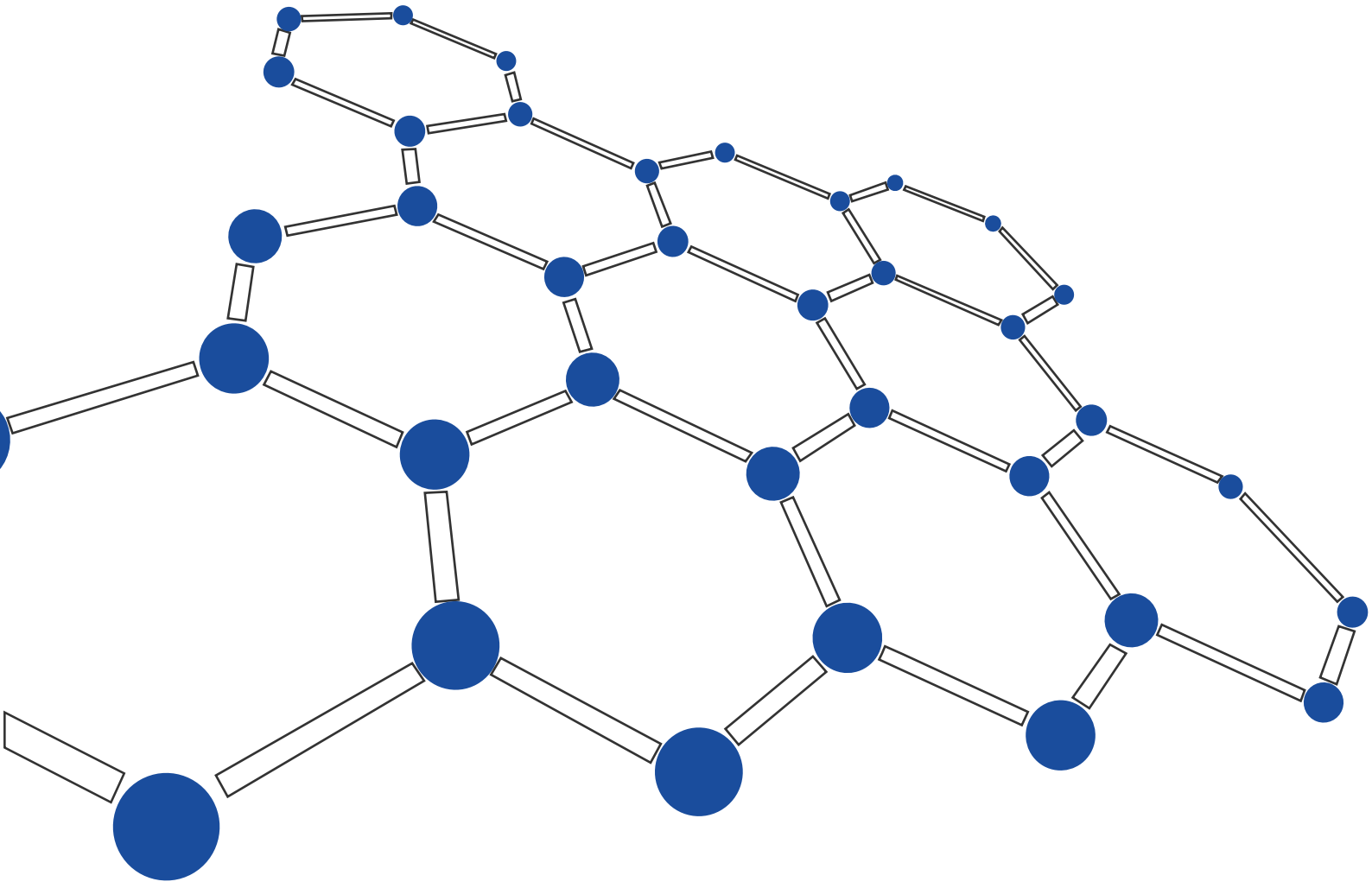
FAPON

A GLOBAL LEADING IVD REAGENT RAW MATERIALS AND ONE-STOP SOLUTIONS PROVIDER

Molecular Diagnostic

Product Catalogue



Fapon Biotech Inc.

Molecular Diagnostic Products Catalogue

PCR Featured Materials Overview

DNA related							
	Taq (MD001)	Platinum (MD002)	Anstart Taq (MD006)	Taq II DNA Polymerase (MD0032)	AnPfu Hot start (MD036)	Hot start Hltaq (MD026)	Anstart Taq DNA II Polymerase (MD007)
Performance							
Speed (Max in Internal test)	4KB/min (1KB/5s*)	4KB/min (1KB/5s*)	4KB/min (1KB/5s*)		1KB/min	1KB/min	1KB/min
Heat activation	95℃ 2.5mins	95℃ 2.5mins	95℃ 2.5mins		95℃ 2.5mins	95℃ 10mins	95℃ 10mins
Hot start			√		√	√	
Application size							
gDNA		3.2KB					3.2KB
Plasmid/lambda	3KB	3KB	3KB			3KB	3.2KB
cDNA		5KB	5KB		8KB	5KB	5KB
Application							
Low Copy Number	√	√	√	√		√	√
Routine PCR	√	√	√	√		√	√
T/A cloning	√	√	√	√		√	√
Colony PCR	√	√	√	√	√	√	√
Sequencing			√	√	√	√	
Genotyping			√	√	√	√	
Multiplex PCR			√*	√*		√*	√
RT-PCR			√	√		√	√
Complex Template			√*	√*	√	√	√
GC-Rich					√	√	
Blunt -end cloning					√		
Mutagenesis					√		
Additional Features							
5'→3' polymerase activity	√	√	√		√	√	√
3'→5'exo-nuclease activity					√		

** Good pollution prevention with UDG enzyme

* Optimized with tailor-made buffer

Isothermal related		
	Bst DNA Polymerase (MD030)	Phi29 DNA Polymerase (MD031)
Performance		
Optimal extension temperature	60℃-65℃	30℃
Heat activation	80℃,20mins	65℃,10mins
Specification	Isothermal DNA amplification	Isothermal amplification with Hi-Fi
Sequencing	Trace DNA / GC rich sequencing	Strand replacement/leading strand synthesis/PGSPGD*

* Optimized with tailor-made buffer

RNA related						
	2.5xSYBR \Anstart One-Step RT-PCR Mix (MD013G)	Anstart One-Step RT-PCR Mix (MD013)	Hot start HITaq One-Step RT-PCR Mix (MD027)	M-MuLV Reverse Transcriptase (MD011)	SuperM-MuLV Reverse Transcriptase (MD028)	Tth DNA Polymerase (MD012)
Polymerase	Anstart Taq	Hot start Taq	Hot start HITaq			
Detection method	SYBR Green 1	Probe	Probe			
Hot start type	Antibody	Antibody	Chemical			
Amplicon size				12KB	12KB	2-3KB
Heat activation						95℃ 2.5mins
Optimal Extension temperature				50℃	50℃	60℃-65℃
Format	1 step (RNA -Ct)	1 step (RNA -Ct)	1 step (RNA -Ct)			

