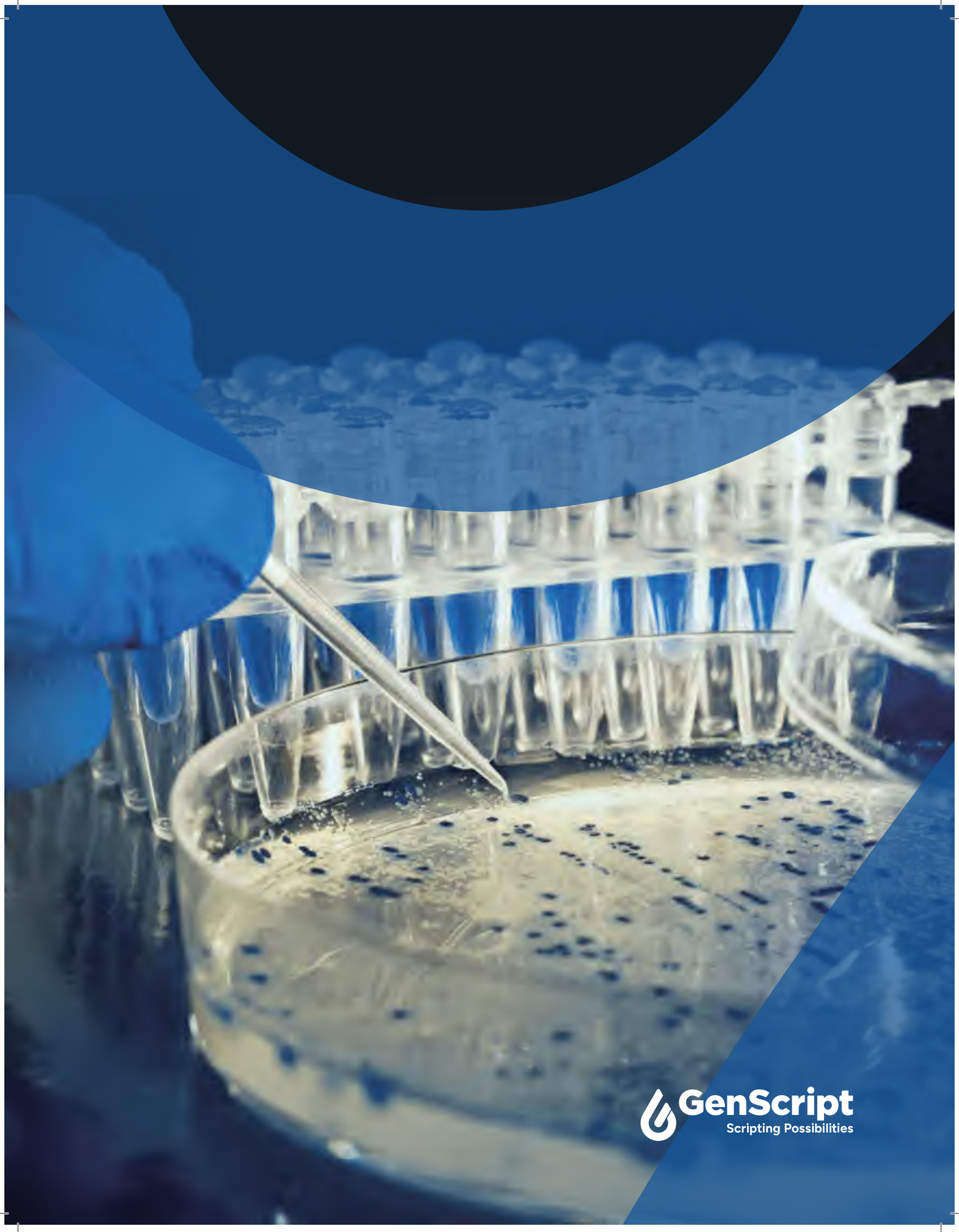

GenScript
Scripting Possibilities

GenScript's

MOLECULAR BIOLOGY PRODUCTS

PCR Reagents

Standard

High-Stability

Hot-Start

M-MuLV Reverse Transcriptase

Page 1-2

Seamless Cloning Kits

Seamless cloning of up to 6 fragments

Seamless cloning of up to 12 fragments

Page 3-4

Cloning Vectors

Protein expression

Mammalian gene expression

Protein expression with 6xHis and GST tags

Standard cloning and sub-cloning

Page 5

PCR Reagents

GenScript's high-quality PCR reagents provide laboratories with robust amplification with enhanced specificity, while reducing formation of non-specific products and primer-dimers. The reagents, including Hot-Start DNA polymerase, temperature-stable Green Taq DNA polymerase, M-MuLV reverse transcriptase, and dNTPs, are each extensively tested and optimized to provide the best PCR reaction results.

Product	Description
Taq DNA Polymerase	Ideal for standard PCR, the Taq DNA polymerase is the standard enzyme used for DNA amplification by PCR.
Taq Master Mix	The ready-to-use Taq Master Mix is a 2x concentrated solution containing the Taq polymerase, buffer, $MgCl_2$ and dNTPs.
Hot-Start Taq DNA Polymerase	The Hot-Start DNA Polymerase enzyme is ideal for high throughput or colony PCR. The polymerase is complexed with the Hot-Start Taq Antibody, which blocks the polymerase activity prior to the initial DNA denaturation step of PCR. The enzyme is ideal for increasing sensitivity and specificity of PCR.
