Agilent

Trusted Answers

Molecular and Synthetic Biology Solutions

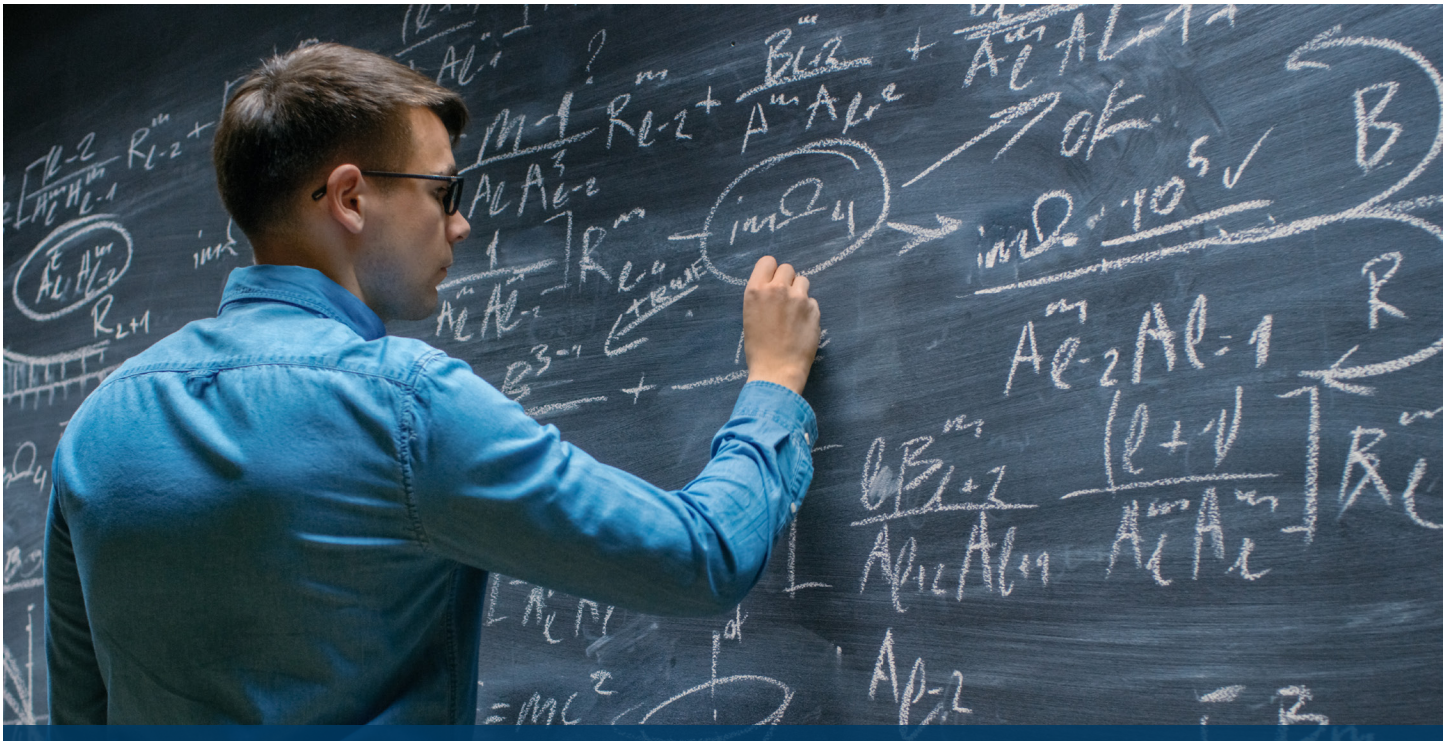
Empowering the synthetic biology revolution
– from molecules to measurement

Contents

The Next-Generation of Molecular Biology

The foundational techniques of molecular biology are changing.

Synthetic biology approaches to engineering biological systems and organisms have driven innovations in both DNA synthesis and assembly. Agilent's products bring these novel tools into the reach of every molecular biology lab, improving the speed and reliability while reducing the cost of next-gen cloning and mutagenesis.