* Optimized with tailor-made buffer

PCR

Code	Product Name	Note
MD001	Taq DNA Polymerase	Strong performance in all kinds of PCR.
MD032	Taq II DNA Polymerase	Strong performance in all kinds of PCR.
MD002	Platnium Taq DNA Polymerase	High fidelity and hotstart specificity.
MD074	Pfu PCR Mix (10x)	Simple operation, time-efficient with high amplification efficiency
MD044	CsTaq DNA Polymerase	Strong strand-displacement activity to function above 90°C

※ MD001---Taq DNA Polymerase

Taq DNA Polymerase is supplied with good performance on fidelity, stability and specificity. It could tolerate a wide range of condition changes with an optimal buffer in different reactions, such as primers (Tm: 50°C-75°C), enzyme concentration and ionic concentration. Amplification of templates with a single copy, the high secondary structure is proved to be successful during control-experiments with products of other brands (such as Roche, Promega, Takara)products of other top brands.

※ MD032---Taq II DNA Polymerase

Taq II DNA Polymerase is an upgraded version of Taq DNA Polymerase. By reducing nucleic acid residues, the half-life and specific activity of the enzyme are significantly improved, offering better stability and stronger specificity compared with conventional Taq enzyme.

※ MD002---Platinum Taq DNA Polymerase

Upgraded on the Taq DNA Polymerase, Fapon Platinum Taq DNA polymerase is designed as hot start, so that it could lead to a better specificity and reliability in PCR. For example, with human DNA template, the effective amplified fragments could achieve 3.2KB.

※ MD074---Pfu PCR Mix (10x)

This kit consists of Pfu DNA polymerase, dNTP and buffers. In which, Pfu is mutated form wild type Pfu polymerase, compared to wild type Pfu, it can read uracil in templates, presenting stronger amplification efficiency and synthesizing endurance. The Fidelity is equivalent to wildtype Pfu, while amplification performance over long fragment and high GC rate templates are significantly improved.

※MD044-- CsTaq DNA Polymerase

CsTaq DNA polymerase is a novel thermostable polymerase with excellent amplification efficiency, sensitivity, specificity and strand-displacement activity, which can be applied flexibly in regular PCR, nested PCR, IDP-PCR and DOP-PCR. Compared to Phi29 and Bst, CsTaq DNA Polymerase remains high activity when the temperature is as high as 92°C. Therefore it can conduct isothermal strand-displacement amplification and also allow template denaturation at high temperature during the initial amplification step to improve the reaction specificity. CsTaq DNA polymerase has 5'-3' polymerase, 5'-3' strand-displacement activity and 5'-3' exonuclease activity, which can be used in Fluorescent Quantitative Detection System

Hot Start PCR, qPCR

Code	Product Name	Note
MD006	Anstart Taq DNA Polymerase	95℃ heat activation for 2mins, qPCR.
MD007	Anstart Taq II DNA Polymerase	95℃heat activation for 2.5mins, high specificity
MD026	Hotstart HiTaq DNA Polymerase	Good stability and high specificity.
MD036	AnPfu Hotstart DNA Polymerase	High fidelity and fast extension
MD010/10H	Taq Antibody	High purity, strong inhibition of enzyme activity and supply in high concentration.
MD066	Hammer-fidelity DNA Polymerase	Heat-tolerant, high amplification efficiency and strand-displacement activity

※ MD006---Anstart Taq DNA Polymerase

Anstart Taq DNA Polymerase is a mixture of Anti-Taq monoclonal antibody and Taq DNA polymerase. Before the onset of thermal cycling, Anti-Taq monoclonal antibody binds Taq Polymerase, which inhibits the activity of polymerase and avoids non-specific amplification derived from mispriming or primer dimers formation. When the amplification reaction system is heated to 95°C in 2mins, no special deactivation is caused due to the reactivation of enzyme activity, which can be used in conventional PCR reaction conditions. With the improved buffer, fast activation, it can effectively increase the amount of reaction product and improve the sensitivity and specificity of the PCR reaction. It can be applied to Hotstart PCR amplification complex template, low copy target fragment amplification, RT-PCR, and so on. Compared with the unmodified version of ordinary Taq DNA polymerase is more stable and convenient to use with wider application.

※ MD007---Anstart Taq II DNA Polymerase

An upgraded version of Anstart Taq DNA polymerase. After a 2.5mins heat shock at 95° C, Taq antibody is denatured and activity of Taq polymerase is restored. Hence, PCR amplification can be performed quickly and efficiently. This enzyme minimizes the formation of non-specific amplification and primer dimers, improves sensitivity and specificity during amplification. It can be applied to hotstart PCR, RT-PCR and multiplex PCR. Especially suit for complex templates and low copy targeted fragment amplification.

※ MD026---Hotstart HiTaq DNA Polymerase

Fapon applied novel chemical decoration on combining the Taq polymerase with special chemical groups to inhibit the enzyme activity and avoid non-specific amplification or primer dimer and increase the specificity, sensitivity and stability of DNA amplification. The HiTaq DNA Polymerase could be resumed in 10mins at 95°C, which could be used in normal PCR, multi-PCR, nest PCR and other PCR experiment. Fapon Hotstart HiTaq DNA Polymerase possesses a 3'→5' excision activity and a 5' 3' excision activity, which could be applied in real time PCR. It has no activity at room temperature which is convenient for PCR experiment at room temperature.

※ MD036---AnPfu Hotstart DNA Polymerase

Pfu DNA Polymerase is a highly thermostable DNA polymerase from a thermophilic bacterium pyrococcus furiosus with 5'→3' polymerase activity and 3'→5' exonuclease activity in synthesis of DNA, Pfu enzyme has better fidelity than the common Taq enzyme, the most suitable temperature is 72 ℃, placing at 95° C for 1 hour, acitivity level remains at 95%.

※ MD010/10H---Taq Antibody

When combining with Taq polymerase, Taq Antibody could inhibit unspecific amplification that led by unspecific anneal or primer dimer in low temperature condition. Thereby, it could restrain the polymerization during Hotstart PCR in this condition. Taq Antibody will degenerate in the original DNA degeneration step, relieve inhibition for the enzymatic activity of DNA polymerase, then the whole action achieves the 'Hotstart' result. Therefore Taq Antibody could be used in original condition of PCR reaction without specific treatment. Using Fapon Taq Antibody with several suppliers' Taq polymerase on Hotstart PCR reaction, the results showed excellent performance on 'Hotstart' effect. Fapon Taq Antibody can increase the amplification specificity, enhance and maintain the stability of the PCR detection products.