Hot-Start Taq Antibody	The Hot-Start mouse monoclonal antibody specifically binds to Taq DNA polymerase to render the enzyme inactive. It provides an antibody-mediated hot start that enhances the specificity and sensitivity of PCR.
dNTP, dATP, dGTP, dCTP, dTTP	Available as convenient, ready-to-use solutions, as individual nucleotides (dATPs, dTTPs, dCTPs and dGTPs) or a mixture of all four (dNTPs).

Robust amplification

Taq DNA Polymerase

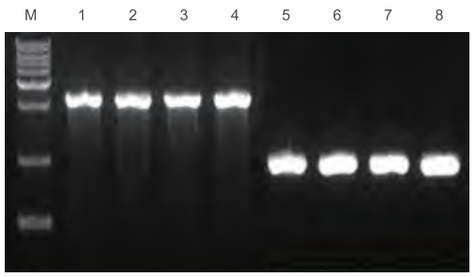


Figure 1. Robust amplification using Taq DNA Polymerase.
Lanes 1-4: 2 kb long amplified fragments from vector pUC57.
Lanes 5-8: 1 kb long amplified fragments from vector pUC57.
Lane M: DNA Ladder.

Higher specificity

Hot-Start Taq DNA Polymerase

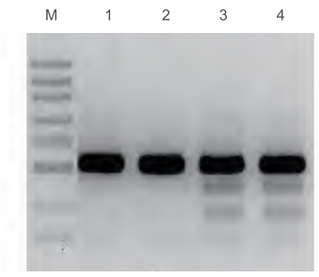


Figure 2. Enhanced amplification specificity using Hot-Start Taq DNA Polymerase.
Lanes 1, 2: 500 bp long HPRT fragment amplified from human gDNA using Hot-Start Taq DNA Polymerase. Non-specific amplification is not observed.
Lanes 3, 4: The same 500 bp long HPRT fragment amplified from human gDNA using Taq DNA Polymerase. Some non-specific amplification is observed.
Lane M: DNA Ladder.

PCR Reagents

Product	Description
Green Taq DNA Polymerase	Temperature-stable polymerase ideal for storage and transport at room temperature, or higher. Ideal for amplification of large DNA fragments.
High-Stability PCR Kit	The high stability PCR kit consists of Green Taq DNA polymerase, 10x buffer and stabilized dNTP mix.
M-MuLV Reverse Transcriptase	The M-MuLV Reverse Transcriptase (M-MLV) synthesizes a complementary cDNA strand using RNA as a template (cDNA synthesis).

