase Inhibitor, Murine	10 KU
G3424-10KU	RNase Inhibitor, Human	10 KU

Products>Recombinant Protein & Enzyme>Modification Enzyme>Ligase

Cat.No.	Product Name	Spec.
G3340-100	T4 DNA Ligase (5 U/μL)	500 U
G3340-50	T4 DNA Ligase (5 U/μL)	250 U

G3437-1000U	T4 RNA ligase I	1000 U
G3459-2000U	Taq DNA ligase	2000 U

Products>Recombinant Protein & Enzyme>Modification Enzyme>Phosphatase/Kinase

Cat.No.	Product Name	Spec.
G3400-1000U	Alkaline Phosphatase (Thermosensitive)	1000 U
G3458-500U	T4 Polynucleotide Kinase	500 U

Products>Recombinant Protein & Enzyme>Modification Enzyme>Pyrophosphatase

Cat.No.	Product Name	Spec.
G3420-100U	Inorganic Pyrophosphatase (E.coli)	100 U
G3421-200U	Inorganic Pyrophosphatase (Thermostable)	200 U
G3460-100U	Inorganic Pyrophosphatase (Yeast)	100 U

Products>Recombinant Protein & Enzyme>Modification Enzyme>Nuclease/Topoisomerase

Cat.No.	Product Name	Spec.
G3342-10KU	Recombinant DNase I (RNase-free)	10 KU
G3342-500U	Recombinant DNase I (RNase-free)	500 U
G3401-1000U	DNA topoisomerase I (vaccinia virus)	1000 U
G3405-1ML	Recombinant RNase A (10 mg/mL)	1 mL
G3405-200UL	Recombinant RNase A (10mg/mL)	200 μL
G3406-50KU	Benzonase Nuclease (his-tag)	50 KU
G3408-50UL	dsDNase (Thermolabile)	50 μL
G3417-100U	RNase H (E.coli)	100 U
G3418-250U	Thermostable RNase H	250 U
G3419-1000U	Uracil-DNA Glycosylase (UDG)	1000 U
G3425-50PMOL	Cas9 Nuclease(SpCas9)	50 pmol
G3426-50PMOL	Cas9(D10A) Nickase	50 pmol
G3427-50PMOL	Cas9(H840A) Nickase	50 pmol
G3433-50PMOL	Lba Cas12a (Cpf I) Nuclease	50 pmol
G3434-50PMOL	Tth Argonaute (TtAgo)	50 pmol
G3439-1000U	Lambda Exonuclease	1000 U
G3461-50KU	Benzonase Nuclease	50 KU
G3462-500U	Ribonuclease R (RNase R)	500 U
G3463-1000U	T5 Exonuclease	1000 U
G3464-3000U	Exonuclease I (E.coli)	3000 U
G3465-5000U	Exonuclease III (E.coli)	5000 U

Products>Recombinant Protein & Enzyme>Modification Enzyme>DNA/RNA Polymerase>Isothermal Amplification and Ligase Chain Reaction Enzymes

Cat.No.	Product Name	Spec.
G3403-1600U	Bst DNA polymerase, Large Fragment	1600 U
G3412-50UL	Terminal Deoxynucleotidyl Transferase	50 μL
G3432-250U	Bsu DNA polymerase, large Fragment	250 U
G3448-300U	Phi29 DNA polymerase	300 U
G3478-500U	DNA polymerase I (E.coli)	500 U

Products>Recombinant Protein & Enzyme>Modification Enzyme>DNA/RNA Polymerase>Enzymes for PCR

Cat.No.	Product Name	Spec.
G3441-1000U	Taq DNA Polymerase	1000 U
G3442-1000U	Fast Taq DNA polymerase	1000 U
G3443-200U	Fast Pfu DNA polymerase	200 U
G3444-200U	Fast High Fidelity DNA polymerase	200 U

Products>Recombinant Protein & Enzyme>Modification Enzyme>DNA/RNA Polymerase>Enzymes for cDNA Synthesis

Cat.No.	Product Name	Spec.
G3415-10KU	SweScript Reverse Transcriptase I	10 KU
G3416-10KU	SweScript Reverse Transcriptase II	10 KU

Servicebio® RNase Inhibitor, Porcine

Cat. #：G3414-10KU

Product Information

Product Name	Cat. No.	Spec.
RNase Inhibitor, Porcine	G3414-10KU	10 KU

Product Introduction

Product Description: The RNase Inhibitor (Ribonuclease Inhibitor) inhibits the activity of RNases A, B and C by binding them in a noncompetitive mode at a 1:1 ratio. It is not effective against RNase 1, RNase T1, S1 Nuclease, RNase H or RNase from Aspergillus.

The performance of Ribonuclease inhibitors from porcine and human is similar. This product exerts its inhibitory effect at pH 5-8, showing the strongest inhibitory effect at pH 7-8. A final concentration of 1mM DTT at least in the storage solution is required to maintain the activity of RNase inhibitor.

Applications:

- RT-PCR
- cDNA synthesis
- *In vitro* transcription/translation
- Enzymatic RNA labeling reaction
- Other applications where the integrity of RNA is important

Source: An *E. coli* strain that carries the Ribonuclease Inhibitor gene from porcine.

Purity: ≥95% by SDS-PAGE

Concentration: 40 U/μL

Definition of Activity Unit: One unit is defined as the amount of RNase Inhibitor required to inhibit the activity of 5ng of RNase A by 50%.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 50 mM NaCl, 5 mM DTT, 50% (v/v) glycerol, pH 7.5.

Inactivation or inhibition

- Inhibitors: common denaturants (SDS, urea and all oxidizing reagents (p-chloromercuribenzoate, dissolved oxygen, ions in their higher oxidation states) strongly inhibit RNase Inhibitor and release the RNase bound.
- Inactivated by heating at 75°C for 10 min.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3414-10KU
G3414-1	RNase Inhibitor, Porcine	250 μL

Assay Protocol / Procedures

1. The recommended concentration of RNase Inhibitor in a reaction is 1-2 unit/μL. During assembly of a reaction (eg. *in vitro* transcription, cDNA synthesis, *in vitro* translation), RNase Inhibitor should be added before other components that are a possible source of RNase contamination.

Note

1. Enzymes should be placed on ice when used, and stored at -20℃ immediately after use. It is recommended to store separately.
2. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® SweScript Reverse Transcriptase I

Cat. #: G3415-10KU

Product Information

Product Name	Cat. No.	Spec.
SweScript Reverse Transcriptase I	G3415-10KU	10 KU

Product Introduction

Product Description: SweScript Reverse Transcriptase I is a recombinant M-MuLV reverse transcriptase without RNase H activity. It can be used to synthesize first strand cDNA at higher temperatures than the wild type M-MuLV. The enzyme is active up to 55°C, providing higher specificity, higher yield of cDNA and more full-length cDNA product up to 10 kb.

Applications: cDNA synthesis

Source: The gene encoding a mutant M-MuLV Reverse Transcriptase is expressed in *E. coli*.

Purity: ≥95% by SDS-PAGE

Concentration: 200 U/μL

Definition of Activity Unit: One unit is defined as the amount of enzyme that will incorporate 1 nmol of dTTP into acid-insoluble material in 10 minutes at 37 °C using poly(rA)•oligo(dT)as template/primer.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 100 mM KCl, 0.1 mM EDTA, 1 mM DTT, 0.5% Tween 20, 0.5% NP-40, 50% Glycerol, pH 8.0.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3415-10KU
G3415-1	SweScript Reverse Transcriptase I	50 μL
G3415-2	5x Reaction buffer	500 μL
Manual		One copy

Assay Protocol / Procedures

Protocol of First Strand cDNA Synthesis

1. Thaw components on ice and mix by inverting several times.
2. Mix the following components in a reaction tube:

Component	Volume
5x Reaction buffer	4 μL
dNTP Mix (10 mM each)	1 μL
Oligo(dT)$_{18}$ (100 μM)	1 μL
or Random Hexamer Primer (100 μM)	or 1 μL
or Gene Specific Primer (2 μM)	or 1 μL
RNase inhibitor (40 U/μL)	1 μL
SweScript Reverse Transcriptase I	1 μL
Total RNA/mRNA	0.1 ng-5 μg/10 pg-0.5 μg

Nuclease-free water	To 20 μL
Total	**20 μL**

Note: For GC rich and complex template, RNA template, primers and nuclease-free water can be premixed. Heat the RNA-primer mix at 65℃ for 5 minutes, and spin briefly and place promptly on ice.

3. Gently mix and briefly centrifuge.
4. Perform reverse transcription using the recommended thermal conditions below:

Temperature	Time
25℃[a]	5 min
50℃[b]	15-30 min
85℃	5 s

a: If using Random Hexamer Primer, incubate the combined reaction mixture at 25℃ for 5 minutes, and then proceed to next step. If using Oligo (dT) 18 Primer or Gene Specific Primer, directly incubate at 50℃.

b: For GC rich and complex templates, the reverse transcription temperature can be improved to 55℃.

Note

1. RNA is easily degraded, Please obey standardized operation to avoid RNase contamination.
2. The reverse transcription products can be stored at -20℃ for a short period. If long-term storage is required, it is recommended to store at -80℃ after packing and avoid freeze-thaw cycles.
3. If the template is of eukaryotic origin, it is recommended to select Oligo (dT)18 Primer and pair it with the 3' Poly A tail of eukaryotic mRNA to obtain the highest yield of full-length cDNA.
4. For reverse transcription of prokaryotic RNA, Random Hexamer Primer or Gene Specific Primer should be used.
5. If reverse transcription is followed by qPCR assay, Oligo (dT)18 Primer and Random Hexamer Primer can be mixed to achieve the same cDNA synthesis efficiency in all regions of mRNA, which helps to improve the authenticity and repeatability of quantitative results.
6. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® SweScript Reverse Transcriptase II

Cat. #：G3416-10KU

Product Information

Product Name	Cat. No.	Spec.
SweScript Reverse Transcriptase II	G3416-10KU	10 KU

Product Introduction

Product Description: SweScript Reverse Transcriptase II is a genetically engineered MMLV reverse transcriptase (RT) based on SweScript Reverse Transcriptase I. Mutations in the RNase H domain of the enzyme avoid degradation of the RNA during first-strand cDNA synthesis, which results in higher yields of full-length cDNA. It has increased thermal stability and higher synthesis efficiency compared to wild-type MMLV RT and SweScript Reverse Transcriptase I. The enzyme is active up between 42-65℃, providing higher specificity, higher yield of cDNA and more full-length cDNA product up to 5 minutes.

Applications: cDNA synthesis

Source: The gene encoding a mutant M-MuLV Reverse Transcriptase is expressed in *E. coli*.

Purity: ≥95% by SDS-PAGE

Concentration: 200 U/μL

Definition of Activity Unit: One unit is defined as the amount of enzyme that will incorporate 1 nmol of dTTP into acid-insoluble material in 10 minutes at 37 °C using poly(rA)•oligo(dT)as template/primer.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 100 mM KCl, 0.1 mM EDTA, 1 mM DTT, 0.5% Tween 20, 0.5% NP-40, 50% Glycerol, pH 8.0.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3415-10KU
G3416-1	SweScript Reverse Transcriptase II	50 μL
G3416-2	5x Reaction buffer	500 μL
Manual		One copy

Assay Protocol / Procedures

Protocol of First Strand cDNA Synthesis

1. Thaw components on ice and mix by inverting several times.
2. Mix the following components in a reaction tube:

Component	Volume
5x Reaction buffer	4 μL
dNTP Mix (10 mM each)	1 μL
Oligo(dT)$_{18}$ (100 μM)	1 μL
or Random Hexamer Primer (100 μM)	or 1 μL

or Gene Specific Primer (2 μM)	or 1 μL
RNase inhibitor (40 U/μL)	1 μL
SweScript Reverse Transcriptase II	1 μL
Total RNA/mRNA	0.1 ng-5 μg/10 pg-0.5 μg
Nuclease-free water	To 20 μL
Total	**20 μL**

Note: For GC rich and complex template, RNA template, primers and nuclease-free water can be premixed. Heat the RNA-primer mix at 65℃ for 5 minutes, and spin briefly and place promptly on ice.

3. Gently mix and briefly centrifuge.
4. Perform reverse transcription using the recommended thermal conditions below:

Temperature	Time
25℃[a]	5 min
50℃[b]	15-30 min
85℃	5 s

a: If using Random Hexamer Primer, incubate the combined reaction mixture at 25℃ for 5 minutes, and then proceed to next step. If using Oligo (dT) 18 Primer or Gene Specific Primer, directly incubate at 50℃.

b: For GC rich and complex templates, the reverse transcription temperature can be improved to 65℃.

