BEST QUALITY

HIGHEST PURITY

Recombinant

ENZYMES & PROTEINS

blirt

We offer a wide range of highest quality enzymes and proteins for molecular biology including DNA polymerases, reverse transcriptases, DNA ligases, proteases, unique heat-labile nucleases and RNase inhibitors.

1. Proteinase K

Features:

–> Recombinant broad-spectrum non-specific protease derived from *Tritirachium album* and over-expressed in *Pichia pastoris*.
–> High activity and exceptional purity (Molecular Biology Grade and NGS Grade).
–> Active at high temperatures (up to 56°C) and denaturing conditions (e.g. in the presence of urea and/or SDS), what makes it ideal for digesting proteins in variety of applications.
–> Stable over a wide pH range: 4.0-12.5 (optimum pH 7.5-8.0).
–> Decreased amount of host DNA (≤ 10 pg/mg / MBG or ≤ 0.1 pg/mg NGS).
–> Available as powder, lyophilized "cake" or liquid.

Applications:

–> Extraction of DNA and RNA from different starting materials.
–> Purification of target material from contaminating proteins.
–> Removal of DNases and RNases during nucleic acids isolation.

2. Reverse Transcriptase

Features:

–> Modified M-MuLV Reverse Transcriptase over-expressed in *E. coli*.
–> Increased thermal stability (optimum activity at 50°C).
–> Higher efficiency and specificity of those transcribed RNA regions which are rich in GC pairs and/or contain secondary structures.
–> Increased sensitivity in RT-qPCR and RT-PCR assays.
–> Reduced RNase H activity, which improves the synthesis of a full-length cDNA, even from long mRNA templates, using random priming.
–> Starting material: 10 pg – 5 µg of total RNA or 10 pg – 500 ng of mRNA.
–> Gives high yields of first strand cDNA up to 10 kb long.
–> Equivalent of SuperScript® III (Invitrogen).

Applications:

–> Full-length cDNA template synthesis for RT-qPCR and two-step RT-PCR assays.
–> DNA synthesis for molecular cloning.
–> DNA library construction.
–> RNA analysis.

3. RNase Inhibitors

Features:

–> Human and murine versions of recombinant ribonuclease inhibitors over-expressed in *E. coli.*
–> Active at high temperatures (up to 58°C) and DTT concentration ranges.
–> Active in diverse reaction conditions and in various buffers.
–> Active over a broad pH range (pH 5.5 – 9.0).
–> Improved resistance to oxidation.
–> Free of DNase, RNase and endonuclease activities.
–> Prolonged stability at higher temperatures.

Applications:

–> RNA isolation and purification.
–> cDNA synthesis, RT-PCR, RT-qPCR.
–> *in vitro* transcription and translation.
–> RNase-free monoclonal antibody preparation.

4. RNase H

Features:

–> Recombinant endoribonuclease over-expressed in *E. coli.*
–> Hydrolyses specifically the phosphodiester bonds of RNA hybridized to DNA.
–> Does not degrade single and double-stranded DNA or unhybridized RNA.
–> Treating cDNA with RNase H prior to PCR can improve sensitivity as RNA bonded to the cDNA template may prevent binding of the amplification primers in a PCR reaction.

Applications:

–> Removal of RNA after first strand cDNA synthesis (RT-PCR and qRT-PCR).
–> Removal of mRNA prior to synthesis of second strand cDNA.
–> Removal of the poly(A) sequences of mRNA after hybridization with oligo(dT).
–> Site-specific cleavage of RNA.
–> Studies of *in vitro* polyadenylation reaction products.

5. T4 DNA Ligase & Quick Ligase

Features:

–> ATP-dependent recombinant DNA ligases over-expressed in *E. coli*.
–> Available also in special formulation for very fast and efficient ligation of DNA fragments with compatible cohesive or blunt ends in 5 and 15 minutes respectively.

Applications:

–> Molecular cloning of PCR products or restriction fragments.
–> Joining double-stranded oligonucleotide linkers or adaptors to DNA.
–> Site-directed mutagenesis.
–> Nick repair in duplex DNA, RNA or DNA/RNA hybrids.
–> Self-circularization of linear DNA.
–> LM PCR methods (Ligation Mediated PCR).

6. Tth Ligase

Features:

–> NAD-dependent recombinant DNA ligase derived from *Thermus thermophilus* and over-expressed in *E. coli.*
–> High thermal stability allows ligation using high-stringency hybridization conditions.
–> High specificity and stringency permits sensitive detection of SNPs.
–> The ligation will occur only if oligonucleotides are perfectly paired to the complementary target DNA and have no gaps between them. Therefore, a single-base substitution can be detected.
–> Equivalent of Ampligase® (Epicentre).

Applications:

–> Ligase Chain Reaction (LCR).
–> Ligation-Rolling Circle Amplification (L-RCA).
–> Repeat Expansion Detection (RED).
–> Simultaneous mutagenesis of multiple sites.
–> Other ligation-based detection methods.