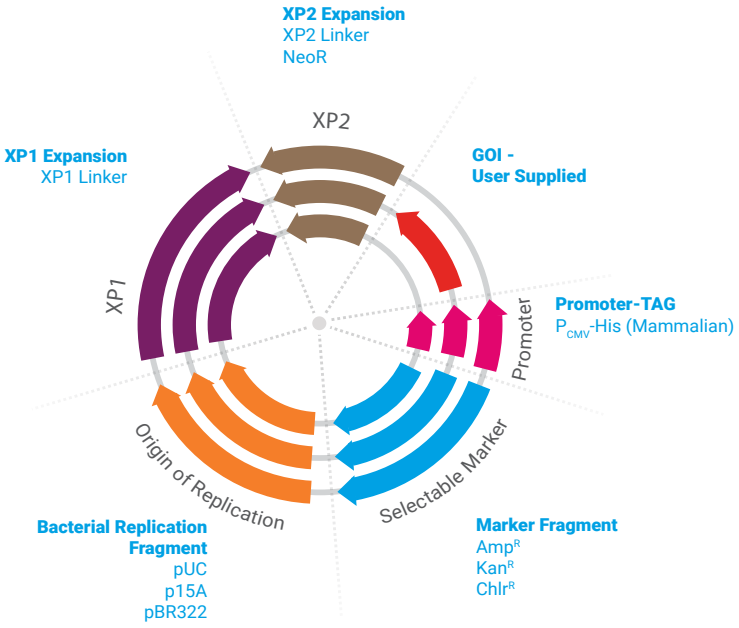
SureVector Next-Gen Cloning Kits

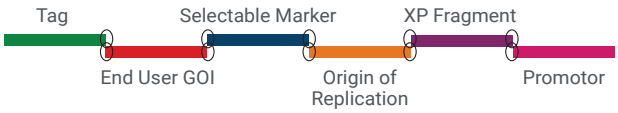
Your Vision. Your Vectors.

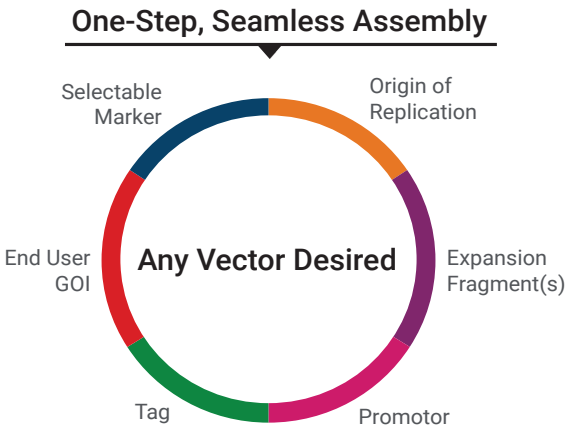
SureVector, the world's first modular vector system, harnesses the power of synthetic biology to provide quick, user-friendly customization of cloning and expression vectors. In contrast to alternative next-gen cloning technologies, SureVector offers a unique set of standard parts that can be assembled into an endless supply of custom vectors – all with a validated assembly system you can count on.

How does SureVector work?

A single Agilent SureVector kit contains a set of DNA fragments which are the functional "parts" of most cloning and expression vectors. These parts can be assembled into any combination desired, resulting in customized vectors. The proprietary SureVector enzymes can assemble up to seven fragments into a circularized plasmid in a singe, 20 minute reaction.





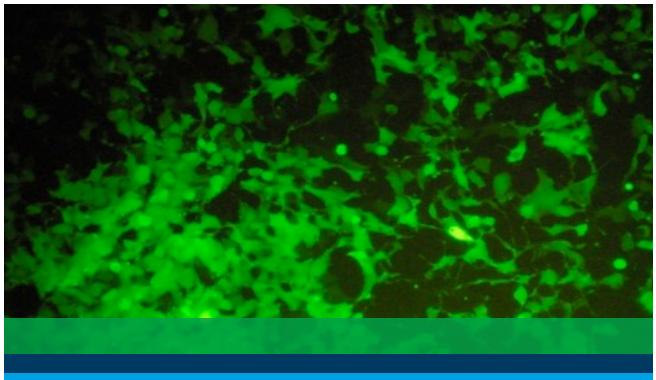


Feature	Service Providers	Catalog Vectors	Home-Brew Assembly	SureVector
Cost per vector	$$$	$$	$$$$	$
Integrated, validated workflow	No	Varies	No	Yes
Time to new vector	two to six weeks	two to seven days	three to four weeks	<1 day
Nex-generation assembly	No	No	Yes	Yes
Web-based design tool	Yes	No	No	Yes