Note

1. RNA is easily degraded, Please obey standardized operation to avoid RNase contamination.
2. The reverse transcription products can be stored at -20℃ for a short period. If long-term storage is required, it is recommended to store at -80℃ after packing and avoid freeze-thaw cycles.
3. If the template is of eukaryotic origin, it is recommended to select Oligo (dT)18 Primer and pair it with the 3' Poly A tail of eukaryotic mRNA to obtain the highest yield of full-length cDNA.
4. For reverse transcription of prokaryotic RNA, Random Hexamer Primer or Gene Specific Primer should be used.
5. If reverse transcription is followed by qPCR assay, Oligo (dT)18 Primer and Random Hexamer Primer can be mixed to achieve the same cDNA synthesis efficiency in all regions of mRNA, which helps to improve the authenticity and repeatability of quantitative results.
6. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® RNase Inhibitor，Murine

Cat. #：G3423-10KU

Product Information

Product Name	Cat. No.	Spec.
RNase Inhibitor, Murine	G3423-10KU	10 KU

Product Introduction

Product Description: The RNase Inhibitor (Ribonuclease Inhibitor) inhibits the activity of RNases A, B and C by binding them in a noncompetitive mode at a 1:1 ratio. It is not effective against RNase 1, RNase T1, S1 Nuclease, RNase H or RNase from Aspergillus.

RNase Inhibitor, Murine has significantly improved resistance to oxidation compared to the human/porcine RNase inhibitors, and is better for experiments sensitive to high reducer. This product exerts its inhibitory effect at pH 5-9, 25-55℃, showing the strongest inhibitory effect at pH 7-8. A final concentration of 1mM DTT at least in the storage solution is required to maintain the activity of RNase inhibitor.

Applications:

- RT-PCR
- cDNA synthesis
- In vitro transcription/translation
- Enzymatic RNA labeling reaction
- Other applications where the integrity of RNA is important

Source: An *E. coli* strain that carries the Ribonuclease Inhibitor gene from porcine.

Purity: ≥95% by SDS-PAGE

Concentration: 40 U/μL

Definition of Activity Unit: One unit is defined as the amount of RNase Inhibitor required to inhibit the activity of 5ng of RNase A by 50%.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 50 mM NaCl, 5 mM DTT, 50% (v/v) glycerol, pH 7.5.

Inactivation or inhibition

- Inhibitors: common denaturants (SDS, urea and all oxidizing reagents (p-chloromercuribenzoate, dissolved oxygen, ions in their higher oxidation states) strongly inhibit RNase Inhibitor and release the RNase bound.
- Inactivated by heating at 75°C for 10 min.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3423-10KU
G3423-1	RNase Inhibitor, Murine	250 μL

Assay Protocol / Procedures

1. The recommended concentration of RNase Inhibitor in a reaction is 1-2 unit/μl. During assembly of a reaction (eg. *in vitro* transcription, cDNA synthesis, *in vitro* translation), RNase Inhibitor should be added before other components that are a possible source of RNase contamination.

Note

1. Enzymes should be placed on ice when used, and stored at -20℃ immediately after use. It is recommended to store separately.
2. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® RNase Inhibitor，Human

Cat. #：G3424-10KU

Product Information

Product Name	Cat. No.	Spec.
RNase Inhibitor, Human	G3424-10KU	10 KU

Product Introduction

Product Description: The RNase Inhibitor (Ribonuclease Inhibitor) inhibits the activity of RNases A, B and C by binding them in a noncompetitive mode at a 1:1 ratio. It is not effective against RNase 1, RNase T1, S1 Nuclease, RNase H or RNase from Aspergillus.

The performance of Ribonuclease inhibitors from porcine and human is similar. This product exerts its inhibitory effect at pH 5-8, showing the strongest inhibitory effect at pH 7-8. A final concentration of 1mM DTT at least in the storage solution is required to maintain the activity of RNase inhibitor.

Applications:

- RT-PCR
- cDNA synthesis
- *In vitro* transcription/translation
- Enzymatic RNA labeling reaction
- Other applications where the integrity of RNA is important

Source: An *E. coli* strain that carries the Ribonuclease Inhibitor gene from porcine.

Purity: ≥95% by SDS-PAGE

Concentration: 40 U/μL

Definition of Activity Unit: One unit is defined as the amount of RNase Inhibitor required to inhibit the activity of 5ng of RNase A by 50%.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 50 mM NaCl, 5 mM DTT, 50% (v/v) glycerol, pH 7.5.

Inactivation or inhibition

- Inhibitors: common denaturants (SDS, urea and all oxidizing reagents (p-chloromercuribenzoate, dissolved oxygen, ions in their higher oxidation states) strongly inhibit RNase Inhibitor and release the RNase bound.
- Inactivated by heating at 75°C for 10 min.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3424-10KU
G3424-1	RNase Inhibitor, Human	250 μL

Assay Protocol / Procedures

1. The recommended concentration of RNase Inhibitor in a reaction is 1-2 U/μL. During assembly of a reaction (eg. *in vitro* transcription, cDNA synthesis, *in vitro* translation), RNase Inhibitor should be added before other components that are a possible source of RNase contamination.

Note

1. Enzymes should be placed on ice when used, and stored at -20℃ immediately after use. It is recommended to store separately.
2. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® T4 DNA Ligase (5 U/μL)

Cat. #：G3340

Product Information

Product Name	Cat. No.	Spec.
T4 DNA Ligase (5 U/μL)	G3340-50	250 U
	G3340-100	500 U

Product Description/Introduction

T4 DNA Ligase catalyzes the formation of a phosphodiester bond between juxtaposed 5' phosphate and 3' hydroxyl termini in duplex DNA or RNA. This enzyme will join blunt end and cohesive end termini as well as repair single stranded nicks in duplex DNA and some DNA/RNA hybrids .

Definition of Activity Unit: One Weiss unit of the enzyme catalyzes the conversion of 1 nmol of [^{32}PPi] into ATP in 20 min at 37°C. One Weiss unit is equivalent to approximately 200 cohesive end ligation units (CEU).

T4 DNA Ligase Storage Buffer： 20 mM Tris-HCl (pH 7.5), 50 mM KCl, 1 mM DTT, 50% (v/v) glycerol.

5×T4 DNA Ligase Buffer： 250 mM Tris-HCl (pH 7.6), 50 mM $MgCl_2$, 5 mM ATP, 5 mM DTT, Enhancer.

Storage and Shipping Conditions

Ship with wet ice; store at -20°C, valid for 12 months.

Product Contents

Component Number	Component	G3340-50	G3340-100
G3340-1	T4 DNA Ligase	250 U (50 μL)	500 U (2×50 μL)
G3340-2	5×T4 DNA Ligase Buffer	1 mL	2×1 mL
Manual		One copy	

Assay Protocol / Procedures

Sticky-end ligation & Blunt-end ligation

1. Add the following (recommend 10-uL reaction system) to an autoclaved, 1.5-mL microcentrifuge tube:

Component	Volume
5×T4 DNA Ligase Buffer	2 μL
T4 DNA Ligase	0.5-1 μL
Linear vector DNA	X μL
Insert DNA	Y μL
Nuclease-Free Water	To 10 μL
Total	**10 μL**

2. Mix gently and centrifuge briefly to bring the contents to the bottom of the tube.
3. For cohesive ends, incubate at 25°C for 5-30 minutes; For blunt end, incubate at 25°C less than 2 hours or overnight at 4°C.
4. Place the tube on ice and proceed immediately to perform transformation reaction. Or you can store the ligation mixture at –20°C until you are ready.

Perform transformation reaction

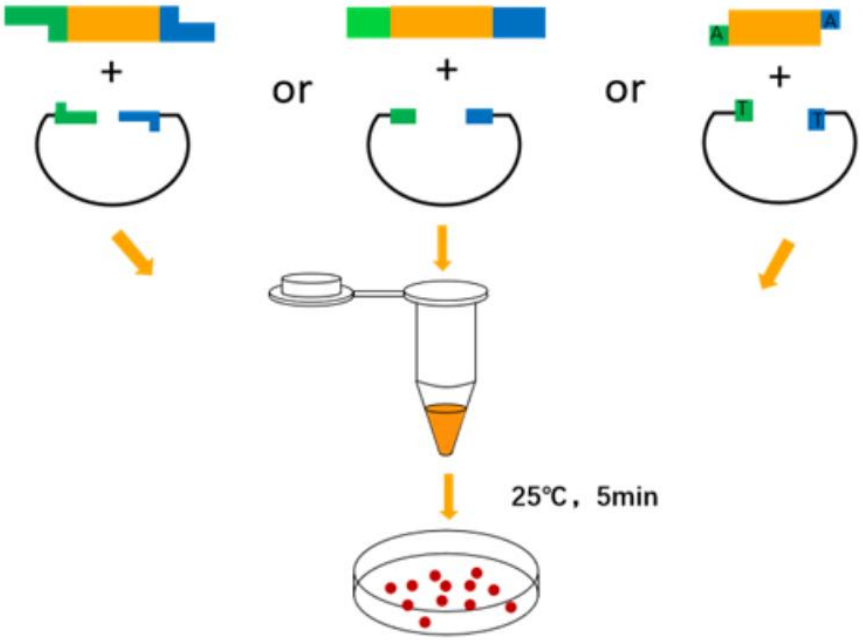
5. Add appropriate ligation mixture into chemically competent cells (such as *E.coli* DH5α, *E.coli* Top10, etc.) and mix by tapping gently. Do not mix by pipetting up and down. The remaining ligation mixture(s) can be stored at −20°C.
6. Incubate for 30 minutes on ice.
7. Incubate for exactly 90 seconds in the 42°C water bath. Do not mix or shake.
8. Remove the centrifuge tubes from the 42°C bath and place them on ice for 2-5 minutes.
9. Add 900 µL of SOC or LB medium. Sterile technique must be practiced to avoid contamination. Shake the the centrifuge tube(s) at 37°C for 1 hour at 225 rpm in a shaking incubator.
10. Spread appropriate volume from each transformation centrifuge tube on separate, labeled LB agar plates. The remaining transformation mix may be stored at 4°C and plated out the next day, if desired.
11. Invert the plate(s) and incubate at 37°C overnight.

Analyze transformants

12. Select colonies and analyze by plasmid isolation, PCR, or sequencing.

Note

1. It is recommended that the reaction system should be prepared on ice.
2. A molar ratio of 3:1~10:1 insert:vector is recommended for the rapid ligation of DNA inserts to vectors to produce circular recombinant molecules.
3. Before use, thaw 5X DNA Ligase Reaction Buffer at room temperature and vortex vigorously to dissolve any precipitated material.
4. T4 DNA Ligase should be kept at -20°C until within 5-10 minutes of use and returned immediately to -20°C after use.
5. If insert DNA is blunt end, the vector following restriction endonuclease digestion should be dephosphorylated (recommended G3400) to prevent its self-circularization.
6. For your safty and health,please wear safety glasses, gloves, or protective clothing.



Servicebio® T4 DNA Ligase (5 U/μL)

Cat. #：G3340

Product Information

Product Name	Cat. No.	Spec.
T4 DNA Ligase (5 U/μL)	G3340-50	250 U
	G3340-100	500 U

Product Description/Introduction

T4 DNA Ligase catalyzes the formation of a phosphodiester bond between juxtaposed 5' phosphate and 3' hydroxyl termini in duplex DNA or RNA. This enzyme will join blunt end and cohesive end termini as well as repair single stranded nicks in duplex DNA and some DNA/RNA hybrids .

Definition of Activity Unit: One Weiss unit of the enzyme catalyzes the conversion of 1 nmol of [^{32}PPi] into ATP in 20 min at 37°C. One Weiss unit is equivalent to approximately 200 cohesive end ligation units (CEU).

T4 DNA Ligase Storage Buffer： 20 mM Tris-HCl (pH 7.5), 50 mM KCl, 1 mM DTT, 50% (v/v) glycerol.

5×T4 DNA Ligase Buffer： 250 mM Tris-HCl (pH 7.6), 50 mM $MgCl_2$, 5 mM ATP, 5 mM DTT, Enhancer.

Storage and Shipping Conditions

Ship with wet ice; store at -20°C, valid for 12 months.