7. Phi29 Polymerase

Features:

–> Recombinant polymerase derived from the *B. subtilis* phage phi29 and over-expressed in E. coli.
–> Free of detectable host DNA.
–> Extremely processive polymerase (up to 70 kb) with very strong strand displacement activity, which allows for highly efficient isothermal DNA amplification.
–> Extremely high yields of amplified DNA can be obtained even from minute amounts of template.
–> High-Fidelity polymerase – possesses a 3'-5' exonuclease (proofreading) activity acting preferentially on ssDNA or RNA.

Applications:

–> Rolling Circle Amplification (RCA).
–> In situ genotyping with padlock probes.
–> Amplification of DNA for SNP and STR detection.
–> Unbiased amplification of whole genome.
–> DNA template preparation for sequencing.
–> RNA-primed DNA amplification.
–> Multiple displacement amplification (MDA).
–> Cell-free amplification of DNA from single cells.

8. Taq DNA Polymerases

Features:

–> Recombinant thermostable DNA polymerases derived from *Thermus aquaticus* and over-expressed in *E. coli.*
–> Extreme yields with minimal amounts of enzyme and little optimization.
–> Increased sensitivity.
–> Suitable for a wide range of applications.
–> The half-life of the enzyme is 45 minutes at 95°C.
–> Amplifies fragments of up to 5 kb.
–> Leaves ´A´ overhangs.

Applications:

–> Routine PCR.
–> Diagnostic PCR.
–> Multiplex PCR.
–> TA cloning.

9. Pwo DNA Polymerase

Features:

–> Modified recombinant hyperthermostable and proofreading DNA polymerase derived from *Pyrococcus woesei* and over-expressed in *E. coli.*
–> High yields with minimal amounts of enzyme and little optimization.
–> The half-life of the enzyme is 8 hours at 95°C.
–> Can generate long amplicons (up to 12 kb).
–> Leaves blunt-ended 3' endings.

Applications:

–> Ideal for difficult templates which fail with standard *Taq* polymerases.
–> Reproducible amplification of long templates.
–> Cloning, site-directed mutagenesis and other methods, which require high fidelity.
–> Amplification of regions abundant in GC.

10. Uracil DNA Glycosylase (UDG)

Features:

–> Modified recombinant *E. coli* enzyme over-expressed in *E. coli.*
–> Sensitive mutant is irreversibly inactive after heating.
–> Catalyses the release of uracil from uracil-containing single-stranded or double-stranded DNA, but not from RNA or oligonucleotides.
–> Active over a broad pH range (optimum at pH 8.0).

Applications:

–> Widely used to eliminate carry-over contamination in PCR.
–> As a probe for protein-DNA interaction studies.
–> Glycosylase mediated single nucleotide polymorphism detection (GMPD).
–> Molecular cloning of PCR products.

11. dsDNase & Non-specific Endonuclease

Activity of the enzyme depends on buffer conditions - easily switched from dsDNase activity for non-specific nuclease activity.

Features:

–> Degrades both DNA and RNA where activity depends on buffer conditions.
–> Active over a broad pH range (optimum at pH 6.5-9.5).
–> Active over a broad temperature range (optimum at 10-80°C).
–> Active at high salt concentrations (0-1000 mM) and in presence of: imidasole (0-500 mM), glycerol (0-35%), DTT (0-100 mM), $(NH_4)_2SO_4$ (0-500 mM), Triton X-100 (0-2%), DMSO (0-10%).

Applications:

–> Removal of contaminating nucleic acids from purified protein.
–> Removal of DNA and RNA from molecular biology reagents.
–> Decontamination of PCR mastermixes.
–> Removal of genomic DNA from RNA preparations.
–> Reduction of viscosity in biological samples.

12. Heat-labile non-specific nuclease / soon available

Features:

–> Highly active non-specific recombinant endonuclease originated from a psychrophilic bacteria and over-expressed in *E. coli.*
–> Allows for complete digestion of all forms of RNA and DNA (single-stranded, double-stranded, linear or circularized) at low temperatures.
–> Has no proteolytic activity.

Applications:

–> Elimination of host cell DNA and RNA during the production of enzymes, biopharmaceuticals and vaccines.
–> Digestion of nucleic acids in samples containing proteins or other heat-unstable substances.
–> Viscosity reduction when extracting proteins from bacterial cells.

13. Heat-labile dsDNase / soon available

Features:

–> Unique specific recombinant deoxyribonuclease derived from a psychrophilic bacteria and over-expressed in *Pichia pastoris.*

–> Highly specific activity towards double-stranded DNA (dsDNA) ensures that RNA and ssDNA such as cDNA and primers are not cleaved.

–> Has an optimum activity at 32-47 °C and can be easily irreversibly inactivated by heat treatment at 50-55 °C.

Applications:

–> Rapid and safe removal of contaminating genomic DNA from RNA samples prior cDNA synthesis, RT-PCR and RT-qPCR.

–> Genomic DNA elimination prior reverse transcription in one-tube procedure.

–> Elimination of contaminating DNA in PCR master mixes (primers and probes are not cleaved).

14. Customized solutions / upon request

–> NA-free enzymes (eg. DNA polymerases, DNA ligases) – recombinant enzymes purified with the use of heat-labile non-specific nuclease that cleaves all types of DNA and RNA

–> Recombinant protein and enzyme production and purification in IP-free *Escherichia coli* or *Pichia pastoris* expression systems.

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