Application:

a. Simple operation: Fapon Taq Antibody can be used immediately after mixed with Taq DNA Polymerase. It could also be used in Long PCR which is based on the Taq DNA Polymerase.
b. No pollution led by mouse chromosome DNA: There is no outcome could be detected in the PCR reaction of specific mouse L1 reagent consensus sequence with primer
c. High blocking ability on DNA polymerization: The blocking rate could be more than 95% when using at Taq DNA Polymerization under 40℃ condition

※ MD 066---Hammer-fidelity DNA Polymerase

Hammer-fidelity DNA Polymerase is a thermal stable fidelity polymerase based on directional cloning and chimeric gene engineering. As a qualitative evolution of Vent DNA Polymerase, it has higher fidelity and strand-displacement activity. Its heat-tolerant is remarkable comparing to other fidelity DNA polymerase, activity level shows no decrease at 100℃ within 6 hours. Hammer-fidelity DNA Polymerase doesn't have a 3′→5′ exonuclease activity. Its fidelity is slightly lower than pfu but significantly higher than Taq. With the strand-displacement activity, the polymerase can be applied in the field of WGS in DOP-PCR or IDOP-PCR and most advantageously, the conventional multiplex PCR.

Hotstart PCR Mix

Code	Product Name	Product Name
MD008A	Anstart PCR Mix	High amplification efficiency, convenient to use.
MD008H	Hotstart HiTaq PCR Mix	
MD008G	2xSYBR Anstart PCR Mix	
MD009A	Anstart Master PCR Mix	Good pollution prevention contains UDG enzyme.
MD009H	Hotstart Master PCR Mix	

※ MD008A, MD008H---Hotstart PCR Mix (Anstart PCR Mix, Hotstart HiTaq PCR Mix)

Good performance was observed during PCR reaction when using the Hotstart polymerase and other reagents including buffer, dNTP Mix premix products. It only needs to prepare the template and primers before the reaction. So that the mix could simplify the operation steps and prevent contamination effectively in the process of PCR reaction. That is the reason for the product could be widely used in the PCR amplification, cloning PCR, RT-PCR and others. Fapon adds pigment reagent in products which are necessary for electrophoresis, the PCR reaction can be processed directly after electrophoresis. The sample's position could be observed easily during the whole treatment. Moreover, the outcome will be accompanied by an 'A' base in 3'-, which could be cloned in T-Vector directly.

※ MD008G--- 2xSYBR Anstart PCR Mix

Fapon 2xSYBR Anstart PCR Mix is specially designed for SYBR Green I Real Time PCR, it contains SYBR Green I (2xSYBR Astart reagent) at its best concentration for Real Time PCR reaction, makes it easy to prepare reaction system. Fapon Anstart Taq DNA Polymerase mix with optimum PCR buffer can effectively inhibit nonspecific PCR amplification, greatly improve amplification efficiency, lead to high sensitivity real time PCR reaction.

※ MD009A, MD009H------ Anstart/Hotstart Master PCR Mix

Core reagent contains optimized buffer, dNTPs Mix (dUTP instead of dTTP), hotstart DNA polymerase, UDG enzyme (Uracil-DNA Glycosylase) and MgCl solution. It only needs to add the right amount of primers and probes or fluorescent dyes to process fluorescent PCR detection. It should be mentioned that the addition of Hotstart DNA polymerase will promote reaction with strong specificity and high sensitivity.

It is known that UDG enzyme could act on single and double-stranded helices of DNA, however it performs no activity on RNA. Due to this character of UDG, Fapon makes a serial of modification on its PCR master mix. Before the PCR reaction, adding UDG can biodegrade the containing uraci PCR products, and template does not have any impact on the excluding uracil, optional hydrolysis PCR products containing uracil. In previous treatment (50℃, 2mins), UDG enzyme can hydrolyze PCR outcome containing uracil base and N-glycosidic bond of sugar phosphate skeleton. In this way, the uracil base is release of free. Then heating treatment hydrolyze sugar phosphate skeleton at the same time of UDG enzyme inactivation will eliminate the uracil pollution of PCR outcome.

Whole Blood PCR Kit

Code	Product Name
MD039	Whole Blood PCR Kit

※ MD039-- Whole Blood PCR Kit

WB DNA Polymerase is a high-performance, blood direct amplification PCR product, with the function resists the inhibitory effects of higher concentrations of blood (EDTA, heparin, sodium citrate), SDS, and NaCl. Even in the absence of a PCR enhancer and in certain concentrations of blood samples where other commercial enzymes fail, they still work in 40% whole blood (50ul system) PCR.

Amplification will be better in the presence of PCR enhancers. It can be directly amplified from whole blood prior to PCR without DNA purification, can be hot-started, and yields high. This new hot-start enzyme preparation from Fapon is equipped with a 5xWB buffer (with Mg^{2+}), which is a proprietary reaction buffer containing 2xenhancer components. It's not suggested to add enhancer in the first experiment. If the amplification effect is poor, then add the enhancer to debug. It should be noted that WB DNA Polymerase contains a certain amount of calibration activity, and the amplified product is blunt. It is necessary to purify the amplification product and finish A tailing before TA cloning.

Multi-PCR Enzyme Mix

Code	Product Name
MD077	Multi-PCR Enzyme Mix

※ MD077-- Multi-PCR Enzyme Mix

Multi-PCR Enzyme Mix can be used for various types of multi PCR reactions. With this, complicated optimization for Multi-PCR can be avoided.

Contended high-fidelity hot-start enzyme in this product can effectively reduce the non-specific amplification due to primer mismatch at PCR starting-up stage. With 10mins activation at 95°C, enzyme is well-matched and functioned with unique buffer for enhancing PCR specificity. So that all primer pairs in reaction system can be effectively extended. GC Enhancer is also included in this product to help achieve efficient amplification of complicated completes, for instance, those with high GC percentage.

Multi-PCR Enzyme Mix is suitable for various sample types including prokaryotic, eukaryotic, microbial genome, animal and plant genomes and human and mouse genomes, as well as different PCR methods, such as microsatellite analysis, genotyping and SNP detection etc.

Reverse Transcription PCR

Code	Product Name
MD011	M-MuLV Reverse Transcriptase
MD028	Super M-MuLV Reverse Transcriptase
MD012	Tth DNA Polymerase
MD015	RNAse Inhibitor

※ MD011-- M-MuLV Reverse Transcriptase

M-MuLV Reverse Transcriptase is an RNA-dependent DNA polymerase that mainly used for long mRNAs to cDNA synthesis. Because of a deficient RH activity, it replaces the AMV reverse transcriptase and becomes one of the preferred products during long fragments of cDNA synthesis. By genome editing, Fapon reduced the RH activity to the minimum with robust reverse transcription performance.