Product Contents

Component Number	Component	G3340-50	G3340-100
G3340-1	T4 DNA Ligase	250 U (50 μL)	500 U (2×50 μL)
G3340-2	5×T4 DNA Ligase Buffer	1 mL	2×1 mL
Manual		One copy	

Assay Protocol / Procedures

Sticky-end ligation & Blunt-end ligation

1. Add the following (recommend 10-uL reaction system) to an autoclaved, 1.5-mL microcentrifuge tube:

Component	Volume
5×T4 DNA Ligase Buffer	2 μL
T4 DNA Ligase	0.5-1 μL
Linear vector DNA	X μL
Insert DNA	Y μL
Nuclease-Free Water	To 10 μL
Total	**10 μL**

2. Mix gently and centrifuge briefly to bring the contents to the bottom of the tube.
3. For cohesive ends, incubate at 25°C for 5-30 minutes; For blunt end, incubate at 25°C less than 2 hours or overnight at 4°C.
4. Place the tube on ice and proceed immediately to perform transformation reaction. Or you can store the ligation mixture at –20°C until you are ready.

Perform transformation reaction

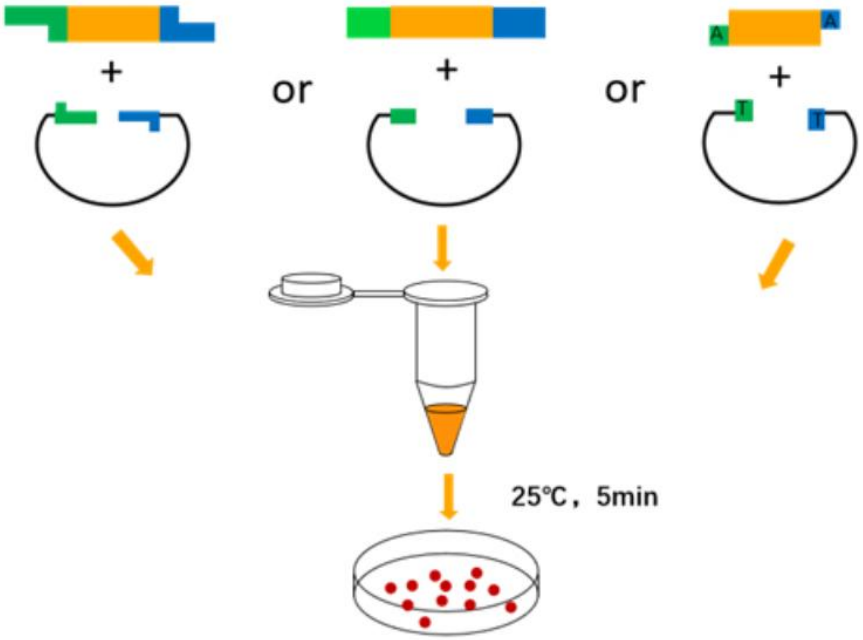
5. Add appropriate ligation mixture into chemically competent cells (such as *E.coli* DH5α, *E.coli* Top10, etc.) and mix by tapping gently. Do not mix by pipetting up and down. The remaining ligation mixture(s) can be stored at −20°C.
6. Incubate for 30 minutes on ice.
7. Incubate for exactly 90 seconds in the 42°C water bath. Do not mix or shake.
8. Remove the centrifuge tubes from the 42°C bath and place them on ice for 2-5 minutes.
9. Add 900 µL of SOC or LB medium. Sterile technique must be practiced to avoid contamination. Shake the the centrifuge tube(s) at 37°C for 1 hour at 225 rpm in a shaking incubator.
10. Spread appropriate volume from each transformation centrifuge tube on separate, labeled LB agar plates. The remaining transformation mix may be stored at 4°C and plated out the next day, if desired.
11. Invert the plate(s) and incubate at 37°C overnight.

Analyze transformants

12. Select colonies and analyze by plasmid isolation, PCR, or sequencing.

Note

1. It is recommended that the reaction system should be prepared on ice.
2. A molar ratio of 3:1~10:1 insert:vector is recommended for the rapid ligation of DNA inserts to vectors to produce circular recombinant molecules.
3. Before use, thaw 5X DNA Ligase Reaction Buffer at room temperature and vortex vigorously to dissolve any precipitated material.
4. T4 DNA Ligase should be kept at -20°C until within 5-10 minutes of use and returned immediately to -20°C after use.
5. If insert DNA is blunt end, the vector following restriction endonuclease digestion should be dephosphorylated (recommended G3400) to prevent its self-circularization.
6. For your safty and health,please wear safety glasses, gloves, or protective clothing.



Servicebio® T4 RNA ligase I

Cat. No.: G3437

Product Information

Product Name	Cat. No.	Spec..
T4 RNA ligase I	G3437-1000U	1000 U

Product Description/Introduction

T4RNA ligase I, derived from the RNA ligase I gene of phage T4, is reexpressed by Escherichia coli. It is an ATP-dependent enzyme that catalyzes the formation of intermolecular or intramolecular phosphodiester bonds between the 5' phosphate terminal and the 3' hydroxyl terminal of single stranded RNA, single stranded DNA, or single nucleotides. T4RNAligase I is also considered a single stranded RNA (ssRNA) ligase because it is the most efficient for linking single-stranded RNA, followed by single-stranded DNA to RNA (when DNA provides a 5 'phosphate group and RNA provides a 3' hydroxyl group), and the least efficient for linking single-stranded DNA.

Uses: ssRNA intermolecular junction; Intermolecular linkage between ssDNA and ssRNA; ssRNA end markers, etc.

Source: Derived from phage T4 recombinant expression by *Escherichia coli*.

Enzyme storage buffer: 10 mM Tris-HCl, 50 mM KCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol, pH 7.4.

10×RNA ligase I Buffer: 500 mM Tris-HCl, 100 mM $MgCl_2$, 10 mM DTT, pH 7.5.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3434-50PMOL
G3437-1	T4 RNA ligase I	100 μL
G3437-2	10×RNA ligase I Buffer	300 μL
G3437-3	ATP (10 mM)	200 μL
G3437-4	PEG8000 (50%, RNase free)	500 μL
Manual		One copy

Assay Protocol / Procedures

1. For cyclization linking reactions of single-stranded RNA, reference reaction system:

Component	Volume
Nuclease-free Water	To 20 μL
ssRNA (20 μM)	0.5 μL
10×RNA ligase I Buffer	2 μL
ATP (1 mM)	1 μL
T4 RNA ligase I	1 μL

Note: PEG8000 (final concentration 15%-25%) can be added to the reaction system to significantly improve enzyme activity without affecting the specificity of the reaction. All reagents and operations should avoid RNase contamination; The amount of RNA substrate in the reference reaction system has been relatively large, and the amount of ssRNA can be greatly reduced when the sample is relatively small.

2. Incubate the above reaction at 37℃ for 30min (in order to make the connection more adequate, the

reaction time can be appropriately extended). The reaction conditions can be adjusted according to the actual situation. If the effect is not satisfactory, incubation at 25℃ for 2h or 16℃ for 16h can be tried.

3. After the reaction was completed, the reaction system was incubated at 65℃ for 15min to terminate the reaction. Perform subsequent operations as required.

Note

1. Involving RNA operation, it is necessary to strictly follow the specifications of RNA operation to avoid RNase contamination, and related reagents and consumables need to be treated by DEPC to remove RNase or ensure that it is RNase free.
2. RNase inhibitors can be used to prevent degradation of RNA during the reaction. An RNase inhibitor (G3414) with a final concentration of 1U/μL can be added.
3. Enzyme products should be placed in an ice box or ice bath when used, and should be stored at -20℃ immediately after use, it is recommended to store in separate packages.
4. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® Alkaline Phosphatase (Thermosensitive)

Cat. #：G3400-1000U

Product Information

Product Name	Cat. No.	Spec.
Alkaline Phosphatase (Thermosensitive)	G3400-1000U	1000 U

Product Introduction

Product Description: Servicebio® Alkaline Phosphatase (Thermosensitive) catalyzes the release of 5'- and 3'- phosphate groups from DNA、RNA、dNTP and rNTP. This enzyme also removes phosphate groups from proteins.

Applications:
- Dephosphorylation of cloning vector DNA to prevent recircularization during ligation.
- PCR product clean-up: nucleotide degradation prior to sequencing of PCR product.
- Dephosphorylation of nucleic acid 5'-termini prior to labeling with T4 Polynucleotide Kinase.

Source: *E.coli* with a cloned bacterial AP gene form AntarcticBacteriumTAB5.

Purity: ≥95% by SDS-PAGE

Molecular Weight ~35 kDa

Concentration: 5 U/μL

Definition of Activity Unit: One unit is the amount of enzyme required to catalyze the dephosphorylation of 1 μg of linearized pUC19 DNA 5' end in 10 minutes at 37 ℃. Dephosphorylation is defined as greater than 95% inhibition of religation of linearized plasmid DNA (as determined by *E. coli* transformation).

10× ALP Reaction Buffer: 500 mM Bis-Tris-HCl, 10 mM $MgCl_2$, 1 mM $ZnCl_2$, pH 6.0.

Storage (Dilution) Buffer: 10 mM Tris-HCl, 1 mM $MgCl_2$, 0.01 mM $ZnCl_2$, 50% Glycerol, pH 7.4.

Inactivation or inhibition
- Inhibitors: metal chelators.
- Inactivated by heating at 80°C for 2 minutes.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3400-1000U
G3400-1	Alkaline Phosphatase (Thermosensitive)	200 μL
G3400-2	10×ALP Reaction Buffer	1 mL
Manual		One copy

Assay Protocol / Procedures

This protocol is suitable for removal of 3' and 5' -phosphate groups from DNA and RNA.

- Thaw frozen reagents, mix and centrifuge briefly.
- Keep enzymes on ice.
- Keep the 10×ALP Reaction Buffer at room temperature.

1. Prepare the following reaction mixture containing:

Component	Volume

DNA or RNA sample	1-5 μg
10×ALP Reaction Buffer	2 μL
Alkaline Phosphatase (Thermosensitive)	1 μL
Nuclease-Free Water	To 20 μL
Total volume	20 μL

2. Mix thoroughly, spin briefly and incubate at 37°C for 15-30 mininutes. The optimal incubation time and the enzyme concentration must be determined experimentally for each substrate.
3. Stop reaction by heating for 2 minutes at 80°C.
4. According to the needs of subsequent experiments, the above dephosphorylated DNA or RNA can be purified in a variety of ways (such as DNA purification kit, phenolic chloroform extraction and ethanol precipitation method).

Note

1. Alkaline Phosphatase as are most alkaline phosphatases, is a Zn2+and Mg2+-dependent enzyme. The ALP Reaction Buffer provides enough Zn2+and Mg2+ to guarantee enzyme activity.
2. Alkaline Phosphatase is inhibited by metal chelators (e.g. EDTA), inorganic phosphate and phosphate analogs.
3. The Alkaline Phosphatase activity is decreased in the presence of reducing agents (DTT, β-ME).
4. The Alkaline Phosphatase should be shipped on ice when handling, and should be stored at -20 ℃ immediately after use.
5. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® Inorganic Pyrophosphatase (*E.coli*)

Cat. #：G3420-100U

Product Information

Product Name	Cat. No.	Spec.
Inorganic Pyrophosphatase (*E.coli*)	G3420-100U	100 U

Product Introduction

Product Description: Inorganic pyrophosphatase (PPase) catalyzes the hydrolysis of inorganic pyrophosphate to form orthophosphate: $P_2O_7^{-4}$ +H_2O+PPase → $2HPO_4^{-2}$). The enzyme requires a divalent metal cation, with Mg^{2+} conferring the highest activity. This product exerts its effect at 16-37℃, showing the strongest effect at 25℃. The Inactivation temperature is above 65℃.

Applications:
- High yield RNA synthesis by in vitro transcription.
- DNA polymerization reactions: preventing accumulation of pyrophosphate.
- Removal of contaminant PPi in reagents used for SNP genotyping by methods based on the detection of pyrophosphate.

Source: PPase is prepared from an *E. coli* strain containing a clone of the *E. coli* inorganic pyrophosphatase gene.

Purity: ≥95% by SDS-PAGE

Endogenous nucleic acid < 1 pg/μL by qPCR

Concentration: 1 U/μL

Definition of Activity Unit: One unit is the amount of enzyme that will generate 1 μmol of phosphate per minute from inorganic pyrophosphate under standard reaction conditions (a 10 minute reaction at 25°C in 100 mM Tris-HCl [pH 8.0], 2 mM $MgCl_2$, 2 mM PPi, reaction volume of 0.5 ml).

Storage (Dilution) Buffer: 20 mM Tris-HCl, 100 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol, pH 8.0.