GenScript PCR Products Benefit Guide

Starting Material	Applications/ Benefits	Taq DNA Polymerase	Hot-Start Taq DNA Polymerase	Green Taq DNA Polymerase	High-Stability PCR Kit	M-MuLV Reverse Transcriptase	dATP	dGTP	dCTP	dGTP
DNA	Standard PCR	✓					✓	✓	✓	✓
	Hot-Start PCR		✓				✓	✓	✓	✓
	Long-fragment PCR (<10 kb)			✓			✓	✓	✓	✓
	Temperature stable taq			✓	✓		✓	✓	✓	✓
	Room temperature reaction setup		✓	✓	✓		✓	✓	✓	✓
	Reduced non-specific amplification		✓				✓	✓	✓	✓
	Reduced primer-dimer formation		✓				✓	✓	✓	✓
RNA	Reverse transcription (cDNA synthesis)					✓	✓	✓	✓	✓

Higher yields for long DNA fragments

Green Taq DNA Polymerase

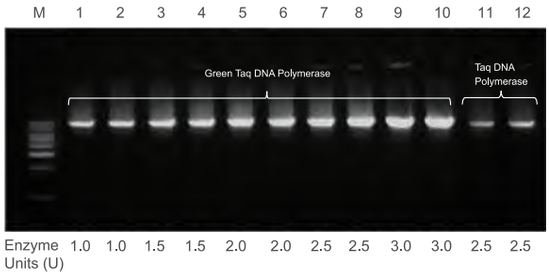


Figure 3. Robust amplification of 8 kb fragment using Green Taq DNA Polymerase.
Lanes 1-10: One 8 kb-long fragment was amplified from λDNA using Green Taq DNA Polymerase, with varying concentrations.
Lanes 11,12: The same 8 kb-long fragment was amplified from λDNA using Taq DNA Polymerase.
Lane M: DNA Ladder.

Stability at high temperatures

Green Taq DNA Polymerase

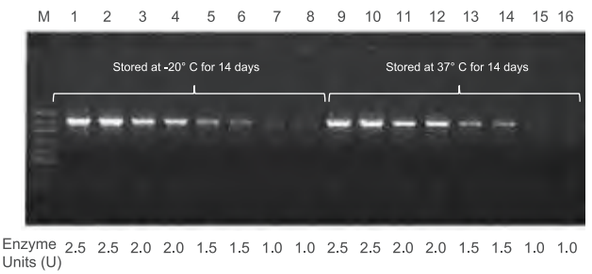


Figure 4. Stability of Green Taq Polymerase at 37°C.
Lanes 1-8: A 2 kb 23S rRNA fragment from *E.coli* gDNA was amplified using Green Taq DNA Polymerase stored at -20°C for 14 days.
Lanes 9-16: The same 2 kb 23S rRNA fragment from *E.coli* gDNA was amplified using Green Taq DNA Polymerase stored at 37°C for 14 days. Storage at higher temperature had little effect on enzyme activity.
Lane M: DNA Ladder.

GenBuilder™ Cloning Kits

GenScript's GenBuilder™ and GenBuilder™ Plus cloning kits offer seamless, one-step cloning of single or multiple DNA fragments (inserts) into linearized vectors. By recognizing 15 bp overlaps at the end of each fragment, the GenBuilder™ technology allows for cloning of 1-12 DNA fragments into any linearized vector of choice. The DNA assembly does not require pre-existing recombination sites or helper sequences, while eliminating the need for a complicated restriction and ligation process. The high efficiency of the cloning kit allows successful DNA assembly with a variety of inserts, including unpurified PCR fragments. Applications include routine cloning and sub-cloning, multi-gene cloning, assembly of single stranded DNA (ssDNA), high throughput cloning, gene mutation, and plasmid library construction.

Key Benefits:

- Highest cloning efficiency in the industry with over 90% of recovered colonies being PCR positive.
- Single-step reaction setup.
- Robust performance omitting the need to perform PCR fragment purification.
- Quick optimized incubation time with the assembly reaction being complete in fifteen minutes.
- Suitable for long fragments (>8 kb).