The enzyme is in high purity, no ribonuclease activity, no nuclease contamination and no other plasmid contamination. the efficiency of full-length molecules synthesis is greater than 95%, with a favorable price.

Advantages of M-MuLV Reverse Transcriptase:

a. Lacking RNase H activity: depletion of reduced RNase H activity is beneficial to obtain more full-length cDNA
b. Good thermal stability: the optimum reaction temperature is 50°C, and the reverse transcription can be performed up to 60°C, it effectively overcomes the secondary structure of template RNA and completes the reverse transcription experiment successfully.
c. Wide application temperature: reverse transcription can be performed in the range of 37°C-60°C, it still keep over 80% of the highest activity even in the range of 42°C-55°C. Users can select the reaction temperature according to their needs;
d. Strong amplification activity: mutations improve the binding ability of reverse transcriptase and RNA, increase the amplification rate of the enzyme, and can obtain higher-quality cDNA, meeting the requirements for the construction of a cDNA library

※ MD028---Super M-MuLV Reverse Transcriptase

Super M-MuLV improved its specificity in order for the highest yield of cDNA in all reverse transcriptase, it is also suitable for cDNA which reverses transcripted from longer mRNA. Due to low RH activity, super M-MuLV possesses better catalytic action than other AMV reverse transcriptase in long cDNA catalyzation. Furthermore, its advantage is outstanding for some special gene's RT-PCR or cDNA from total RNA or poly(A) and RNA.

Fapon introduces specific site directed mutagenesis into the super M-MuLV, which would not only extend the half-life period, but also lower RNase activity and enhance stability. Good reverse transcription ability was observed in a series of strict demonstration tests and QC experiments.

※ MD012---Tth DNA Polymerase

Tth DNA polymerase is a thermostable DNA polymerase. The enzyme has a reverse transcriptase activity in addition to a 5'→3' polymerase activity and a double strand specific 5'→3' exonuclease activity in the presence of Mn^{2+} ions. Therefore, this enzyme enables 'one-step RT-PCR' including the reverse transcription and PCR steps. Kits for one-step RT-PCR and real-time PCR using this enzyme are also available.

MD015−−− RNase Inhibitor

RNasin can specially compound with RNase based on covalent bond, which makes RNase non-active. RNasin can protect mRNA's integrity and improve efficiency of transcription and translation. At the same time, it avoids the affection which comes from using organic compounds' inhibitor. This product is electrophoresis pure, without RNase and Nickase pollution. RNasin specific activity meets the international criterion.

Rnasin inhibits eukaryotic organism's activity: RNase A/B/C, and Placenta.

Rnasin does not inhibit Rnase H/S1 Nucleic acid enzyme, SP6, T7 and T3RNA Polymerase, AMV or M-MLV Reverse transcriptase, Taq DNA Polymerase, RNase T1. It doesn't Transcription and Protein translation. Buffer system needs to have 1mMDTT exist, the wide range of active Ph.
Buffer system needs to have 1mMDTT exist, the wide range of active Ph.

a. Prevent potential RNase contamination
b. Protecting mRNA in CDNA compounded/Vitro Transcription Systems/Translation Systems
c. Improve Polysomes' activity and output; Virus vitro copy
d. Produce Non-RNase protein product, such as antibody

One-Step RT-PCR Mix

Code	Product Name
MD013	Anstart One-Step RT-PCR Mix
MD013G	SYBR Anstart One Step RT-PCR Mix
MD027	Hot start HiTaq One-Step RT-PCR Mix

※ MD013--- Anstart One-Step RT-PCR Mix

Anstart One-Step RT-PCR Mix with its outstanding rapidity and high quality could be used widely in different area. With this product, the Real Time RT-PCR reaction can be carried out in one tube constantly, whose operation is simple and able to prevent pollution effectively. The Anstart One-Step RT-PCR Mix contains MMLV Reverse Transcriptase and Hotstart Taq DNA Polymerase, which are most suitable for Real Time RT-PCR reaction. Owing to its good amplification efficiency, specificity and stability, it can greatly improve the sensitivity while eliminating the electrophoresis procedure after PCR reaction. Thus, it is very suitable for RNA virus trace detection.

The product is designed for convenient, good sensitivity one step RT-PCR reaction. Its unique enzyme and tailor-made buffer can ensure the efficiency and accuracy of reverse transcription PCR reaction. There is no need for additional optimization. Standard curve can be easily obtained in a broad quantitative area and the target genes can be quantitatively detected with great accuracy.

Application:

a. Quick and easy single-tube reaction; suitable for a variety of RNA template, without optimizing the reaction conditions
b. A unique combination of enzymes, to ensure high specificity and sensitivity of the response
c. An optimized buffer system ensures efficient reverse transcription and amplification process

※ MD013G--- SYBR Anstart One Step RT-PCR Mix

Fapon SYBR One-Step RT-PCR Mix is specially designed for SYBR Chimeric fluorescence One-Step RT-PCR reaction with its outstanding synthetic ability and amplification efficiency. Use RNA as template, reverse gene-specific primers as reverse transcription primers to synthesise cDNA, then use cDNA as template, the forward and reverse gene-specific primers for PCR reaction. Real Time RT-PCR reaction can be carried out continuously in the same reaction tube by Fapon SYBR One-Step RT-PCR Mix, it is easy to use and can effectively prevent pollution at the same time. Since Fapon products can perform real-time detection of amplification products, greatly improve sensitivity and wipe out electrophoresis steps, so it is very suitable intrace RNA detection for RNA virus.

※MD027---Hotstart HiTaq One-Step RT-PCR Mix

Fapon Hotstart HiTaq One-Step RT-PCR Mix contains unique enzyme and special buffer, which would ensure the accuracy and efficiency of reverse transcription PCR. This system could be used directly without any further optimization in the final user. With this product, real time RT-PCR could take place in the same tube, that means easier handle and less contamination. The PCR results is observed with good repeatability and standard curve in broad quantitative range. Using Super MMLV Reverse Transcriptase and Hotstart HiTaq DNA Polymerase together could enhance the amplification efficiency, sensitivity and specificity obviously, which makes the real time one step RT-PCR more stable. It is appropriate to apply in trace RNA detection for RNA virus.

Isothermal Amplification

Code	Product Name
MD030	Bst DNA Polymerase
MD031	Phi29 DNA Polymerase

※ MD030--- Bst DNA Polymerase

Fapon Bst DNA polymerase large fragment is part of the bacterium Bacillus stearothermophilus DNA polymerase, having 5'→3'DNA polymerase activity, but does not have 5'→3' exonuclease activity. Bst DNA polymerase large fragment with strong strand displacement activity, optimum temperature is 60 ℃-65℃. By recombinant DNA technology, the Bst DNA polymerase large fragment and label protein are fusion expressed in *E.coil* system, label protein resected after purification, then target Bst DNA polymerase large frag mentis collected after second purification.