Inactivation or inhibition
- Inhibitors: imidodiphosphate, α ω glycol disphosphates, methanedial diphosphate, 1,2-ethanedial diphosphate.
- Inactivation by heating is not complete, reliably removed by spin column or phenol/chloroform extraction.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3421-100U
G3420-1	Inorganic Pyrophosphatase (*E.coli*)	100 μL
Manual		One copy

Assay Protocol / Procedures

The Inorganic Pyrophosphatase (*E.coli*) can be directly added into the reaction system.
Working concentration of the enzyme range from 0.05 to 1 U/mL.

Note

1. Enzymes should be placed on ice when used, and stored at -20℃ immediately after use. It is recommended to store separately.
2. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® Inorganic Pyrophosphatase (from yeast)

Cat. #：G3460-100U

Product Information

Product Name	Cat. No.	Spec.
Inorganic Pyrophosphatase (from Yeast)	G3460-100U	100 U

Product Introduction

Product Description: Pyrophosphatase (PPase), Inorganic catalyzes the hydrolysis of inorganic pyrophosphate to two orthophosphates ($P_2O_7^{-4}$ +H_2O+PPase → $2HPO_4^{-2}$). The enzyme requires a divalent metal cation, with Mg^{2+} conferring the highest activity. This product exerts its effect at 16-37℃, showing the strongest effect at 25℃. The Inactivation temperature is above 65℃.

Applications:

- High yield RNA synthesis by in vitro transcription.
- DNA polymerization reactions: preventing accumulation of pyrophosphate.
- Removal of contaminant PPi in reagents used for SNP genotyping by methods based on the detection of pyrophosphate.

Source: *E.coli* cells with a cloned ppa gene of Saccharomyces cerevisiae

Purity: ≥95% by SDS-PAGE

Endogenous nucleic acid < 1 pg/μL by qPCR

Concentration: 1 U/μL

Definition of Activity Unit: One unit of the enzyme hydrolysis 1 μmol of inorganic pyrophosphate in 1 minute at 25°C. Enzyme activity is assayed in the following mixture: 100 mM Tris-HCl, 2 mM MgCl2 and 2 mM PPi, pH 8.0 at 25℃, pH 8.0.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 100 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol, pH 8.0

Inactivation or inhibition

- Inhibitors: imidodiphosphate, α ω glycol disphosphates, methanedial diphosphate, 1,2-ethanedial diphosphate.
- Inactivation by heating is not complete, reliably removed by spin column or phenol/chloroform extraction.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3460-100U
G3460-1	Inorganic Pyrophosphatase (from Yeast)	100 μL
Manual		One copy

Assay Protocol / Procedures

Inorganic Pyrophosphatase (from yeast) can be directly added into the reaction system.

Working concentration of the enzyme range from 0.05 to 1 U/mL.

Note

1. Enzymes should be placed on ice when used, and stored at -20℃ immediately after use. It is recommended to store separately.
2. For your safty and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® Recombinant DNase I (RNase-free)

Cat. #：G3342-500U

Product Information

Product Name	Cat.No.	Spec.
Recombinant DNase I (RNase-free)	G3342-500U	500U

Product Description/Introduction

DNase I is an endonuclease that hydrolyzes phosphodiester linkages yielding oligonucleotides with a 5'-phosphate and a 3'-hydroxyl group. DNase I is calcium-dependent and can be activated by magnesium and divalent manganese ions. In the presence of magnesium ion, DNase I could randomly splice any site of double-stranded DNA. In the presence of divalent manganese ions, DNase I can splice DNA double strands at the same site, forming blunt ends, or sticky ends with 1 or 2 nucleotides.

Applications:

1. Preparing RNA samples without DNA;
2. Destroy genomic DNA in RNA preparations prior to reverse transcription-PCR (RT-PCR).
3. In vitro T7, T3, SP6 and other RNA Polymerases catalyze the removal of DNA templates in the RNA post-transcription system;
4. Nick translationin DNA markers;
5. Generating libraries of random DNA fragments;
6. Apoptosis Tunel detection of partial splice of genomic DNA as positive control.

Features: specifically degrades DNA, but cannot degrade RNA.

Source: Recombinant expression of the *pichia coli* strain containing the Bovine Pancreatic DNase I gene.

Definition of enzyme activity: One unit is the amount of enzyme required for complete degradation of 1 μg pBR322 vector DNA in 10 minutes at 37℃.

Inactivation or inhibition: A 10-minute incubation at 75°C for complete inactivation of DNase I.

Purity: ≥95% by SDS-PAGE, RNase free; 10 U/uL.

Storage and Shipping Conditions

Ship with wet ice; Store at -20℃ valid for 12 months.

Product Contents

Component	G3342-500U
Recombinant DNase I (RNase-free)	50 μL
10×DNase I Reaction Buffer	1 mL
25 mM EDTA	1 mL

Assay Protocol / Procedures

Reference use (e. g. prepare RNA samples without DNA)

1. Add the following component into a sterile, nuclease-free tube on ice in the indicated order, mix gently and centrifuge briefly.

Component	Amount
RNA	1 μg
Recombinant DNase I (RNase-free)	1 U

10×DNase I Reaction Buffer	1 μL
RNase-free Water	to 10 μL

2. Incubate at 37℃ for 30 minutes.
3. Add 0.5 μL of 25 mM EDTA to stop the reaction;
4. DNase I was completely inactivated after incubation at 75℃ for 10minutes.

Note

1. When using the product, the enzyme should be on ice and stored immediately after use at -20ºC.
2. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® Recombinant DNase I (RNase-free)

Cat. #：G3342-500U

Product Information

Product Name	Cat.No.	Spec.
Recombinant DNase I (RNase-free)	G3342-500U	500U

Product Description/Introduction

DNase I is an endonuclease that hydrolyzes phosphodiester linkages yielding oligonucleotides with a 5'-phosphate and a 3'-hydroxyl group. DNase I is calcium-dependent and can be activated by magnesium and divalent manganese ions. In the presence of magnesium ion, DNase I could randomly splice any site of double-stranded DNA. In the presence of divalent manganese ions, DNase I can splice DNA double strands at the same site, forming blunt ends, or sticky ends with 1 or 2 nucleotides.

Applications:

1. Preparing RNA samples without DNA;
2. Destroy genomic DNA in RNA preparations prior to reverse transcription-PCR (RT-PCR).
3. In vitro T7, T3, SP6 and other RNA Polymerases catalyze the removal of DNA templates in the RNA post-transcription system;
4. Nick translationin DNA markers;
5. Generating libraries of random DNA fragments;
6. Apoptosis Tunel detection of partial splice of genomic DNA as positive control.

Features: specifically degrades DNA, but cannot degrade RNA.

Source: Recombinant expression of the *pichia coli* strain containing the Bovine Pancreatic DNase I gene.

Definition of enzyme activity: One unit is the amount of enzyme required for complete degradation of 1 μg pBR322 vector DNA in 10 minutes at 37℃.

Inactivation or inhibition: A 10-minute incubation at 75°C for complete inactivation of DNase I.

Purity: ≥95% by SDS-PAGE, RNase free; 10 U/uL.

Storage and Shipping Conditions

Ship with wet ice; Store at -20℃ valid for 12 months.

Product Contents

Component	G3342-500U
Recombinant DNase I (RNase-free)	50 μL
10×DNase I Reaction Buffer	1 mL
25 mM EDTA	1 mL

Assay Protocol / Procedures

Reference use (e. g. prepare RNA samples without DNA)

1. Add the following component into a sterile, nuclease-free tube on ice in the indicated order, mix gently and centrifuge briefly.

Component	Amount
RNA	1 μg
Recombinant DNase I (RNase-free)	1 U

10×DNase I Reaction Buffer	1 μL
RNase-free Water	to 10 μL

2. Incubate at 37℃ for 30 minutes.
3. Add 0.5 μL of 25 mM EDTA to stop the reaction;
4. DNase I was completely inactivated after incubation at 75℃ for 10minutes.

Note

1. When using the product, the enzyme should be on ice and stored immediately after use at -20ºC.
2. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® Recombinant RNase A（10 mg/mL）

Cat. #：G3405

Product Information

Product Name	Cat. No.	Spec.
Recombinant RNase A（10 mg/mL）	G3405-1ML	1 mL
	G3405-200UL	200 μL

Product Description/Introduction

Recombinant RNase A is a Recombinant endoribonuclease that specifically target the 3' -ends of cytosine (C) or uracil (U) residues in single-stranded RNA and cleaves phosphate diester bonds with adjacent nucleotides. Recombinant RNase A has the highest cleavage activity for single stranded RNA. It is active under a wide range of reaction conditions. At low salt concentration (0-100 mM NaCl), it cleaves single stranded RNA, double stranded RNA, and RNA strand in RNA-DNA hybridization; at high salt concentration (≥300 mM NaCl), only single stranded RNA is specifically cleaved.

The Recombinant RNase A contains His-tag.

Applications:

To remove RNA from DNA preparations. minimize the risk of pathogen introduction into the bioprocess; Other related research application in molecular biology and cell biology.

Feature: Specifically degraded RNA, purified by recombinant expression and free from contamination from animals, and rigorously control test for contaminating nonspecific endonuclease, exonuclease, and protease activity.

Source: RNase A gene from Bovine pancreas, recombinant expression of *Pichia pastoris*.

Definition of enzyme activity: At room temperature, the amount of enzyme required to increase the A_{286} value by 0.0146 per minute in 1 mL reaction system.

Enzyme activity is assayed in the following mixture: 100 mM Tris-acetate, 1 mM EDTA, 1 mM cyclic 2', 3' -CMP, pH 6.5.

Purity and concentration:The purity is ≥95% by SDS-PAGE, DNase-free, Proteinase-free, 10 mg/mL.

Storage (Dilution) buffer: 50 mM Tris-HCl， 50% Glycerol， pH 7.4 at 25℃.

Storage and Shipping Conditions

Ship with wet ice; Store at –20°C, valid for 12 months.

Product Contents

Component Number	Component	G3405-1ML	G3405-200UL
G3405-1	Recombinant RNase A	1 mL	200 μL
G3405-2	Dilution Buffer	1 mL	1 mL
Manual		One copy	

Note

1. To facilitate microdilution, dilute the Recombinant RNase A with Dilution Buffer as desired.
2. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Benzonase Nuclease (his-tag)

Benzonase Nuclease (his-tag)

Cat.No. : G3406-50KU

Brand : Servicebio

Spec.: 50 KU

Product Introduction

ProductInformation

Product Name	Cat. No.	Spec.
Benzonase Nuclease (his-tag)	G3406 -50 KU	50KU

Description/Introduction

Benzonase Nuclease, also known as broad-spectrum Nuclease, is a nonspecific endonuclease derived from Serratia Marcescen. This endonuclease can attack and degrade all forms of DNA and RNA (single-stranded, double-stranded, linear, cyclized) under very broad conditions, cutting at any position within the nucleic acid chain, and completely degrading the nucleic acid to 5 '-monophosphate-oligonucleotide 3-5 bases in length. The working pH range is pH 6-10, the optimum pH is 8.0, the working temperature range is 0

-42℃, the optimum temperature is 37℃. Benzonase Nuclease is widely used to remove nucleic acids from recombinant proteins, viral vaccines and other biological products. Benzonase Nuclease can effectively reduce the viscosity of protein lysates such as cell

s, tissues and microorganisms.This product has his-tag, which can be removed by nickel column adsorption

Definition of enzymeactivity: The

amount of enzyme required to change ΔA260 absorption value by 1.0 (equivalent to complete digestion of 37 μg salmon sperm DNA as oligonucleotide) in 2.625 mL reaction system at 37℃, pH 8.0, within 30 min was defined as one

enzyme active unit.

Purity: ≥95% by SDS-PAGE, no protease, ≥250 U/μL.

Enzyme storage buffer:20 mM Tris-HCl, 2 mM $MgCl_2$, 2 mM NaCl, 50% Glycerol, pH 8.0.

Dilution buffer: 20 mM Tris-HCl, 2 mM $MgCl_2$, 2 mM NaCl, pH 8.0.