GenScript Cloning Kit Selection Guide

Features	GenBuilder™ Cloning Kit	GenBuilder™ Plus Cloning Kit
Number of fragments that can be cloned into a linearized vector	6 DNA fragments	12 DNA fragments
Cloning efficiency (insert was cloned into the vector) %	>90%	>90%
Plasmid library construction	Suitable	Recommended
Minimum time taken for cloning the maximum number of inserts in a vector	15 min	15 min
Cloning efficiency of unpurified PCR product	***	*****
Assembly with ss oligos (single stranded oligos)	No	Yes
Can be used for high throughput cloning	Yes	Yes
Seamless one-step cloning	Yes	Yes
Positive control	Linearized pUC57 with two fragments to reconstitute RFP for visual determination of cloning efficiency	

GenBuilder™ Perfomance

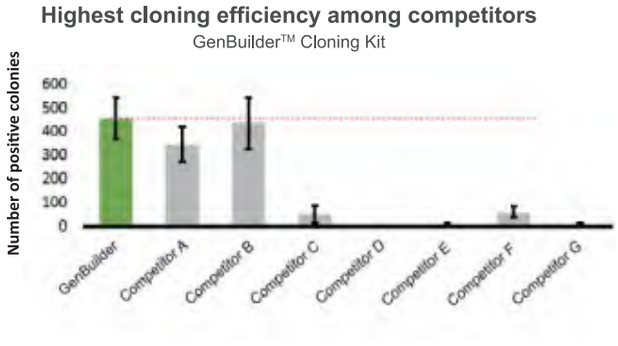


Figure 5. Cloning of five PCR fragments into a vector using various DNA Assembly methods. Five PCR fragments from 0.7 kb to 1.6 kb in length were assembled into pUC57 in a single-step assembly reaction. The number of colonies recovered from 1/10 of the cloning reaction were counted for each reaction. Error bars represent standard deviations of at least three independent experiments. GenBuilder™ Cloning Kits had the best cloning efficiency among all competing kits.

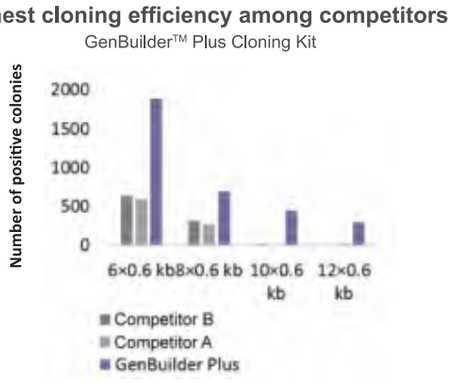


Figure 6. Comparing assembly efficiency of GenBuilder™ Plus and competitor cloning kits with increasing numbers of DNA fragments. DNA assembly efficiency, and therefore the number of colonies recovered reduces as the number of DNA fragments used simultaneously increases. In this experiment six, eight, ten, or twelve PCR fragments were assembled into a linearized pUC57 vector in a single-step assembly reaction. The number of colonies recovered from 1/10th of the cloning reaction were counted for each reaction. GenBuilder™ Plus Cloning Kit had the best assembly performance.

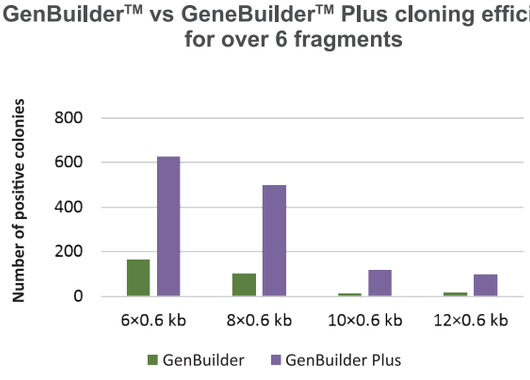


Figure 7. Varying number of DNA fragment assemblies using GenBuilder™ and GenBuilder™ Plus kits. To compare the assembly efficiencies of the GenBuilder™ and GenBuilder™ Plus kits, a number of PCR fragments (six, eight, ten, or twelve) were assembled into a linearized pUC57 vector in a single-step assembly reaction. The number of colonies recovered from 1/10th of the cloning reaction were counted for each reaction. The GenBuilder™ Plus cloning kit is more effective than the GenBuilder™ cloning kit, especially when more than six fragments are simultaneously assembled into a vector.