※ MD031--- Phi29 DNA Polymerase

Fapon Phi29 DNA Polymerase is a highly persistent polymerase which amplification capability reach up to 70KB, has a strong strand displacement activity for efficient isothermal DNA amplification. Phi29 DNA Polymerase also has a preference for single-stranded DNA 3'→5' exonuclease proofreading function as well as special and continuous strand displacement synthesis features.

NGS Featured Materials Overview

Category	Product Name	Code
Enzyme Materials		
Polymerase	Phi29 DNA Polymerase (High Concentration)	MD031H
	Phi29 DNA Polymerase (Low Concentration)	MD031L
	T4 DNA Polymerase	MD033
	HiFi Seq DNA Polymerase	MD063
	Klenow Fragment	MD037
	Klenow (3'→ 5' exo-)	MD038L
	Bst DNA Polymerase	MD030
	Poly(A) Polymerase	FPZ-29
Others	Fast T4 DNA Ligase	MD035
	T4 Polynucleotide Kinase	MD034
	Proteinase K	MD025
	RNase H	MD056
	Terminal Deoxynucleotidyl Transferase	FPZ-42
Library Construction Preparation Module		
DNA Library Construction	End-Repair Module	MD070-E
	A-Tailing Module	MD070-A
	End-Repair & A-Tailing module	MD073-E
	Adapter Ligation Module	MD070-L
	WGS Ligase	MD065
	WGS Fragmentation Mix	FPZ-04
Library Amplification	HiFi Seq PCR Mix	MD069
Library Preparation Kit		
Library Construction	Fast DNA Library Prep Kit for Illumina (Two-step)	MD073
	DNA Library Prep Kit for Illumina (Three-step)	MD070
	RNA-seq Strand-specific Library Prep Kit	NK201
	Single-Cell RNA Sequencing Library Prep Kit	MD075
	DNA Library Prep Kit for Ion Torrent Platform	FPZ-02
Library Quantification	Library Quantification Kit for Illumina	MD072

Enzyme Materials

Polymerase

Code	Product Name
MD031H	Phi29 DNA Polymerase (High Concentration)
MD033	T4 DNA Polymerase
MD063	HiFi Seq DNA Polymerase
MD037	Klenow Fragment
MD038L	Klenow (3'→5' exo-)
FPZ-14	T7 RNA Polymerase
FPZ-26	DNA Polymerase I
FPZ-29	Poly (A) Polymerase

※ MD031H--- Phi29 DNA Polymerase (High Concentration)

Phi29 DNA polymerase is a highly processive polymerase (up to 70KB) featuring strong strand displacement activity, which allows for highly efficient isothermal DNA amplification. Phi29 DNA Polymerase also possesses a 3'→5' exonuclease(proofreading) activity acting preferentially on single-stranded DNA or RNA. Therefore 3'-modified primers are highly recommended.

※ MD033--- T4 DNA Polymerase

T4 DNA Polymerase catalyzes the extension of a primed DNA template in the 5'→3' direction. This enzyme exhibits a powerful 3'→5' exonuclease activity, while lacking any inherent 5'→3' exonuclease or strand displacement functions.

※ MD063--- HiFi Seq DNA Polymerase

High-Fidelity DNA polymerase is an engineered, ultra-thermostable polymerase designed to maximize the speed, accuracy, and length of DNA synthesis during sequencing template preparation. The result is a novel enzyme that can extend a kilobase of sequence in 15 seconds and with accuracy 50 times higher than Taq DNA Polymerase.

※ MD037--- Klenow Fragment

Klenow Fragment is a DNA-dependent Polymerase I enzyme derived from the mesophilic *E.coli.* The enzyme exhibits DNA synthesis and proofreading (3'→5') activities. A holoenzymes (5'→3') nuclease lost Klenow Fragment domain displays a moderate strand displacement activity during DNA synthesis. The protein is expressed as a product of truncated *E.coli.* PolA gene.

※ MD038L--- Klenow(3'→5' exo-)

Klenow (3'→5' exo-) is a mesophilic DNA polymerase deficient in both proofreading (3'→5') and nick-translation (5'→3') nuclease activities, and that displays a moderate strand displacement activity during DNA synthesis. The protein is expressed as a truncated product of the *E.coli.* PolA gene with the D355A and E357A mutations.

※ FPZ-14--- T7 RNA Polymerase

T7 RNA Polymerase is a DNA-dependent RNA polymerase having high specificity for the T7 promoter. After promoter initiation, it catalyzes the Mg^{2+} dependent synthesis of RNA from rNTPs.

※ FPZ-26---DNA Polymerase I

DNA Polymerase I is a mesophilic DNA polymerase that exhibits 5'→3' DNA synthesis in addition to both 3'→5' and 5'→3' exonuclease activities. The combination of DNA synthesis and 5'→3' nuclease characteristics enable nick-translation during DNA synthesis.

※ FPZ-29---Poly(A) Polymerase

Poly(A) Polymerase catalyzes the addition of AMP from ATP to the 3'-hydroxyl of RNA. The reaction requires Mg^{2+} and is template independent.

Ligase

Code	Product Name
MD035	Fast T4 DNA Ligase
FPZ-16	T3 DNA Ligase
FPZ-17	T4 DNA Ligase
FPZ-20	Taq DNA Ligase
FPZ-21	T4 RNA Ligase 1
FPZ-22	T4 RNA Ligase 2
FPZ-24	T4 Gene 32 Protein
FPZ-38	*E.coli* DNA Ligase

※ MD035--- Fast T4 DNA Ligase

T4 DNA Ligase catalyzes the formation of a phosphodiester bond between the terminal 5'-phosphate and 3'-hydroxyl groups of duplex DNA or RNA. The enzyme efficiently joins blunt and cohesive ends and repairs single-stranded nicks in duplex DNA, RNA or DNA/RNA hybrids.

※ FPZ-16---T3 DNA Ligase

T3 DNA Ligase catalyzes the formation of a phosphodiester bond between 5-phosphate and 3'-hydroxyl termini in duplex DNA. The enzyme will join blunt end and cohesive end termini as well as repair single stranded nicks in duplex DNA. In the absence of 20-30% PEG 6000, T3 DNA Ligase displays a very low efficiency for blunt-ended ligation. T3 DNA Ligase displays a higher efficiency for joining A/T overhangs than C/G matched ends. T3 DNA Ligase retains 95% of its activity in 1.0 M NaCl or KCl, with an optimal concentration of 300 mM.

※ FPZ-17---T4 DNA Ligase

T4 DNA Ligase catalyzes the formation of a phosphodiester bond between the terminal 5'-phosphate and 3'-hydroxyl groups of duplex DNA or RNA. The enzyme efficiently joins blunt and cohesive ends and repairs single-stranded nicks in duplex DNA, RNA or DNA/RNA hybrids.