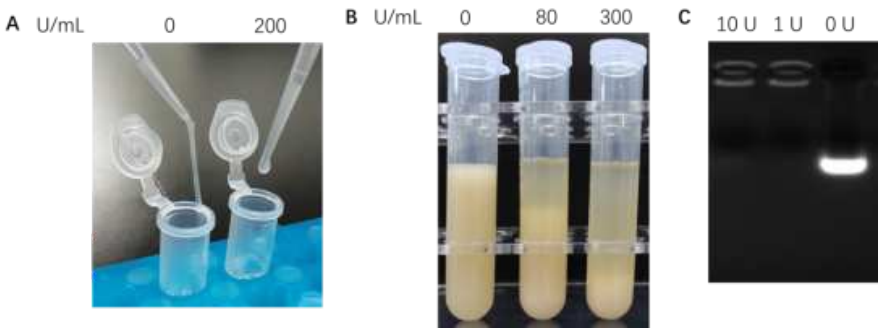


Figure 1. Effect diagram of the use of Benzonase nuclease. A. After lysis of 293 cells by RIPA lysate, a large amount of genomic DNA was released from the samples without the addition of Benzonase nuclease and was viscous, while the samples with the addition of Benzonase nuclease were not viscous because the released genomic DNA was degraded; B. Add 5 mL RIPA lysate to 1 g of E. coli wet bacteria, mix well, and add appropriate amount of Benzonase nuclease (0, 80, 300 U/mL) respectively. Take photos for observation after treatment at room temperature for 30 min;
C. Take 40 μg of salmon sperm DNA, add an appropriate amount of Benzonase nuclease, and incubate at 37°C for 30 min to detection on agarose gel.

Storage and Handling Conditions

Transport with wetice; Store at -20℃, valid for 12 months.

Component

Component Number	Component	G
G3406-1	Benzonase Nuclease (his-tag)	200μL
Manuals		One copy

Assay Protocol / Procedures

1. For reducing the viscosity of cell, tissue or bacterial lysate:

Cell samples:

A, Adherent cell samples were washed again with PBS after removal of medium. 1-2 μL of Benzonase nuclease was added to 1 mL of RIPA lysate (

G2033, G2002 was recommended

) and then used for lysis of adherent cells according to the instructions for the lysate. After incubation at room temperature or on ice for 5-30 min, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

B, Supernatant was removed by centrifugation of the suspended cell sample. 1-2 μL of Benzonase nuclease was added to 1 mL of RIPA lysate (

G2033, G2002 was recommended

) and then used for lysis of suspended cells according to the instructions for use of the lysate. After incubation at room temperature or on ice for 5-30 min, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

Tissue samples: Tissue blocks were washed with pre-cooled PBS to remove blood stains and cut into small pieces.1 mL lysate (

G2033, G2002 was recommended

) was added per 50 mg of tissue, and 1-2 μL of Benzonase nuclease was added at the same time. The tissue was ground with a lapping instrument (

KZ-III, KZ-III-F, KZ-III-FP

was recommended) until full cleavage. After sufficient tissue lysis, the tissue was incubated for 5-30 min at room temperature or on ice, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

Bacterial and fungal sam

ples: Bacteria or fungi are collected after centrifugation. 1-2 μL of Benzonase nuclease was added to 1 mL lysate (G2033, G2002 was recommended). Then the lysate is used for bacterial or fungal lysis according to the instructions for use. After incubation at room temperature or on ice for 5-30 min, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

Note: The commonly used lysates contain different concentrations of Triton X-100 or NP-40, SDS and sodium deoxycholate, etc. These reagents have certain effects on the Benzonase nuclease, so it is necessary to increase the amount of enzyme appropriately or prolong the incubation time for different experiments

.

2. For improve the renaturation rate of inclusion body protein:

it is recommended that the concentration of Benzonase nuclease in cell lysate is 1 U/mL, which can effectively reduce the protease adhesion due to genomic DNA, improve the purity of inclusion bodies, and finally improve the renaturation rate of inclusion body proteins.

3. Remove nucleic acid in recombinant protein

: the final concentration of omnipotent nuclease in the reaction system is recommended to be 90 U / ml, which can degrade all nucleic acids in the system. This product has his

-tag, which can be removed by nickel column adsorption.

Note:

1.

Mg^{2+} is the key catalytic cofactor of universal nuclease, and the reaction buffer containing 1-2 mM Mg^{2+} is necessary for the activity of Benzonase nuclease.

2. The recommended conditions for the use of all-purpose nuclease are shown in the following table.

3. For your safety and health, please wear lab coat and disposable gloves when operating.

Condition	Optimal Range	Effective Range
Mg^{2+}	1-2 mM	1-10 mM
pH	8.0-9.2	6.0-10.0

Temperature	37℃	0-42℃
DTT	0-100 mM	> 100 mM
2-Mercaptoethanol	0-100 mM	> 100 mM
Na^+、K^+、NH_4^+	0-20 mM	0-150 mM
PO_4^{3-}	0-10 mM	0-100 mM
Triton X-100	-	< 0.4%
Sodium deoxycholate	-	< 0.4%
SDS	-	< 0.05%
Urea	-	< 5 M
$(NH_4)_2SO_4$	-	< 100 mM

Servicebio® Cas9(D10A) Nickase

Cat. No.: G3426

Product Information

Product Name	Cat. No.	Spec..
Cas9(D10A) Nickase	G3426-50PMOL	50 pmol

Product Description/Introduction

Cas9(D10A) Nickase is a single point mutant of wild-type Cas9 Nuclease(SpCas9) (containing two cleavage active centers), which is mutated to lose one cleavage active center, thereby creating a incision in a single strand of DNA that is complementary to the sgRNA target sequence, forming a functional single-strand break. Cas9(D10A)Nickase, when used with a pair of gRNA, can also achieve the same double-strand breaking effect as Cas9 Nuclease.

Uses: In vitro, gRNA induces single strand breaks in specific double-stranded DNA, or double-stranded DNA breaks.

Source: Derived from *Streptococcus pyogenes*, recombinant expression by *Escherichia coli*.

Inactivation or inhibition: complete inactivation for 5 minutes at 65℃.

Enzyme storage buffer: 10 mM Tris-HCl, 300 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50%(v/v) glycerol, pH 7.4.

Cas9 Reaction Buffer(10x): 500 mM Tris-HCl, 1 M NaCl, 100 mM $MgCl_2$, 1 mg/mL BSA, pH 7.9.

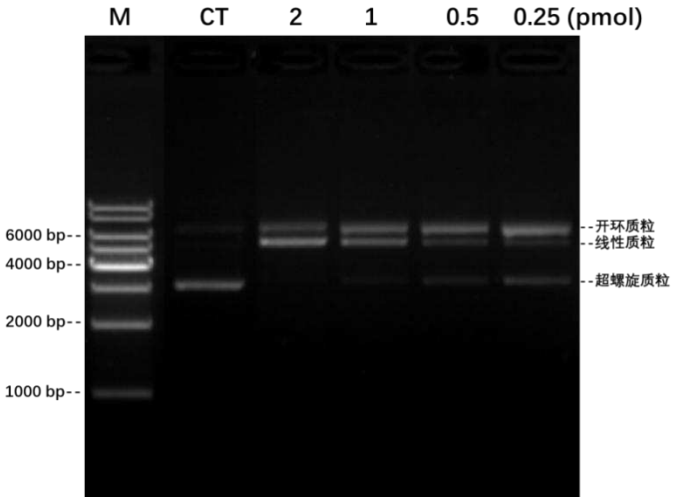


Fig1. Enzyme activity of Cas9 Nickase(D10A or H840A). Reaction system: 20 μL ddH2O, 3 μL Cas9 Reaction Buffer (10 x), 3 μL 300 nM gRNA (Target sequence: 5'-TGCGGTAAAGCTCATCAGCG-3'), 1 μL Cas9 Nickase (2, 1, 0.5, 0.25 pmol, respectively), Pre-incubated at 25℃ for 15 min (CT indicated that Cas9 Nickase was replaced with 1 μL Nuclease-free water in the system). Then, 3μL of 30 nM pET28a plasmid was added and incubated at 37℃ for 15 min. Electrophoretic analysis was performed with 1% agarose gel. It can be seen from the figure that the combination of gRNA and Cas9 Nickase leads the latter to the complementary location of pET28a and gRNA, resulting in single-strand DNA breaks.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3426-50PMOL
G3426-1	Cas9(D10A) Nickase	50 μL
G3426-2	Cas9 Reaction Buffer(10x)	1 mL
Manual		One copy

Assay Protocol / Procedures

1. Various reagents for in vitro digestion Reaction were prepared [Cas9(D10A) Nickase, gRNA, substrate DNA, Cas9 Reaction Buffer were diluted on ice bath, gRNA to 300 nM, substrate DNA to 30 nM];
2. Preparation reaction system (30μL system as an example) :

Reagent	Volume
Nuclease-free water	20 μL
Cas9 Reaction Buffer(10x)	3 μL
gRNA(300 nM)	3 μL
Cas9(D10A) Nickase(1 μM)	1 μL
Total Reaction Volume	27 μL

3. After vortex mixing, centrifuge at room temperature for a few seconds, make the liquid concentrate on the bottom of the tube, and pre-incubate at 25 ℃ for 10min; Note: RNaseInhibitor with final concentration of 1U/μL can be added to the reaction system to prevent RNase contamination (corresponding reduction of Nuclease-freewater volume to maintain the overall reaction system unchanged).
4. Then add 3μL30nM substrate DNA (final volume 30μL) into the system, mix gently, centrifuge the precipitated liquid, incubate at 37℃ for 15min, and the reaction time can be appropriately extended by 30-120min according to the actual situation.
5. After the reaction, each sample was added with 1μL protease K (20mg/mL, item No. G1234) and incubated at room temperature for 10min (or heat treated at 65℃ for 5-10min).
6. The reaction system can be directly analyzed by electrophoresis with an appropriate concentration of agarose gel. If not immediately electrophoretic, the system can be stored at -20℃.

Note

1. The use of this product should pay attention to RNase-free, DNase-free related operations, reagents and consumables used should ensure Nuclease-free.
2. Enzyme products should be placed in the ice box or ice when used, it is recommended to use separately, and should be stored at -20℃ immediately after use.
3. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® Cas9(D10A) Nickase

Cat. No.: G3426

Product Information

Product Name	Cat. No.	Spec..
Cas9(D10A) Nickase	G3426-50PMOL	50 pmol

Product Description/Introduction

Cas9(D10A) Nickase is a single point mutant of wild-type Cas9 Nuclease(SpCas9) (containing two cleavage active centers), which is mutated to lose one cleavage active center, thereby creating a incision in a single strand of DNA that is complementary to the sgRNA target sequence, forming a functional single-strand break. Cas9(D10A)Nickase, when used with a pair of gRNA, can also achieve the same double-strand breaking effect as Cas9 Nuclease.

Uses: In vitro, gRNA induces single strand breaks in specific double-stranded DNA, or double-stranded DNA breaks.

Source: Derived from *Streptococcus pyogenes*, recombinant expression by *Escherichia coli*.

Inactivation or inhibition: complete inactivation for 5 minutes at 65℃.

Enzyme storage buffer: 10 mM Tris-HCl, 300 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50%(v/v) glycerol, pH 7.4.

Cas9 Reaction Buffer(10x): 500 mM Tris-HCl, 1 M NaCl, 100 mM $MgCl_2$, 1 mg/mL BSA, pH 7.9.

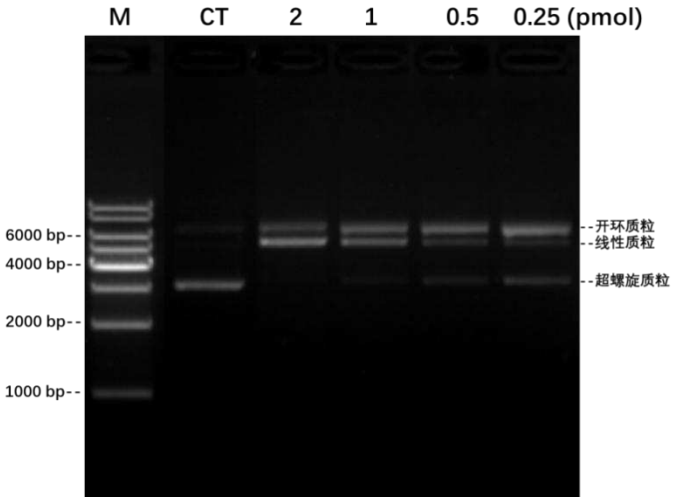


Fig1. Enzyme activity of Cas9 Nickase(D10A or H840A). Reaction system: 20 μL ddH2O, 3 μL Cas9 Reaction Buffer (10 x), 3 μL 300 nM gRNA (Target sequence: 5'-TGCGGTAAAGCTCATCAGCG-3'), 1 μL Cas9 Nickase (2, 1, 0.5, 0.25 pmol, respectively), Pre-incubated at 25℃ for 15 min (CT indicated that Cas9 Nickase was replaced with 1 μL Nuclease-free water in the system). Then, 3μL of 30 nM pET28a plasmid was added and incubated at 37℃ for 15 min. Electrophoretic analysis was performed with 1% agarose gel. It can be seen from the figure that the combination of gRNA and Cas9 Nickase leads the latter to the complementary location of pET28a and gRNA, resulting in single-strand DNA breaks.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3426-50PMOL
G3426-1	Cas9(D10A) Nickase	50 μL
G3426-2	Cas9 Reaction Buffer(10x)	1 mL
Manual		One copy

Assay Protocol / Procedures

1. Various reagents for in vitro digestion Reaction were prepared [Cas9(D10A) Nickase, gRNA, substrate DNA, Cas9 Reaction Buffer were diluted on ice bath, gRNA to 300 nM, substrate DNA to 30 nM];
2. Preparation reaction system (30μL system as an example) :

Reagent	Volume
Nuclease-free water	20 μL
Cas9 Reaction Buffer(10x)	3 μL
gRNA(300 nM)	3 μL
Cas9(D10A) Nickase(1 μM)	1 μL
Total Reaction Volume	27 μL

3. After vortex mixing, centrifuge at room temperature for a few seconds, make the liquid concentrate on the bottom of the tube, and pre-incubate at 25 ℃ for 10min; Note: RNaseInhibitor with final concentration of 1U/μL can be added to the reaction system to prevent RNase contamination (corresponding reduction of Nuclease-freewater volume to maintain the overall reaction system unchanged).
4. Then add 3μL30nM substrate DNA (final volume 30μL) into the system, mix gently, centrifuge the precipitated liquid, incubate at 37℃ for 15min, and the reaction time can be appropriately extended by 30-120min according to the actual situation.
5. After the reaction, each sample was added with 1μL protease K (20mg/mL, item No. G1234) and incubated at room temperature for 10min (or heat treated at 65℃ for 5-10min).
6. The reaction system can be directly analyzed by electrophoresis with an appropriate concentration of agarose gel. If not immediately electrophoretic, the system can be stored at -20℃.