For more information and references for SureVector, go to www.agilent.com/cs/library/technicaloverviews/public/5991-5568EN.pdf and www.agilent.com/cs/library/datasheets/public/SureVector%20App%20Note_5991-8315EN.pdf

Fast, Flexible, Reliable

- **Rapid custom vector generation**
  From design to transformation in less than 30 minutes.
- **Reliable and precise assembly**
  SureVector is extensively validated to ensure standard parts can be interchanged without loss of functionality.
- **More flexible than traditional systems**
  Assemble new vectors in your lab as experimental requirements change, rather than ordering a new one.
- **Control your experiments**
  Take control of your experiments by troubleshooting your DNA assembly – not your service provider's.



Mammalian

Stable mammalian cell lines using the neomycin resistant fragment from the SureVector kit.

	Mammalian	Part Number
Promoters	CMV	G7516A-B
	SV40	G7516A-B
	EF-1a	G7516A-B
Tags	3xFLAG	G7516A-B
	GFP	G7516A-B
	3xHA	G7516A-B
	6xHis	G7516A-B
	c-Myc	G7516A-B
	SBP	G7516A-B
Bacterial Selection	AmpR	G7514A, G7518A-E
	CamR	G7514A, G7518A
	KanR	G7514A, G7518A
Bacterial Origins of Replication	pUC	G7514A, G7518A-E
	p15A	G7514A
	pBR322	G7514A
XP1 Fragments	XP1	G7514A, G7518A-E
XP2 Fragments	Blasticidin	G7516A-B
	Hygromycin	G7516A-B
	Puromycin	G7516A-B
	NeoR	G7514A
	XP2	G7514A
Promoter-Tag Fusions	CMV-HIS6	G7514A

Check out the Agilent SureVector Design tool at www.agilent.com/store/surevector/vectorFragment.jsp

Mutagenesis Products

Efficiency Without Compromise

From rational design to random mutations, Agilent offers mutagenesis solutions for any application. Agilent offers the only widely available commercial technology that is not PCR based, so you don't have to sacrifice error rate for efficiency.

Market-leading QuikChange mutagenesis

Agilent QuikChange kits have provided researchers with a fast, easy and efficient non-PCR method to reliably perform site-directed mutagenesis for over 20 years. Other commercially-available kits utilize PCR-based techniques, which can propagate errors with each successive round of thermal cycling. The QuikChange method uses a linear amplification strategy with only the parental strand serving as the DNA template. Combining this with our highest fidelity polymerases leads to a significant reduction in unwanted second-site errors. The existence of such errors is likely to complicate and delay downstream screening and analysis.

QuikChange Lightning Multi

- Fast, reliable and easy QuikChange protocol
- Mutate up to three sites simultaneously using a single QuikChange reaction

QuikChange Lightning

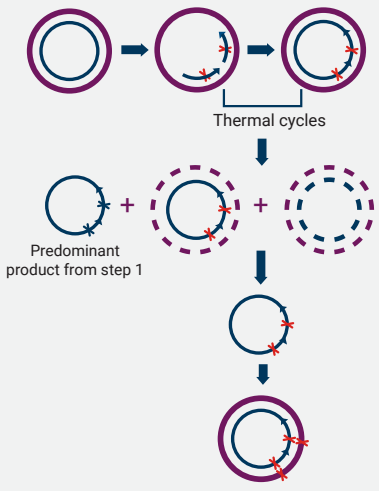
- 75% reduction in thermocycling time compared t original QuikChange enzyme blend
- More efficient with improved colony yields
- >80% mutation efficiency for both short and long templates (up to 14 kb)

GeneMorph II

- More uniform mutational spectrum when performing error-prone PCR
- GeneMorph II kits utilize Mutazyme II DNA polymerase, a novel error prone PCR enzyme blend, with equivalent mutation rates at As and Ts vs. Gs and Cs

The 'Lightning Advantage'

The QuikChange Lightning kit contains specially engineered enzymes that have been designed to shorten the time necessary to complete our signature 3-step protocol. Extension times for he thermal cycling process have been reduced by 75% and digestion of the non-mutated parental template has been decreased to only five minutes.