※ FPZ-20---Taq DNA Ligase

Taq DNA Ligase catalyzes the formation of a phosphodiester bond in duplex DNA containing adjacent 5'-phosphoryl and 3'-hydroxyl termini, using NAD+ as a cofactor.

※ FPZ-21---T4 RNA Ligase1

T4 RNA Ligase catalyzes the ATP-dependent ligation of single-stranded nucleic acids (RNA or DNA).

※ FPZ-22---T4 RNA Ligase2

T4 RNA Ligase 2 truncated catalyzes phosphodiester bond formation between a pre-adenylated 5'-phosphate (DNA or RNA) and the 3'-hydroxyl of RNA. The truncated enzyme contains the first 249 amino acids which make the enzyme requires a pre-adenylated 5'-terminal donor and eliminates the need for ATP. Because T4 RNA ligase 2 truncated cannot use the 5'-phosphate of RNA or DNA as a donor in the ligation reaction, it is useful for certain applications such as linker ligations with pre-adenylated 5'-DNA to 3'-hydroxyl RNA. The desired specific ligation products are enhanced dramatically over unwanted background ligation products, making the truncated enzyme superior to the full-length enzyme for this use.

※ FPZ-24---T4 Gene 32 Protein

T4 Gene 32 Protein is a single-stranded DNA binding protein which is required for T4 DNA replication, recombination and repair. The protein has exhibited an ability to enhance the performance of several DNA synthesis-related activities, including DNA sequencing in secondary-structure rich regions and PCR amplification. T4 Gene 32 also greatly stimulates the rate of synthesis of T4 DNA Polymerase on primed-single-stranded substrates (5-10 folds increase in synthesis rate).

※ FPZ-38---*E. coli* DNA Ligase

E.coli DNA ligase catalyzes the phosphodiester bond formation between an adjacent 5'-phosphate and a 3'-hydroxyl of DNA ends, requiring NAD+ and Mg^{2+} as cofactors. Ligation of blunt-ended DNA is extremely inefficient relative to cohesive DNA end ligation and nick sealing.

Endonuclease

Code	Product Name
FPZ-31	Exonuclease I
FPZ-32	Exonuclease III

※ FPZ-31---Exonuclease I

Exonuclease I cleaves single-stranded DNA in the 3'→5' direction, releasing 5'-mono/di-nucleotides and leaving double-stranded DNA molecules and the 5'-terminus intact. The enzyme is processive though digestion and is inhibited by the presence of a 3'-terminal phosphate. Exonuclease I is tolerant of a wide range of buffer conditions and can typically be added to reactions containing magnesium.

※ FPZ-32---Exonuclease III

Exonuclease III is a 3'→5' exonuclease which acts by digesting one strand of a dsDNA duplex at a time or digesting the RNA strand of an RNA-DNA heteroduplex. Exonuclease III breaks phosphodiester bonds on the 5'-side of AP sites in both dsDNA and ssDNA, removes 3'-terminal groups on dsDNA, increases MutY turnover, and efficiently degrades 3'-recessed but not 3'-protruding DNA ends (creating 5'-overhangs). Exo III removes a limited number of nucleotides per binding event, resulting in coordinated progressive deletions within the population of DNA molecules.

Others

Code	Product Name
MD034	T4 Polynucleotide Kinase
MD025	Proteinase K
MD056	RNase H
FPZ-42	Terminal Deoxynucleotidyl Transferase

※ MD034---T4 Polynucleotide Kinase (T4 PNK)

T4 Polynucleotide Kinase (PNK) catalyzes the transfer and exchange of the terminal gamma position phosphate of ATP to the 5'-hydroxyl terminus of double-and single-stranded DNA, RNA and nucleoside 3'-monophosphate molecules. T4 PNK also exhibits 3'-phosphatase and 2', 3'-cyclic phosphodiesterase activities.

※ MD025---Proteinase K

Proteinase K is a broad-spectrum serine protease, coming from Tritirachium album limber. It belongs to Peptidase family S8, which enzyme activity is the highest in proteinase. The site of cleave is the peptide bond adjacent to the carboxyl group of aliphatic and aromatic amino acids with blocked alpha amino groups, which is used to digest protein in biological samples

Fapon Proteinase K is recombinant protein from Yeast. The enzyme activity theoretically was enhanced 50 times through six site directed mutagenesis. RNA and DNA were eliminated by decoloration and chromatogram. There is no other enzyme in our proteinase K. It is stable and could work perfectly from pH4 to pH12 even with SDS, urea or EDTA. Proteinase K could be applied widely in molecular diagnostic test kit, genome DNA extraction kit, RNA extraction kit to digest the nuclease in DNA/RNA extraction or protein impurity during extraction of nonprotein component from tissue.

※ MD056---RNase H

RNase H (rnh) is an endoribonuclease which degrades the RNA strand of RNA/DNA hybrid molecules. RNase H digestion produces ribonucleotide molecules with 5'-phosphate and 3'-hydroxyl termini. RNase H is nearly inactive against single or double-stranded RNA molecules.

※ FPZ-42---Terminal deoxynucleotidyl Transferase (TdT)

Terminal deoxynucleotidyl transferase (TdT) is a template-independent DNA polymerase that catalyzes the addition of deoxynucleotides to the 3'-hydroxyl terminus of single or double-stranded DNA molecules. The presence of 1 mM Co^{2+} stimulates the tailing of the 3'-ends of DNA fragments. This construct is sold as an N-terminal truncation of the terminal transferase gene attached to an N-terminal fusion tag.

Library Construction Preparation Module

DNA Library Construction

Code	Product Name
MD070-E	End-Repair Module
MD070-A	A-Tailing Module
MD073-E	End-Repair & A-Tailing Module
MD070-L	Adapter Ligation Module
MD065	WGS Ligase
FPZ-04	WGS Fragmentation Mix

※ MD070-E--- End-Repair Module

Fapon DNA End-repair module is applied to repair cohesive ends of fragmental dsDNA and form 5'-phosphorylated and 3'-OH blunt ends. dsDNA amount from 10ng to 5ug can be handled with this End-repair module.

Application Scope: Fragmental gDNA、cDNA、cfDNA、ctDNA and other PCR products after enzymatic or physical shearing.

	Items
End-Repair Module	End Repair buffer
	End Repair Enzyme Mix

※ MD070-A--- A-Tailing Module

Fapon A-tailing module is applied to the adenine adding of 3'-end of fragmental DNA during DNA library construction. dsDNA amount from 10ng to 5ug is manageable with this end-repair module.