Note

1. The use of this product should pay attention to RNase-free, DNase-free related operations, reagents and consumables used should ensure Nuclease-free.
2. Enzyme products should be placed in the ice box or ice when used, it is recommended to use separately, and should be stored at -20℃ immediately after use.
3. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® Lambda Exonuclease

Cat. No.: G3439

Product Information

Product Name	Cat. No.	Spec..
Lambda Exonuclease	G3439-1000U	1000 U

Product Description/Introduction

Lambda Exonuclease, or λ Exonuclease, is a 5'-3' deoxy-ribonucleic acid exonuclease derived from λ phage and expressed by recombinant *Escherichia coli*. It can specifically hydrolyze the 5'-terminal phosphorylated strand of double-stranded DNA in the 5'-3 'direction, and has low enzymatic activity for single-stranded DNA and the 5'-terminal unphosphorylated dsDNA, and cannot be digested from DNA cuts or gaps.

Uses: Production of single strand PCR products, DNA single strand conformation polymorphism analysis, rolling ring amplification, PCR product cloning, etc.

Source: Derived from λ phage and expressed by *Escherichia coli*.

Enzyme activity definition: One unit is defined as the amount of enzyme required to produce 10nmol of acid-soluble deoxyribonucleotide from double-stranded substrate in a total reaction volume of 50μl in 30minutes at 37°C in 1X Lambda Exonuclease Reaction Buffer with 1μg sonicated duplex [^{3}H]-DNA.

Purity and concentration: SDS-PAGE ≥ 95%; Endogenous nucleic acid residue <1 pg/μL (qPCR detection); Enzyme activity 5U/μL.

Inactivation or inhibition: incubation at 75℃ for 10min can be inactivated.

Enzyme storage buffer: 25 mM Tris-HCl, 50 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol, pH 8.

10X Reaction Buffer: 670 mM Glycine-KOH, 25 mM $MgCl_2$, 500 μg/mL BSA, pH 9.4.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3439-1000U
G3439-1	Lambda Exonuclease	200 μL
G3439-2	10X Reaction Buffer	1 mL
Manual		1 pc

Assay Protocol / Procedures

1. Refer to the table below to formulate the reaction system:

Component	Volume
DNA sample	2-5 μg
Nuclease-Free water	To 50 μL
10x Reaction Buffer	5 μL
Lambda Exonuclease	1 μL

2. After the system is mixed, the liquid is settled to the bottom of the tube by centrifugation at low speed.
3. After incubation at 37℃ for 30 min, the reaction could be terminated by adding the final concentration of 10mM EDTA or incubating at 75℃ for 10 min.

4. The treated samples may be subjected to electrophoretic analysis or further purification.

Note

1. Enzymes should be stored in the ice box immediately after use at -20℃.
2. For your safety and health, please wear a lab coat and disposable gloves.

Servicebio® Lambda Exonuclease

Cat. No.: G3439

Product Information

Product Name	Cat. No.	Spec..
Lambda Exonuclease	G3439-1000U	1000 U

Product Description/Introduction

Lambda Exonuclease, or λ Exonuclease, is a 5'-3' deoxy-ribonucleic acid exonuclease derived from λ phage and expressed by recombinant *Escherichia coli*. It can specifically hydrolyze the 5'-terminal phosphorylated strand of double-stranded DNA in the 5'-3 'direction, and has low enzymatic activity for single-stranded DNA and the 5'-terminal unphosphorylated dsDNA, and cannot be digested from DNA cuts or gaps.

Uses: Production of single strand PCR products, DNA single strand conformation polymorphism analysis, rolling ring amplification, PCR product cloning, etc.

Source: Derived from λ phage and expressed by *Escherichia coli*.

Enzyme activity definition: One unit is defined as the amount of enzyme required to produce 10nmol of acid-soluble deoxyribonucleotide from double-stranded substrate in a total reaction volume of 50μl in 30minutes at 37°C in 1X Lambda Exonuclease Reaction Buffer with 1μg sonicated duplex [^{3}H]-DNA.

Purity and concentration: SDS-PAGE ≥ 95%; Endogenous nucleic acid residue <1 pg/μL (qPCR detection); Enzyme activity 5U/μL.

Inactivation or inhibition: incubation at 75℃ for 10min can be inactivated.

Enzyme storage buffer: 25 mM Tris-HCl, 50 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol, pH 8.

10X Reaction Buffer: 670 mM Glycine-KOH, 25 mM $MgCl_2$, 500 μg/mL BSA, pH 9.4.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3439-1000U
G3439-1	Lambda Exonuclease	200 μL
G3439-2	10X Reaction Buffer	1 mL
Manual		1 pc

Assay Protocol / Procedures

1. Refer to the table below to formulate the reaction system:

Component	Volume
DNA sample	2-5 μg
Nuclease-Free water	To 50 μL
10x Reaction Buffer	5 μL
Lambda Exonuclease	1 μL

2. After the system is mixed, the liquid is settled to the bottom of the tube by centrifugation at low speed.
3. After incubation at 37℃ for 30 min, the reaction could be terminated by adding the final concentration of 10mM EDTA or incubating at 75℃ for 10 min.

4. The treated samples may be subjected to electrophoretic analysis or further purification.

Note

1. Enzymes should be stored in the ice box immediately after use at -20℃.
2. For your safety and health, please wear a lab coat and disposable gloves.

Servicebio® Lambda Exonuclease

Cat. No.: G3439

Product Information

Product Name	Cat. No.	Spec..
Lambda Exonuclease	G3439-1000U	1000 U

Product Description/Introduction

Lambda Exonuclease, or λ Exonuclease, is a 5'-3' deoxy-ribonucleic acid exonuclease derived from λ phage and expressed by recombinant *Escherichia coli*. It can specifically hydrolyze the 5'-terminal phosphorylated strand of double-stranded DNA in the 5'-3 'direction, and has low enzymatic activity for single-stranded DNA and the 5'-terminal unphosphorylated dsDNA, and cannot be digested from DNA cuts or gaps.

Uses: Production of single strand PCR products, DNA single strand conformation polymorphism analysis, rolling ring amplification, PCR product cloning, etc.

Source: Derived from λ phage and expressed by *Escherichia coli*.

Enzyme activity definition: One unit is defined as the amount of enzyme required to produce 10nmol of acid-soluble deoxyribonucleotide from double-stranded substrate in a total reaction volume of 50μl in 30minutes at 37°C in 1X Lambda Exonuclease Reaction Buffer with 1μg sonicated duplex [^{3}H]-DNA.

Purity and concentration: SDS-PAGE ≥ 95%; Endogenous nucleic acid residue <1 pg/μL (qPCR detection); Enzyme activity 5U/μL.

Inactivation or inhibition: incubation at 75℃ for 10min can be inactivated.

Enzyme storage buffer: 25 mM Tris-HCl, 50 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50% Glycerol, pH 8.

10X Reaction Buffer: 670 mM Glycine-KOH, 25 mM $MgCl_2$, 500 μg/mL BSA, pH 9.4.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3439-1000U
G3439-1	Lambda Exonuclease	200 μL
G3439-2	10X Reaction Buffer	1 mL
Manual		1 pc

Assay Protocol / Procedures

1. Refer to the table below to formulate the reaction system:

Component	Volume
DNA sample	2-5 μg
Nuclease-Free water	To 50 μL
10x Reaction Buffer	5 μL
Lambda Exonuclease	1 μL

2. After the system is mixed, the liquid is settled to the bottom of the tube by centrifugation at low speed.
3. After incubation at 37℃ for 30 min, the reaction could be terminated by adding the final concentration of 10mM EDTA or incubating at 75℃ for 10 min.

4. The treated samples may be subjected to electrophoretic analysis or further purification.

Note

1. Enzymes should be stored in the ice box immediately after use at -20℃.
2. For your safety and health, please wear a lab coat and disposable gloves.

Benzonase Nuclease

Cat.No. : G3461-50KU

Brand : Servicebio

Spec.: 50 KU

Product Introduction

ProductInformation

ProductName	Cat. No.	Spec.
Benzonase Nuclease	G3461-50 KU	50KU

Description/Introduction

Benzonase Nuclease, also known as broad-spectrum Nuclease, is a nonspecific endonuclease derived from Serratia Marcescen. This endonuclease can attack and degrade all forms of DNA and RNA (single-stranded, double-stranded, linear, cyclized) under very broad conditions, cutting at any position within the nucleic acid chain, and completely degrading the nucleic acid to 5 '-monophosphate-oligonucleotide 3-5 bases in length. The working pH range is pH 6-10, the optimum pH is 8.0, the working temperature range is 0

-42℃, the optimum temperature is 37℃. Benzonase Nuclease is widely used to remove nucleic acids from recombinant proteins, viral vaccines and other biological products. Benzonase Nuclease can effectively reduce the viscosity of protein lysates such as cell

s, tissues and microorganisms. This product has no His-Tag.

Definition of enzymeactivity: The

amount of enzyme required to change ΔA260 absorption value by 1.0 (equivalent to complete digestion of 37 μg salmon sperm DNA as oligonucleotide) in 2.625 mL reaction system at 37℃, pH 8.0, within 30 min was defined as one

enzyme active unit.

Purity: ≥95% by SDS-PAGE, no protease, ≥250 U/μL.

Enzyme storage buffer:20 mM Tris-HCl, 2 mM $MgCl_2$, 2 mM NaCl, 50% Glycerol, pH 8.0.

Dilution buffer: 20 mM Tris-HCl, 2 mM $MgCl_2$, 2 mM NaCl, pH 8.0.

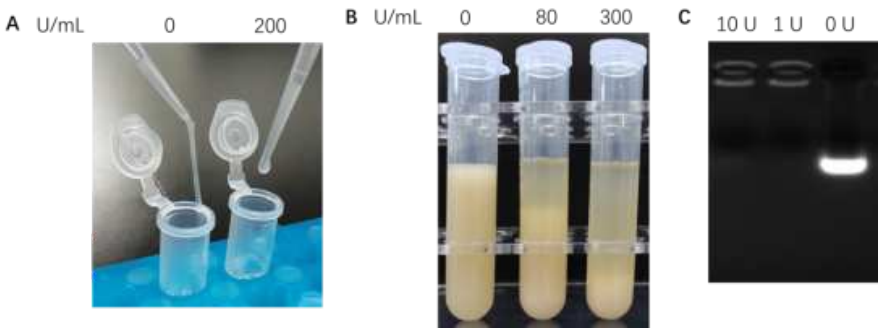


Figure 1. Effect diagram of the use of Benzonase nuclease. A. After lysis of 293 cells by RIPA lysate, a large amount of genomic DNA was released from the samples without the addition of Benzonase nuclease and was viscous, while the samples with the addition of Benzonase nuclease were not viscous because the released genomic DNA was degraded; B. Add 5 mL RIPA lysate to 1 g of E. coli wet bacteria, mix well, and add appropriate amount of Benzonase nuclease (0, 80, 300 U/mL) respectively. Take photos for observation after treatment at room temperature for 30 min;

C. Take 40 μg of salmon sperm DNA, add an appropriate amount of Benzonase nuclease, and incubate at 37°C for 30 min to detection on agarose gel.