QuikChange Lightning Multi

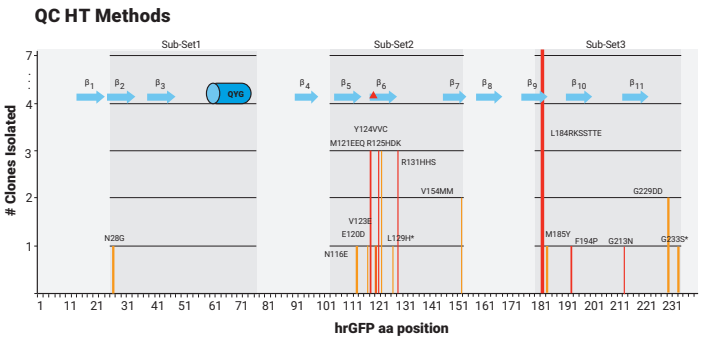
1. **Mutant Strand Synthesis**
   Perform thermal cycling to:
   - Denature DNA template
   - Anneal mutagenic primers (all primers bind to the same strand)
   - Extend primers and ligate nicks with QuikChange Multi enzyme
2. **Dpn I Digestion of Template**
   - Digest methylated and hemi-methlated DNA and Dpn I with QuikChange Multi enzyme
3. **Transformation**
   Transform mutated ssDNA into XL10-Gold ultracompetent cells, which synthesize the complementary strand

QuikChange HT Protein Engineering System

QuikChange technology meets high-throughput DNA synthesis to provide access to rationally-designed oligo libraries for protein engineering applications. The QuikChange HT Protein Engineering system provides rapid resolution of structural and functional questions by creating libraries of rationally-designed mutants for applications such as single amino acid scanning, site saturations scanning or targeted combinatorial mutagenesis.

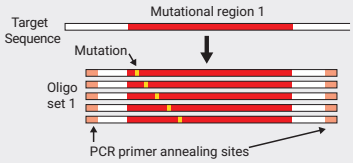
Key features

- Rapidly generate a rational design library of protein variants – less than a full day of hands-on time compared to weeks of waiting for a gene variant library
- Reduced cost of library generation – only pennies per mutant compared to $20 or more for gene variant libraries.

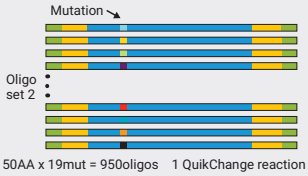


An example of the QuikChange HT kit applied to engineering of a GFP variant with enhanced brightness. Using site saturation mutagenesis yielded several beneficial mutations.

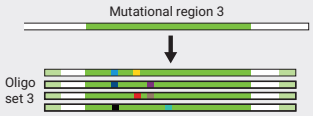
Use QuikScan1 to determine relevant stability: Separately replaces each amino acid in the wild type mutational region with a particular amino acid. Often used for Alanine scanning to quickly identify key functional or structural amino acids.



Use QuikScan19 to identify single codon replacements that improve binding, function or stability: Codon saturation scanning, systematically replaces each amino acid in the wild type mutational region with all 19 other amino acids, resulting in 19 mutagenic oligos for each amino acid position in the mutational region.



Use QuikCombine to discover a multisite mutant with improved structure, function and stability: Combine multiple mutants in groups of 1–4 position with defined variation at each site. Make up to $1.2x10^4$ libraries for a single 50AA set or combine a few identified variants and validate functional relevance.



Three possible mutational strategies using QuikChange HT: Alanine-scanning, site saturation scanning and combinatorial mutagenesis.