Application Scope: DNA processed by end-repair module and blunt-end dsDNA

	Items
A-Tailing Module	5xA-Addition Buffer
	A-Tailing Enzyme

※ MD073-E--- End-Repair & A-Tailing Module

This module is applied to repair cohesive ends of fragmental dsDNA and form 5' phosphorylated and 3'-OH blunt-end. Furthermore, adding an adenine to 3' end of fragmental DNA, dsDNA amount from 10ng to 5ug is manageable with this End-repair module.

Application Scope: Fragmental gDNA、cDNA、cfDNA、ctDNA and other PCR products after enzymatic or physical shearing

	Items
End-Repair Module	End Repair & A-tailing buffer
	End Repair & A-tailing Enzyme Mix

※ MD070-L---Adapter Ligation Module

Fapon DNA fast ligation module is applied to connect complementary cohesive end or blunt-end dsDNA with adapters. dsDNA amount from 10ng to 5ug can be handled with this End-repair module.

Application Scope: 1) dsDNA processed with A-tailing module / T vector 2) dsDNA processed with end-repair & A-tailing module / T vector 3) complementary cohesive end dsDNA 4) Blunt-end dsDNA

	Items
Adapter Ligation Module	Ligation buffer
	Ligation enzyme

※ MD065--WGS Ligase

WGS Ligase is optimized for ligation following WGS Fragmentation. It catalyzes the formation of a phosphodiester bond between the terminal 5'-phosphate and a 3'-hydroxyl groups of duplex DNA or RNA. The enzyme efficiently joins blunt and cohesive ends and repairs single-stranded nicks in duplex RNA, RNA, or DNA/RNA hybrid.

※ FPZ-04---WGS Fragmentation Mix

This mix provides a single-tube solution for library construction for Illumina platforms. The protocol supports fragmentation, end-repair and dA-tailing in a single reaction step, therefore greatly simplifying the workflow, reducing the total reaction time and hands-on time.

Library Amplification

Code	Product Name
MD069	HiFi Seq PCR Mix

※ MD069-- HiFi Seq PCR Mix

HI-FI PCR is usually adopted for picking out DNA fragments with adaptors in an enrichment library, hence, it is critical to reduce bias for improving the coverage of library. Fapon NGS Library Amplification Module is specially developed for DNA library optimization on Illumina sequencing platform. DNA of high fidelity and less sequence bias can be collected after amplification. P5/P7 Primers Mix in content is mixed forward and reverse primers, which is suitable for DNA fragments with P5 or P7 sequence. Please follow the instructions offered by suppliers if you interested in using alternative primers.

Application Scope: Illumina high throughput sequencing platform

	Items
HiFi Seq PCR Mix	HiFi Seq DNA Amplification Mix
	10xPrimers Mix

Performance:

- Qualified stability and activity
- Hi-Fi and no obvious base bias
- High sensitivity, as lowest to 1ng DNA sample

Library Preparation Kit

DNA Library Construction

Code	Product Name
MD073	Fast DNA Library Prep Kit for Illumina (Two Steps)
MD070	DNA Library Prep Kit for Illumina (Three Steps)
NK201	RNA-seq Strand-specific Library Prep Kit
MD075	Single-Cell RNA Sequencing Library Prep Kit
FPZ-02	DNA Library Prep Kit for Ion Torrent Platform

※ MD073-- Fast DNA Library Prep Kit for Illumina (Two Steps)

The Fapon DNA Sample Prep Kit is utilized for the construction of genomic DNA library. All optimized enzymes and buffers are provided with efficient and stable reagents, which can convert 10 ng to 5 ug of fragmented dsDNA into DNA libraries.

Application Scope:
Suitable for the preparation of DNA libraries for Illumina sequencing. Applicable for a variety of sample types and species sources, including a variety of microbial genome, animal and plant genomes, human and mouse genomes.

Compatible with the following types of samples:

- Genomic DNA
- REPLI-g amplified DNA
- Reverse transcription of double-stranded cDNA.
- PCR Amplicons
- Cell-Free DNA（cfDNA，ctDNA）
- DNA extracted from FFPE samples
- ChIP Seq

	Items	20 Reactions
End Repair & A-tailing	HiFi Seq DNA Amplification Mix	250 ul
	10xPrimers Mix	120 ul
Adapter Ligation	Ligation Buffer	750 ul
	Ligation Enzyme	650 ul

Performance:

- Shorten preparation time of DNA library to 3 hours
- Less input of DNA templates is required
- Product quality compatible with Kapa DNA library prep kit after a comparative test on conventional genome library construction

※ MD070---DNA Library Prep Kit for Illumina (Three Steps)

The Fapon DNA Sample Prep Kit is utilized for the construction of genomic DNA library. All optimized enzymes and buffers are provided with efficient and stable reagents, which can convert 10 ng to 5 ug of fragmented dsDNA into DNA libraries.

Application Scope: Suitable for the preparation of DNA libraries for Illumina sequencing. Applicable for a variety of sample types and species sources, including a variety of microbial genome, animal and plant genomes, human and mouse genomes.

Compatible with the following types of samples:

- Genomic DNA
- REPLI-g amplified DNA
- Reverse transcription of double-stranded cDNA.
- PCR Amplicons
- Cell Free DNA（cfDNA，ctDNA）
- DNA extracted from FFPE samples
- ChIP Seq

	Items	20 Reactions
End Repair	End Repair Buffer	250 ul
	End Repair Enzyme Mix	100 ul
A Tailing	5xA-Tailing Buffer	250 ul
	A-Tailing Enzyme Mix	120 ul
Adapter ligation	2xLigation Buffer	600 ul
	Ligation Enzyme	70 ul

Fapon three-step DNA library prep kit adopted the classical protocol of library construction. Purification at the end of each step to improve DNA purity, ensuring the efficiency of Library conversion to the maximum degree. Quality of Fapon's kit equals to Kapa DNA library prep kit after a comparative test on conventional genome library construction.

※ NK201 -- RNA-seq Strand-specific Library Prep Kit

Fapon RNA Library Prep Kit is applied to transcriptome library preparation on Illumina high-throughput sequencing platform. All optimized enzyme and buffer are stored in a form of reagent. Only 0.1-4ug total RNA is required to construct RNA library.

Application Scope: 0.1-4ug human/animal/plant/microorganisim total RNA with good integrity. rRNA which is often not of interest in total RNA, can be removed using oligo dT beads, or can be depleted using rRNA specific probes

	Items
Fragmentation & Random Primers	Fragmentation Buffer
	Random Primers
First Strand Synthesis	First Strand Synthesis Reaction Buffer
	First Strand Synthesis Enzyme Mix
Second Strand Synthesis	Second Strand Synthesis Reaction Buffer with dUTP Mix
	Second Strand Synthesis Enzyme Mix
End Repair and A-tailing	End Repair & A-Tailing buffer
	End Repair & A-Tailing Enzyme Mix
Adaptor Ligation	Ligation Buffer
	Ligation Enzyme

※ MD075--Single-Cell RNA Sequencing Library Prep Kit

Single-Cell RNA sequencing library Prep Kit can extract 10pg-10ng high-quality whole cDNA from single to 10 cells. The amplified products can be applied to Life and Illumina platform for library preparation.