Storage and Handling Conditions

Transport with wetice; Store at -20℃, valid for 12 months.

Component

Component Number	Component	G
G3461-1	Benzonase Nuclease（全能核酸酶）	200μL
Manuals		One copy

Assay Protocol / Procedures

1. For reducing the viscosity of cell, tissue or bacterial lysate:

Cell samples:

A, Adherent cell samples were washed again with PBS after removal of medium. 1-2 μL of Benzonase nuclease was added to 1 mL of RIPA lysate (

G2033, G2002 was recommended

) and then used for lysis of adherent cells according to the instructions for the lysate. After incubation at room temperature or on ice for 5-30 min, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

B, Supernatant was removed by centrifugation of the suspended cell sample. 1-2 μL of Benzonase nuclease was added to 1 mL of RIPA lysate (

G2033, G2002 was recommended

) and then used for lysis of suspended cells according to the instructions for use of the lysate. After incubation at room temperature or on ice for 5-30 min, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

Tissue samples: Tissue blocks were washed with pre-cooled PBS to remove blood stains and cut into small pieces.1 mL lysate (

G2033, G2002 was recommended

) was added per 50 mg of tissue, and 1-2 μL of Benzonase nuclease was added at the same time. The tissue was ground with a lapping instrument (

KZ-III, KZ-III-F, KZ-III-FP

was recommended) until full cleavage. After sufficient tissue lysis, the tissue was incubated for 5-30 min at room temperature or on ice, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

Bacterial and fungal sam

ples: Bacteria or fungi are collected after centrifugation. 1-2 μL of Benzonase nuclease was added to 1 mL lysate (G2033, G2002 was recommended). Then the lysate is used for bacterial or fungal lysis according to the instructions for use. After incubation at room temperature or on ice for 5-30 min, the lysate was collected and centrifuged, and the supernatant was taken for subsequent experiments.

Note: The commonly used lysates contain different concentrations of Triton X-100 or NP-40, SDS and sodium deoxycholate, etc. These reagents have certain effects on the Benzonase nuclease, so it is necessary to increase the amount of enzyme appropriately or prolong the incubation time for different experiments

.

2. For improve the renaturation rate of inclusion body protein:

it is recommended that the concentration of Benzonase nuclease in cell lysate is 1 U/mL, which can effectively reduce the protease adhesion due to genomic DNA, improve the purity of inclusion bodies, and finally improve the renaturation rate of inclusion body proteins.

Note:

1.

Mg2+ is the key catalytic cofactor of universal nuclease, and the reaction buffer containing 1-2 mM Mg2+ is necessary for the activity of Benzonase nuclease.

2. The recommended conditions for the use of all-purpose nuclease are shown in the following table.

3. For your safety and health, please wear lab coat and disposable gloves when operating.

Condition	Optimal Range	Effective Range
Mg^{2+}	1-2 mM	1-10 mM
pH	8.0-9.2	6.0-10.0
Temperature	37℃	0-42℃
DTT	0-100 mM	> 100 mM
2-Mercaptoethanol	0-100 mM	> 100 mM
Na^{+}、K^{+}、NH_4^{+}	0-20 mM	0-150 mM

PO_4^{3-}	0-10 mM	0-100 mM
Triton X-100	-	< 0.4%
Sodium deoxycholate	-	< 0.4%
SDS	-	< 0.05%
Urea	-	< 5 M
$(NH_4)_2SO_4$	-	< 100 mM

Servicebio® Bst DNA polymerase, Large Fragment

Cat. No.: G3403-1600U

Product Information

Product Name	Cat. No.	Spec..
Bst DNA polymerase, Large Fragment	G3403-1600U	1600 U

Product Description/Introduction

Bst DNA Polymerase, Large Fragment is the large fragment of Bacillus stearothermophilus (Bst) DNA Polymerase I with 5'→3' DNA polymerase activity, but not 5'→3' exonuclease activities. Bst DNA Polymerase, Large Fragment has strong strand displacement ability and can be applied to isothermal nucleic acid amplification reactions, such as Loop-mediated isothermal amplification (LAMP) and Rolling-circle amplification (RCA), etc.

Applications: Loop-mediated isothermal amplification (LAMP), helicase isothermal gene amplification (HDA) and other DNA isothermal amplification; multiple displacement amplification (MDA); whole genome amplification (WGA); high GC content DNA sequencing; rapid sequencing of nanogram-level DNA templates; library preparation for sequencing, etc.

Source: The recombinant large fragment of Bacillus stearothermophilus DNA Polymerase I expressed in *E. coli.*

Purity and concentration: Purity ≥95% by SDS-PAGE; endonuclease <1 pg/μLby qPCR; 8 U/uL.

Definition of activity: One activity unit is defined as the amount of enzyme that can incorporate 10nmol of dNTPs into acid insoluble material in 30 minutes at 65℃.

Enzyme storage buffer: 10mM Tris-HCl (pH 7.5), 50mM KCl, 0.1mM EDTA, 1mM DTT, 0.1% Triton X-100, 50% (v/v) glycerol.

10X Bst Reaction Buffer: 200mM Tris-HCl, 100mM KCl, 100mM (NH4)2SO4 , 20mM MgSO4 , 1% Triton X-100 , pH 8.8 at 25°C.

Inactivation or inhibition: Heat at 80℃ for 20min.

Storage and Shipping Conditions

Ship with wet ice; store at -20°C, valid for 12 months.

Product Content

Component Number	Component	G3403-1600U
G3403-1	Bst DNA polymerase, Large Fragment	200 μL
G3403-2	10×Bst Reaction Buffer	1 mL
G3403-3	$MgSO_4$ (100 mM)	500 μL
Manual		One copy

Assay Protocol / Procedures

Taking LAMP isothermal amplification as an example.

1. **Set up the following reaction.**

Component	Volume
10× Bst Reaction Buffer	2.5 μl
MgSO4 (100 mM)	1.5 μl
dNTP Mix (10 mM each)	3.5 μl
FIP/BIP Primers (100 μM)	0.4/0.4 μL

F3/B3 Primers (10 μM)	0.5/0.5 μL
LoopF/LoopB Primers (10 μM)	2/2 μL
Bst DNA polymerase, Large Fragment	1 μL
Template DNA	1 μL
Nuclease-free Water	To 25 μL

2. Incubate at 60-65℃ for 1 hour.

3. According to different experimental requirements, the LAMP reaction system can be added with hydrogen naphthol blue or phenol red for visual indication, or gel electrophoresis can be used for detection and analysis.

Note

1. *Bst* DNA Polymerase, Large Fragment cannot be used for thermal cycle sequencing and PCR.
2. When using enzyme products, they should be placed on ice. After use, they should be immediately stored at -20 ℃, and it is recommended to store them separately.
3. For your safety and health, please wear a lab coat and disposable gloves during the operation.

Servicebio® *Bsu* DNA polymerase, large Fragment

Cat. No.: G3432

Product Information

Product Name	Cat. No.	Spec..
Bsu DNA polymerase, large Fragment	G3432-250U	250 U

Product Description/Introduction

Bsu DNA polymerase LargeFragment is from bacillus subtilis DNA polymerase, larger pieces of *E. coli* recombinant expression, 5'-3' DNA polymerase activity, do not have 3'-5' and 5'-3' exonuclease activity. *Bsu* DNA polymerase, LargeFragment also have chain replacement activity, are often used to restructure polymerase enzyme amplification (RPA) reaction, the temperature of the isothermal amplification is usually 37℃.

Uses: Isothermal amplification by RPA method; RPA strand replacement DNA synthesis; Random primer labeling; cDNA second strand synthesis.

Source: Derived from *Bacillus subtilis*, recombinant expression by *Escherichia coli*.

Inactivation or inhibition: complete inactivation for 20 minutes at 75℃.

Enzyme storage buffer: 25 mM Tris-HCl, 50 mM NaCl, 1 mM DTT, 0.1 mM EDTA, 50%Glycerol, pH 7.4.

10×*Bsu* Reaction Buffer: 100 mM Tris-HCl, 500 mM NaCl, 100 mM MgCl2, 10 mM DTT, pH 7.9.

Storage and Shipping Conditions

Wet ice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3432-250U
G3432-1	*Bsu* DNA polymerase, large Fragment	50 μL
G3432-2	10×*Bsu* Reaction Buffer	500 μL
Manual		One copy

Assay Protocol / Procedures

Examples of isothermal amplification:

1. Single-strand primer and DNA Template were mixed with equal molar number, the recommended final concentration was 10μM, incubated at 95℃ for 2min, and then gradient cooling to 25℃ annealing to form Primer/Template hybrid double-strand.
2. Prepare the reaction system according to the following table:

Component	Volume
Nuclease-Free Water	15 μL
Primer/Template	1 μL
dNTP Mix (2.5 mM each)	1 μL
10×*Bsu* Reaction Buffer	2 μL
Bsu DNA polymerase, large Fragment	1 μL

3. Incubate the above reaction system at 37℃ for an appropriate time (the incubation time needs to be explored in actual use). The elongation rate tested was similar to that of conventional DNA polymerase, about 1kb/min.
4. After incubation at 75℃ for 20min to stop the reaction, agarose gel electrophoresis can be performed.

Note

1. Enzyme products should be placed in an ice box or ice bath when used, and should be stored at -20℃ immediately after use, it is recommended to store in separate packages.
2. *Bsu* DNA polymerase largeFragment because of the lack of 3'-5' exonuclease activity, should not be used for the production of flat end.
3. *Bsu* DNA polymerase, a large Fragment, retains about 50% of its activity at 25℃ twice as much as the Klenow fragment (3'-5' exo-) at this temperature.
4. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® Taq DNA polymerase

Cat. #：G3441-1000U

Product Information

Product Name	Cat. No.	Spec.
Taq DNA polymerase	G3441-1000U	1000 U

Product Introduction

Product Description: The Taq DNA polymerase catalyzes 5′→3′synthesis of DNA, which can efficiently amplify DNA fragments up to 7 kb. The enzyme also exhibits 3'→5' exonuclease (proofreading) activity without 5'→3' exonuclease activity. The 3' end of the PCR product has an "A" base..

Applications:
- Ideal for routine PCR applications.
- TA cloning

Source: *E.coli* cells with a cloned *polA* gene from Thermus aquaticus.

Concentration: 5 U/μL

Purity: ≥95% by SDS-PAGE

Endogenous nucleic acid < 1 pg/μL by qPCR

Definition of Activity Unit: One unit of the enzyme catalyzes the incorporation of 10 nmol of deoxyribonucleotides into an acid-insoluble substance 30 min at 74 °C

10 × Reaction Buffer： 100 mM Tris-HCl，500 mM KCl，15 mM $MgCl_2$，pH 8.3

Storage Buffer： 10 mM Tris-HCl (pH 7.4), 100 mM KCl, 1 mM DTT, 0.1 mM EDTA, 0.5% Tween 20，50% (v/v)Glycerol

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3441-1000U
G3441-1	Taq DNA polymerase	200 μL
G3441-2	10 × Reaction buffer	1 mL
G3441-3	dNTP（10 mM each）	500 μL
Manual		One copy

Assay Protocol / Procedures

Routine PCR Protocol

1. Reaction setup:

We recommend assembling all reaction components on ice and quickly transferring the reactions to a thermocycler preheated to the denaturation temperature (95°C).

Component	Volume
10 × Reaction buffer	5 μL
Taq DNA polymerase	0.5 μL (variable)
dNTP Mix (10 mM each)	1 μL
Forward primer/Reverse primer (10 μM)	2 μL/2 μL
Template	Variable (0.1-50 ng)

Nuclease-Free water	To 50 μL

- **It could be added to no more than 10% DMSO to the reaction system for high GC templates.**
- **The reaction volumes can be scaled up or down providing that the final concentrations of the components (DNA, dNTPs, labeled dNTP) are as indicated in the protocol.**

2. Gently vortex the samples and spin down.
3. Perform PCR using the recommended thermal cycling conditions outlined below:

Step	Temperature	Time	Number of Cycles
Initial Denaturation	95℃	3 min	1
Denaturation	95℃	15-30 s	25-35
Annealing	50-68℃	15-30 s	
Extension	72℃	1 min/kb	
Final extension	72℃	5-10 min	1

Note

1. It is recommended that the reaction system should be prepared on ice.
2. The optimization of PCR reactions can be adjusted from Mg^{2+} concentration, template amount, enzyme amount, annealing temperature, etc.
3. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® Fast Pfu DNA polymerase

Cat. No.: G3443

Product Information

Product Name	Cat. No.	Spec..
Fast Pfu DNA polymerase	G3443-200U	200 U

Product Description/Introduction

Fast Pfu DNA polymerase is a modified high-fidelity Pfu DNA polymerase that incorporates a single-stranded binding protein. The amplification ability is strong, the amplification speed is fast, the elongation speed can reach 5-15s/kb, with high fidelity, high specificity, with 5'-3' polymerase activity and 3'-5' exonuclease activity, and the amplified product is flat terminal. It is suitable for PCR amplification of conventional PCR, colony PCR, complex template and high GC content template. DNA fragments up to 14kb can be amplified.