Product	Uses	Part Number
QuikChange Mutagenesis		
QuikChange Lightning Multi	Use for up to three mutations simultaneously, 10 or 30 reaction kits	210514, 210516
QuikChange Lightning	Single site mutagenesis, 10 or 30 reaction kits	210518, 210519
QuikChange HT Protein Engineering system		
QuikChange HT	Use for targeting up to 10 different 50 amino acid long regions in a protein	G5900A
QuikChange HT	Use for targeting up to 20 different 50 amino acid long regions in a protein	G5900B
QuikChange HT	Use for targeting up to 10 different 67 amino acid long regions in a protein	G5901A
QuikChange HT1	Use for targeting up to 20 different 67 amino acid long regions in a protein	G5901B
Random Mutagenesis		
GeneMorph II	Mutagenic polymerase for balanced random mutagenesis	200550, 200552

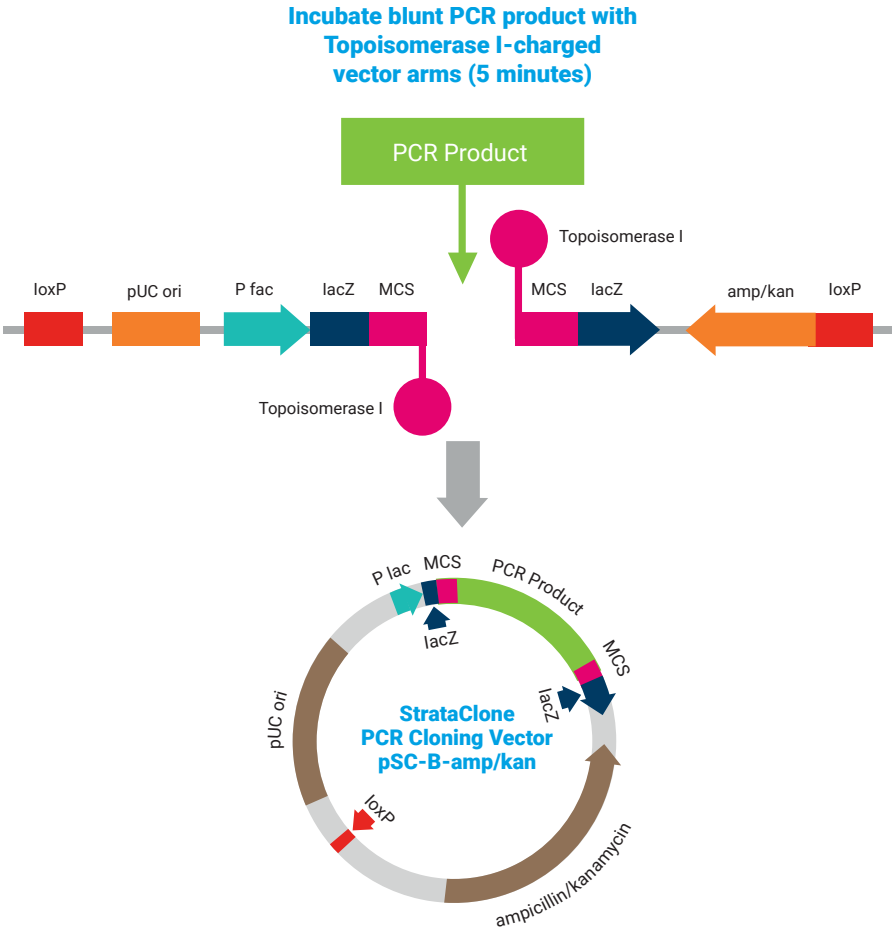
Specialty Cloning Products

A Solution for Every Situation

When you have a difficult cloning project, Agilent offers everything from a traditional topoisomerase based kit to a selection of catalog vectors for any application.

StrataClone PCR Cloning Kit

The Agilent StrataClone PCR Cloning kit allows high-efficiency, five-minute cloning of PCR products at room temperature, using the efficient DNA rejoining activity of DNA topoisomerase I and the DNA recombination activity of Cre recombinase. These kits are available for both blunt-end and UA cloning.