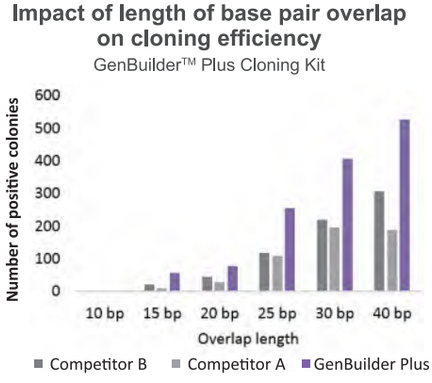
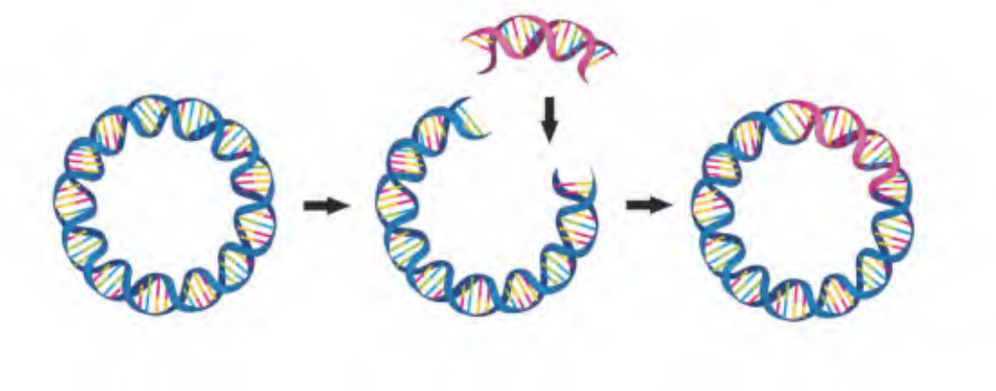


Figure 8. Impact of the overlapping base pair length with cloning of 5 DNA inserts into one vector. Various PCR fragments with overlapping lengths of 10 bp, 15 bp, 25 bp, 30 bp, and 40 bp were assembled into pUC57 in a single-step assembly reaction. The number of colonies recovered from 1/10th of the cloning reaction were counted per reaction. A minimum of 15 bp overlap was required for cloning. The cloning efficiency increased with increasing length of DNA overlap.

PCR Cloning Vectors

GenScript offers unique expression vectors with enhanced promoters for efficient expression, selection, and analysis of recombinant proteins.

Product	Description
pGS-21a	High level expression vector for convenient expression of 6xHis and GST tags at the N-terminus, which can be cleaved by enterokinase.
pGen2.1	Mammalian expression vector with a human cytomegalovirus (CMV) promoter. CMV promoter is designed for high levels of transient protein expression.
pDream2.1/MCS	An excellent expression vector with seven restriction enzyme sites in MCS. The gene cloned into MCS can be expressed in any one of the three major protein expression systems: bacteria, insect cells and mammalian cells.
pUC18 plasmid DNA	A commonly used cloning vector in *E. coli,* with 2,686 bp.
pUC57 plasmid DNA	A commonly used cloning vector in *E. coli*, with 2,710 bp.