	Items	20 Reactions
Cell Lysis	Cell Lysis buffer	15ul
	RT-Primer	15ul
First Strand Synthesis	RT Buffer	50ul
	RTase	20ul
Second Strand Synthesis & PCR Amplification	Cut Buffer	5ul
	Cutter	15ul
	Tag Buffer	15ul
	Tagger	7.5ul
	PCR Buffer	1.25ml
	Tag-Primer	10ul
	DNA Polymerase	50ul
	PCR-Primer	25ul

※ FPZ-02---DNA Library Prep Kit for Ion Torrent Platform

Preparation of library DNA is an important process for successful amplification on Ion Torrent™ platforms and subsequently generates valuable sequencing data. This kit provides room temperature stable reagents to convert double-stranded fragmented DNA into libraries. The DNA Sample Prep Kit is primarily designed for constructing genomic DNA libraries. All enzymes and buffers required are provided as room temperature stable mixes that can convert 10ng to 1μg of fragmented dsDNA into library DNA.

Library Quantification

Code	Product Name
MD072	Library Quantification Kit for Illumina

※ MD072--- Library Quantification Kit for Illumina

Library Quantification Kit for Illumina contains all necessary reagents quantifying stream cell with P5&P7 oligonucleotide sequence.

Application Scope: Genome source - prokaryotic & eukaryotic, microorganism genome/ animal and plant genome/ mouse genome; Sample types - Genomic DNA, REPLI-g amplified DNARNA transcript double strands cDNA Amplicons

	Items
Standard	Standard material 1-6 (10-fold dilute)
	Dilution Buffer
Reaction System	SYBR GREEN PCR mix
	Enzyme Mix

Low variation between batches, suitable for automatic liquid handling system and quantification of high-throughpu0t samples.

Others

Code	Product Name
MD014	Uracil-DNA Glycosylase (UDG)
MD029	Heat-labile Uracil-DNA Glycosylase
MD016	25mM dNTP Mix (100mM dAtp:dCTP:dGTP:dTTP=1:1:1:1)
MD016M	25mM dN(U)TP Mix (100mMdATP:dCTP:dGTP:dUTP=1:1:1:1)
MD016L	20/40mM dN(U)TP Mix (100mM dATP:dCTP:dGTP:dUTP=1:1:1:2)
MD017	100mM dATP
MD018	100mM dCTP
MD019	100mM dGTP
MD020	100mM dTTP
MD021	100mM dUTP
MD022	SA-HRP/SA-POD
MD050	SUMO Protease

※ MD014---Uracil-DNA Glycosylase (UDG)

In order to guarantee the accuracy of the PCR results, it is necessary to prevent nonspecific PCR amplification and pollution. UDG enzyme can catalyze the hydrolysis of uracil glycosidic-containing single-stranded DNA or dU-containing double-stranded uracil and the sugar-phosphate backbone of the DNA chain of the N-glycosidic bond and release of free uracil. The most appropriate temperature for UDG is 50℃, 95℃ inactive. The PCR reaction, the most common is the pollutants in PCR products, pollution prevention heat treatment PCR kit replace dTTP to dUTP, so PCR products contain dU of DNA chain. Increase 50℃ heat preservation steps before the PCR reaction, UDG enzyme in the reaction system can be an existing U-DNA base uracil degradation of pollutants, and under the condition of step then modified the DNA chain rupture, eliminate the pollution of DNA amplification, so to ensure that the results of the specificity and accuracy of amplification. UDG enzymes are inactivated at the same time, will not degrade the product of the new expansion U-DNA.

Application:

a. PCR cross-contamination control
b. Site-specific mutagenesis
c. PCR products clone

※ MD029--- Heat-labile Uracil-DNA Glycosylase

Thermolabile Uracil-DNA Glycosylase removes uracil from DNA by hydrolyzing the N-glycosylic bond between the deoxyribose and the base leaving an AP (apurinic or apyrimidinic) site. This enzyme (1-10 units) is completely inactivated by a 10 minutes incubation at temperatures greater than 50°C in the 1x reaction buffer as measured in the unit characterization assay.

dNTP Mix, dN(U)TP Mix, dATP, dCTP, dGTP, dTTP, dUTP

High purity of dNTPs is the key to success PCR reaction since any contamination would affect the sensitivity and yield of PCR reaction. Fapon dNTPs is the highest cost performance-price ratio in similar products. We monitor all production processes and analysis of the product physically and functionally to make sure the purity and stability of our products.

※ MD016---25mM dNTP Mix

(100mM Datp:dCTP:dGTP:dTTP=1:1:1:1)

※ MD016M---25mM dN(U)TP

(100mM dATP:dCTP:dGTP:dUTP=1:1:1:1)

※ MD016L---20/40mM dN(U)TP Mix

(100mM dATP:dCTP:dGTP:dUTP=1:1:1:2)

Composed of dATP, dCTP, dGTP and dTTP, the concentration of dNTP is 25mM:

a. To be applied as subtrate of DNA polymerase

b. To be applied directly in normal PCR and RT-PCR directly, which reduce the contamination probability. The usage is 0.4μl in 50μl reaction system with final concentration 200μM

c. To be applied directly without any dilution in PCR

※ MD017-MD020---100mM dNTP (A, T, C, G)

※ MD021---100mM dUTP

The concentration of dATP .dCTP .dGTP .dTTP .dUTP is 100mM.

They are suitable for PCR, real-time PCR, RT-PCR, synthesis of cDNA or normal DNA, primer extend reaction, DNA sequencing, DNA label and other normal molecular biology reaction.

※ MD022---SA-HRP/SA-POD

SA-HRP (HRP-labeled Streptavidin) could be applied in the detection of biotin-labelled antibody, nucleic acid, protein and other molecular. Our SA-HRP is generated by high purity Streptavidin and super purity HRP, which ensure the lowest background and highest sensitivity.

HRP could be applied in generating chemiluminescence in Western, EMSA, Southern or Northern when catalyzing ECL reagents such as ECL, Beyo ECL and etc... It is visible as blue when catalyzing TMB in EIA and causes brown precipitation in immunohistochemistry, immunocytochemistry or Western blot.

※ MD050-SUMO Protease

SUMO Protease recognizes the tertiary structure of SUMO rather than an amino acid sequence and therefore it can be used to remove the fusion tags from recombinant proteins. Although the optimal temperature for cleavage is 30°C, it remains active over a wide range of temperature (4-30°C) and pH (pH 7.0-9.0). The SUMO Protease can be removed easily from the cleavage reaction by affinity chromatography using the polyhistidine tag.

FAPON

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