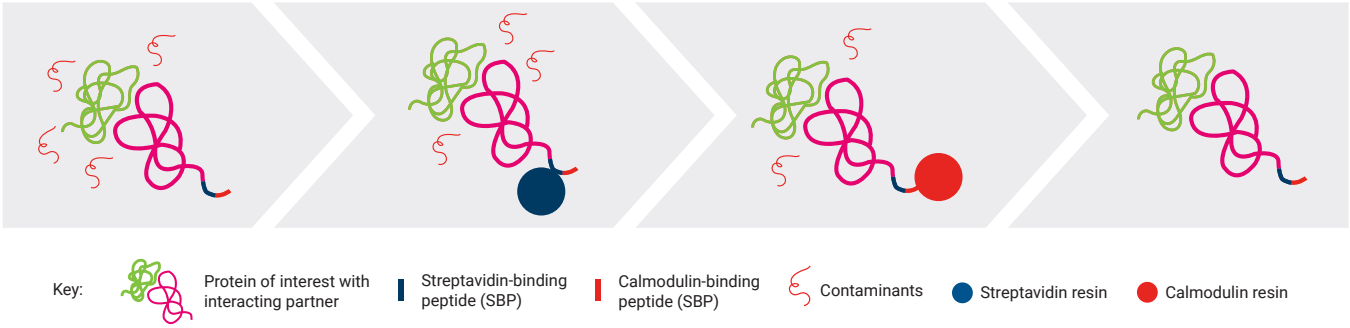
The blunt end Agilent StrataClone kit is perfect for use with our new Cas9 programmable restriction enzyme kit. Cas9 can be used to produce a linear fragment of DNA with blunt ends that can be rapidly cloned into the StrataClone vector.

InterPlay TAP Systems for Protein-Protein Interactions

The Agilent InterPlay Mammalian TAP system allows you to recover interacting proteins from mammalian cells. Tandem affinity purification yields your tagged protein and interacting proteins using gentle washing and small molecule elution conditions.

Two easy purification steps

To purify proteins with the TAP protocol, apply the mammalian cell lysate to the streptavidin resin, then elute using biotin, and apply that eluate to a calmodulin resin. Once you elute with EGTA, you will get exceptionally clean proteins.



Product	Part Number
StrataClone systems	
StrataClone PCR Cloning kit	240205
StrataClone Blunt Cloning kit	240207
StrataClone Ultra Blunt Cloning kit	240218
Extract for libraries constructed from highly methylated DNA	
Gigapack III XL Packaging Extract	200209
InterPlay TAP systems for protein-protein interactions	
InterPlay N-Terminal Mammalian TAP system kit	240103
InterPlay C-Terminal Mammalian TAP system kit	240104
InterPlay N-Terminal Mammalian TAP vectors, 3 x 20 µg	240101
InterPlay C-Terminal Mammalian TAP vectors, 3 x 20 µg	240102
InterPlay Adenoviral N-Terminal TAP	240213
InterPlay Adenoviral C-Terminal TAP	240215
InterPlay N-Terminal Mammalian TAP vectors, 3 x 20 µg	240214
InterPlay C-Terminal Mammalian TAP vectors, 3 x 20 µg	240216
Cas9 Nucleases	
SureGuide Cas9 Programmable Nuclease, 100 rxn	5190-7717
SureGuide Cas9 Programmable Nuclease kit, 20 rxn	5190-7715
SureGuide Cas9 Programmable Nuclease kit, 100 rxn	5190-7716

We have a vector system for any application you could imagine—
visit **www.agilent.com/en/solutions/genomics-applications-solutions**