Molecular Biology Product Offerings

Category	Cat. NO.	Product Description
Hot-Start DNA Polymerase	E00049-250	Hot-Start Taq DNA Polymerase - 250 U
	E00049-1000	Hot-Start Taq DNA Polymerase - 1000 U
Taq DNA Polymerase	E00007-50000	Taq DNA Polymerase - 50000 U (1000.0U/vial)
	E00007-1000	Taq DNA Polymerase - 1000 U (1000.0U/vial)
	E00043	Green Taq DNA Polymerase - 1000 U (1000.0U/vial)
	E00008	Taq DNA Polymerase without Mg2+ - 1000 U (1000.0U/vial)
	E00012	Taq DNA Polymerase, concentrated - 2500 U (2500.0U/vial)
	E00101	Taq DNA Polymerase (1000 U) with 10 mM dNTP Mix (0.5 mL) - 1 PK
High-Stability PCR Kit	L00342	High-Stability PCR Kit - 1 kit
Taq MM	E00019	2X Taq Master Mix - 100 Reactions (2.5 mL)
Reverse Transcriptase	E00050-40000	M-MuLV Reverse Transcriptase - 40000 U
	E00050-10000	M-MuLV Reverse Transcriptase - 10000 U
Tag Antibody	A01849-250	Hot-Start Taq Antibody - 250 U (5U/μl)
	A01849-1000	Hot-Start Taq Antibody - 1000 U (5U/μl)
GenBuilder™ Cloning Kit	L00701-50	GenBuilder™ Cloning Kit - 50 Reactions
	L00701-10	GenBuilder™ Cloning Kit - 10 Reactions
GenBuilder™ Plus Cloning Kit	L00744-50	GenBuilder™ Plus Cloning Kit - 50 Reactions
	L00744-10	GenBuilder™ Plus Cloning Kit - 10 Reactions
Protein expression vector with 6xHis and GST tags	SD0121	pGS-21a - 10 ug/vial
Mammalian gene expression	SD0122	pGen2.1 - 10 ug/vial
Standard protein expression vector	SD0222	pDream2.1/MCS - 10 ug/vial
Standard cloning and sub-cloning	SD1162	pUC18 plasmid DNA - 50 ug/vial
	SD1176	pUC57 plasmid DNA - 50 ug/vial

Molecular Biology Product Offerings

Category	Cat. NO.	Product Description
dNTP Mix	D0056	dNTP mixture, 10 mM each - 0.5 mL
	C01689	Stabilized dNTP Mix, 10 mM each - 0.5 mL
dNTP	C01582-50	dNTP (10 mM each) ≥99% HPLC - 50 mL (50 mL/bottle)
	C01582-250	dNTP (10 mM each) ≥99% HPLC - 250 mL (250.0 mL/bottle)
	C01582-10	dNTP (10 mM each) ≥99% HPLC - 10 mL (10.0 mL/vial)
	C01582-1	dNTP (10 mM each) ≥99% HPLC - 1 mL (1.0 mL/vial)
dATP	C01577-50	dATP (100 mM) ≥99% HPLC - 50 mL (50 mL/bottle)
	C01577-250	dATP (100 mM) ≥99% HPLC - 250 mL (250.0 mL/bottle)
	C01577-10	dATP (100 mM) ≥99% HPLC - 10 mL (10.0 mL/vial)
	C01577-1	dATP (100 mM) ≥99% HPLC - 1 mL (1.0 mL/vial)
dGTP	C01578-50	dGTP (100 mM) ≥99% HPLC - 50 mL (50 mL/bottle)
	C01578-250	dGTP (100 mM) ≥99% HPLC - 250 mL (250.0 mL/bottle)
	C01578-10	dGTP (100 mM) ≥99% HPLC - 10 mL (10.0 mL/vial)
	C01578-1	dGTP (100 mM) ≥99% HPLC - 1 mL (1.0 mL/vial)
dCTP	C01579-50	dCTP (100 mM) ≥99% HPLC - 50 mL (50 mL/bottle)
	C01579-250	dCTP (100 mM) ≥99% HPLC - 250 mL (250.0 mL/bottle)
	C01579-10	dCTP (100 mM) ≥99% HPLC - 10 mL (10.0 mL/vial)
	C01579-1	dCTP (100 mM) ≥99% HPLC - 1 mL (1.0 mL/vial)
dTTP	C01580-50	dTTP (100 mM) ≥99% HPLC - 50 mL (50 mL/bottle)
	C01580-250	dTTP (100 mM) ≥99% HPLC - 250 mL (250.0 mL/bottle)
	C01580-10	dTTP (100 mM) ≥99% HPLC - 10 mL (10.0 mL/vial)
	C01580-1	dTTP (100 mM) ≥99% HPLC - 1 mL (1.0 mL/vial)

All reagents concentration can be customized.

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