Source: Derived from *Pyrococcus furiosus*, recombinant expression by Escherichia coli.

Enzyme activity definition: Using activated salmon sperm DNA as template primer, the enzyme required for incorporation of 10nmol deoxynucleotides into acid insoluble substances was defined as an enzyme activity unit within 30min at 74℃.

Enzyme storage buffer: 10 mM Tris-HCl, 100 mM KCl, 1 mM DTT, 0.1 mM EDTA, 0.5% Tween 20, 0.5% NP-40, 50% Glycerol, pH 8.0.

Storage and Shipping Conditions

wetice transport; Store at -20℃ for 12 months.

Product Content

Component Number	Component	G3443-200U
G3443	Fast Pfu DNA polymerase	100 μL
Manual		One copy

Assay Protocol / Procedures

1. This product is mainly sold in the form of Fast Pfu DNA polymerase raw materials, and customers need to optimize the reaction buffer and reaction system according to their own needs. G3305 is recommended for purchase of PCR premixes.

Note

1. Enzyme products should be placed in an ice box or ice bath when used, and should be stored at -20℃ immediately after use, it is recommended to store in separate packages.
2. For your safty and health,please wear safety glasses, gloves, or protective clothing.

Servicebio® **Fast High Fidelity DNA polymerase**

Cat #: **G3444-200U**

Product Information

Product Name	Cat. No.	Spec.
Fast High Fidelity DNA Polymerase	G3444-200U	200 U

Product Description

Fast High Fidelity DNA polymerase is a engineered ultra-high fidelity DNA polymerase combining with single-stranded DNA-binding protein. It possesses the fast extension speed available up to 5-15 s/kb, along with the extremely high fidelity 50-fold higher than of Taq, and 6-fold higher than that of Pfu. with 5'-3' polymerase and 3'-5' exonuclease activities, it produces biunt end DNA products. It is ideal for routine PCR, colony PCR, Amplification of difficult (GC-rich) templates and Long-range amplification up to 14 kb.

Definition of Activity Unit: The amount of enzyme required to incorporate 10 nmol of deoxynucleotide into acid insoluble material is defined as one unit of enzyme activity at 74°C for 30 min using activated salmon sperm DNA as a template primer.

Purity and concentration: ≥ 95% detected by SDS-PAGE; endogenous nucleic acid < 1 pg/μL detected by qPCR.

Concentration: 2 U/μL.

Storage and Shipping Conditions

Ship with wet ice; Store at-20℃ up to 12 months.

Product Contents

Component Number	Component	G3444-200U
G3444-1	Fast High Fidelity DNA polymerase	100 μL
G3444-2	10x Reaction buffer	1 mL
G3444-3	dNTP (10 mM each)	500 μL
Manual		One copy

Assay Protocol/Procedures

Commonly used PCR reaction system (50 μL) :

Component	Volume
10x Reaction buffer	5 μL
Nuclease-Free water	To 50 μL
dNTP Mix (10 mM each)	1 μL
Forward primer/Reverse primer (10 uM)	2 μL/2 μL
Template	n (Adjustable)
Fast High Fidelity DNA polymerase	0.5 μL (Adjustable)

Note: ①For plasmid or phage DNA as a template, the recommended addition amount is 10 ng-1 pg per 50 μL system; For genomic DNA as a template, the recommended addition amount is 250 ng-50 ng per 50 μL system; For cDNA as a template, it is recommended to dilute 2-100 folds, the addition amount does not

exceed 10 % of the final volume ; For bacterial liquid or crude extract sample as a template, add no more than 10 % of the reaction volume. Excessive templates are easy to lead to non-specific amplification, too few templates are easy to lead to low efficiency of PCR amplification. ②The final concentration range of primers is 0.2-1.0μM, and the recommended primer concentration is 0.4 μM. Too few primers may lead to low or no amplification, and excessive primers may lead to non-specific amplification. ③for high GC template no more than 10 % DMSO can be added to the system. ④Other volume of reaction system can be adjusted according to the 50μL reaction system.

Recommended PCR procedures :

Temperature	Time	Cycles
98℃	3 min	1
98℃	15-30 s	25-35
50-72℃	15-30 s	
72℃	5-15 s/kb	
72℃	5-10 min	1
4-16℃	Forever	

Note

1. Enzyme products should be kept in an ice box or ice bath when used, and stored at -20℃ immediately after use. It is recommended to store them separately.
2. For your safety and health, please wear a lab coat and disposable gloves.

Servicebio® SweScript Reverse Transcriptase I

Cat. #: G3415-10KU

Product Information

Product Name	Cat. No.	Spec.
SweScript Reverse Transcriptase I	G3415-10KU	10 KU

Product Introduction

Product Description: SweScript Reverse Transcriptase I is a recombinant M-MuLV reverse transcriptase without RNase H activity. It can be used to synthesize first strand cDNA at higher temperatures than the wild type M-MuLV. The enzyme is active up to 55°C, providing higher specificity, higher yield of cDNA and more full-length cDNA product up to 10 kb.

Applications: cDNA synthesis

Source: The gene encoding a mutant M-MuLV Reverse Transcriptase is expressed in *E. coli*.

Purity: ≥95% by SDS-PAGE

Concentration: 200 U/μL

Definition of Activity Unit: One unit is defined as the amount of enzyme that will incorporate 1 nmol of dTTP into acid-insoluble material in 10 minutes at 37 °C using poly(rA)•oligo(dT)as template/primer.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 100 mM KCl, 0.1 mM EDTA, 1 mM DTT, 0.5% Tween 20, 0.5% NP-40, 50% Glycerol, pH 8.0.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3415-10KU
G3415-1	SweScript Reverse Transcriptase I	50 μL
G3415-2	5x Reaction buffer	500 μL
Manual		One copy

Assay Protocol / Procedures

Protocol of First Strand cDNA Synthesis

1. Thaw components on ice and mix by inverting several times.
2. Mix the following components in a reaction tube:

Component	Volume
5x Reaction buffer	4 μL
dNTP Mix (10 mM each)	1 μL
Oligo(dT)$_{18}$ (100 μM)	1 μL
or Random Hexamer Primer (100 μM)	or 1 μL
or Gene Specific Primer (2 μM)	or 1 μL
RNase inhibitor (40 U/μL)	1 μL
SweScript Reverse Transcriptase I	1 μL
Total RNA/mRNA	0.1 ng-5 μg/10 pg-0.5 μg

Nuclease-free water	To 20 μL
Total	**20 μL**

Note: For GC rich and complex template, RNA template, primers and nuclease-free water can be premixed. Heat the RNA-primer mix at 65℃ for 5 minutes, and spin briefly and place promptly on ice.

3. Gently mix and briefly centrifuge.
4. Perform reverse transcription using the recommended thermal conditions below:

Temperature	Time
25℃[a]	5 min
50℃[b]	15-30 min
85℃	5 s

a: If using Random Hexamer Primer, incubate the combined reaction mixture at 25℃ for 5 minutes, and then proceed to next step. If using Oligo (dT) 18 Primer or Gene Specific Primer, directly incubate at 50℃.

b: For GC rich and complex templates, the reverse transcription temperature can be improved to 55℃.

Note

1. RNA is easily degraded, Please obey standardized operation to avoid RNase contamination.
2. The reverse transcription products can be stored at -20℃ for a short period. If long-term storage is required, it is recommended to store at -80℃ after packing and avoid freeze-thaw cycles.
3. If the template is of eukaryotic origin, it is recommended to select Oligo (dT)18 Primer and pair it with the 3' Poly A tail of eukaryotic mRNA to obtain the highest yield of full-length cDNA.
4. For reverse transcription of prokaryotic RNA, Random Hexamer Primer or Gene Specific Primer should be used.
5. If reverse transcription is followed by qPCR assay, Oligo (dT)18 Primer and Random Hexamer Primer can be mixed to achieve the same cDNA synthesis efficiency in all regions of mRNA, which helps to improve the authenticity and repeatability of quantitative results.
6. For your safety and health, please wear safety glasses, gloves, or protective clothing.

Servicebio® SweScript Reverse Transcriptase II

Cat. #：G3416-10KU

Product Information

Product Name	Cat. No.	Spec.
SweScript Reverse Transcriptase II	G3416-10KU	10 KU

Product Introduction

Product Description: SweScript Reverse Transcriptase II is a genetically engineered MMLV reverse transcriptase (RT) based on SweScript Reverse Transcriptase I. Mutations in the RNase H domain of the enzyme avoid degradation of the RNA during first-strand cDNA synthesis, which results in higher yields of full-length cDNA. It has increased thermal stability and higher synthesis efficiency compared to wild-type MMLV RT and SweScript Reverse Transcriptase I. The enzyme is active up between 42-65℃, providing higher specificity, higher yield of cDNA and more full-length cDNA product up to 5 minutes.

Applications: cDNA synthesis

Source: The gene encoding a mutant M-MuLV Reverse Transcriptase is expressed in *E. coli*.

Purity: ≥95% by SDS-PAGE

Concentration: 200 U/μL

Definition of Activity Unit: One unit is defined as the amount of enzyme that will incorporate 1 nmol of dTTP into acid-insoluble material in 10 minutes at 37 °C using poly(rA)•oligo(dT)as template/primer.

Storage (Dilution) Buffer: 20 mM Tris-HCl, 100 mM KCl, 0.1 mM EDTA, 1 mM DTT, 0.5% Tween 20, 0.5% NP-40, 50% Glycerol, pH 8.0.

Storage Conditions: Store at –20°C up to 12 months.

Product Contents

Component Number	Component	G3415-10KU
G3416-1	SweScript Reverse Transcriptase II	50 μL
G3416-2	5x Reaction buffer	500 μL
Manual		One copy

Assay Protocol / Procedures

Protocol of First Strand cDNA Synthesis

1. Thaw components on ice and mix by inverting several times.
2. Mix the following components in a reaction tube:

Component	Volume
5x Reaction buffer	4 μL
dNTP Mix (10 mM each)	1 μL
Oligo(dT)$_{18}$ (100 μM)	1 μL
or Random Hexamer Primer (100 μM)	or 1 μL

or Gene Specific Primer (2 μM)	or 1 μL
RNase inhibitor (40 U/μL)	1 μL
SweScript Reverse Transcriptase II	1 μL
Total RNA/mRNA	0.1 ng-5 μg/10 pg-0.5 μg
Nuclease-free water	To 20 μL
Total	**20 μL**

Note: For GC rich and complex template, RNA template, primers and nuclease-free water can be premixed. Heat the RNA-primer mix at 65℃ for 5 minutes, and spin briefly and place promptly on ice.

3. Gently mix and briefly centrifuge.
4. Perform reverse transcription using the recommended thermal conditions below:

Temperature	Time
25℃[a]	5 min
50℃[b]	15-30 min
85℃	5 s

a: If using Random Hexamer Primer, incubate the combined reaction mixture at 25℃ for 5 minutes, and then proceed to next step. If using Oligo (dT) 18 Primer or Gene Specific Primer, directly incubate at 50℃.

b: For GC rich and complex templates, the reverse transcription temperature can be improved to 65℃.

Note

1. RNA is easily degraded, Please obey standardized operation to avoid RNase contamination.
2. The reverse transcription products can be stored at -20℃ for a short period. If long-term storage is required, it is recommended to store at -80℃ after packing and avoid freeze-thaw cycles.
3. If the template is of eukaryotic origin, it is recommended to select Oligo (dT)18 Primer and pair it with the 3' Poly A tail of eukaryotic mRNA to obtain the highest yield of full-length cDNA.
4. For reverse transcription of prokaryotic RNA, Random Hexamer Primer or Gene Specific Primer should be used.
5. If reverse transcription is followed by qPCR assay, Oligo (dT)18 Primer and Random Hexamer Primer can be mixed to achieve the same cDNA synthesis efficiency in all regions of mRNA, which helps to improve the authenticity and repeatability of quantitative results.
6. For your safety and health, please wear safety glasses, gloves, or protective clothing.

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