Viral Expression Systems

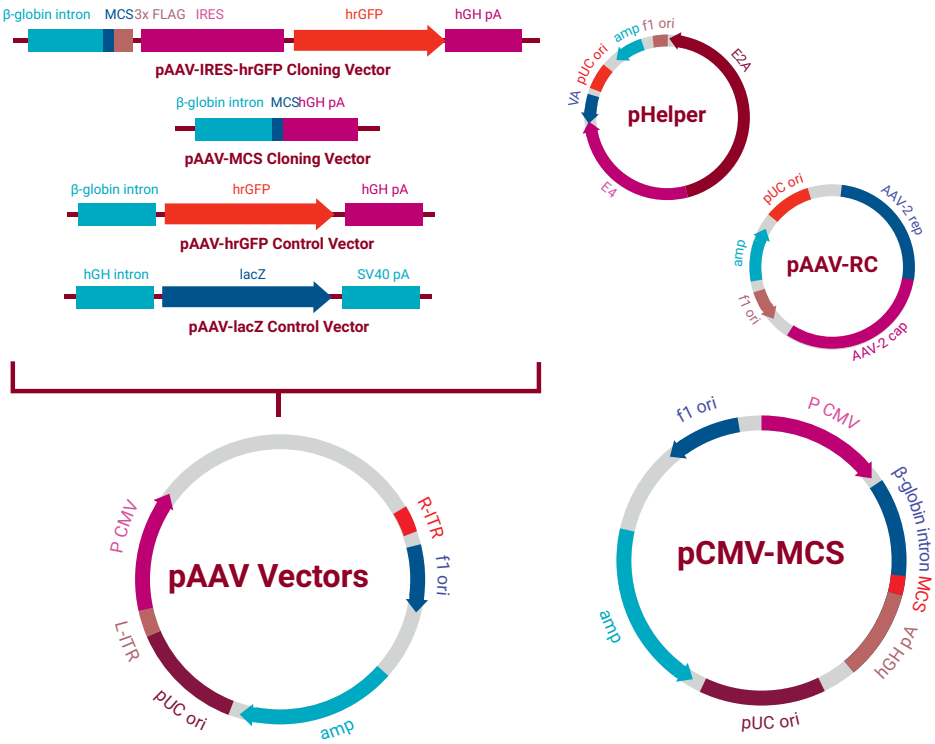
High-Efficiency Gene Delivery Starts Here

As synthetic biology moves out of the prokaryote and into eukaryotic systems, the need to study gene expression in a native host is becoming increasingly important. Many of these hosts are difficult or impossible to transfect, meaning progress may be limited by hosts that easily accept DNA using traditional transfection methods. To solve this problem, viral-based gene delivery systems have been developed for exceptionally high-efficiency gene delivery to a broader range of hosts.

Application	Long-Term Gene Expression	Transient, High-Level Gene Expression
System	**AAV Helper-Free system**	**AdEasy Adenoviral system**
Advantages	– Infects both dividing and non-dividing cells – Long-term, stable gene expression – Unparalleled biosafety profile	– High-level protein production – Infects both dividing and non-dividing cells – Homologous recombination in *E.coli* saves weeks of work

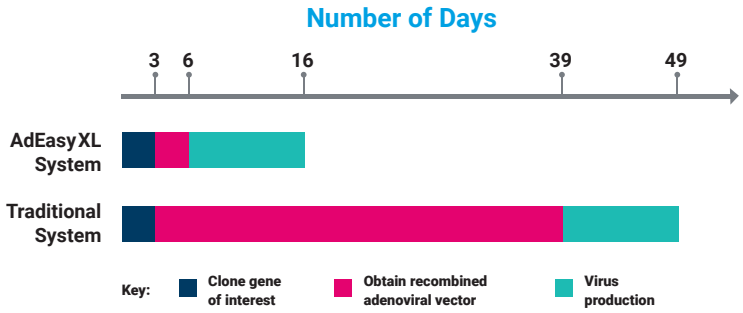
AAV Helper-Free

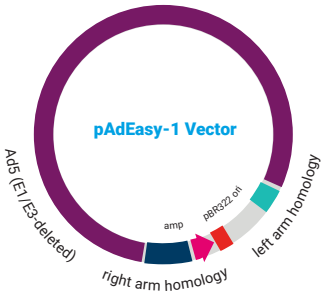
The Agilent AAV Helper-Free system improves upon recombinant adeno-associated virus-2 (AAV-2) technology by eliminating the need for helper virus. It allows safe, high-efficiency gene delivery and long-term expression in a broad range of hosts.

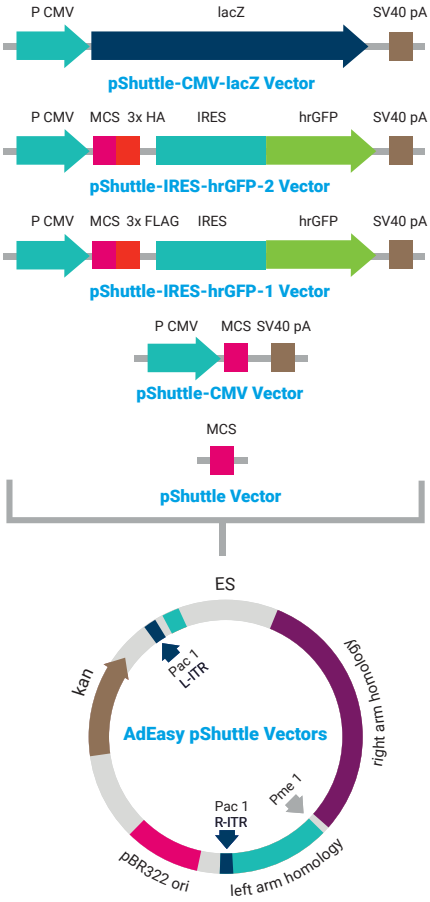


AdEasy XL and AdEasy Systems

The Agilent AdEasy XL and AdEasy Adenoviral Vector systems save you a month of work over traditional methods by producing the recombinant adenoviral plasmid by homologous recombination in *E. coli*. Now you can obtain your recombinant plasmid after a simple transformation.







System	AAV	AdEasy XL	Standard Transfection Protocol
Gene delivery efficiency	>90%	>90%	~20%
Host: Dividing cells	+	+	+
Host: Non-dividing cells	+	+	-
Long-term expression	+	-	+
Transient expression	-	+	+
High-titer virus	+	+	N/A
Host immunogenecity	-	+	N/A
Maximum insert size	3 kb	7.5 kb	Variable
Selection for stable cells	+/-	N/A	+

Product	Quantity	Part Number
AAV Helper-Free system		
AAV Helper-Free system + pAAV-MCS vector, 10 µg + pCMV-MCS vector, 10 µg + pAAV-lacZ vector, 10 µg + pAAV-RC vector, 20 µg + pHelper vector, 20 µg + AAV-293 cells, 1 x 10^6 cells + AAV HT1080, 1 x 10^6 cells	1 kit	240071
pAAV-hrGFP vector	20 µg	240074
pAAV-IRES-hrGFP vector	20 µg	240075
AAV-293 cells	1 x 10^6 cells	240073
AAV-HT1080 cells	1 x 10^6 cells	240109
AdEasy and AdEasy XL Adenoviral Vector systems		
AdEasy XL system + pShuttle vector, 20 µg + pShuttle-CMV vector, 20 µg + pShuttle-CMV-lacZ control vector, 10 µg + BJ5183-AD1 electrophoration-competent cells, 5 x 100 µL + XL10-Gold ultracompetent cells, 5 x 100 µL + pUC18 DNA control plasmid, 10 µL + AD-293 cells, 1 x 10^6 cells	1 kit	240010
BJ5183-AD1 electrophoration-competent cells	5 x 100 µL	200157
AdEasy Adenoviral Vector system + pAdEasy-1 vector, 2.5 µg + pShuttle vector, 20 µg + pShuttle-CMV vector, 20 µg + pShuttle-CMV-lacZ vector, 10 µg + BJ5183 electroporation-competent cells, 5 x 100 µL + XL10-Gold ultracompetent cells, 5 x 100 µL + pUC18 DNA control plasmid, 10 µL	1 kit	240009
BJ5183 electroporation-competent cells	5 x 100 µL	200154
pAdEasy-1 vector	2.5 µg	240005
pShuttle vector	20 µg	240006
pShuttle-CMV vector	20 µg	240007
pShuttle-CMV-lacZ control vector	10 µg	240008
pShuttle-IRES-hrGFP-1	20 µg	240081
pShuttle-IRES-hrGFP-2	20 µg	240082

Competent Cells

Explore a Wider Selection Unique to Agilent

Finding the right competent cells is easy with Agilent – we have a comprehensive selection of strains for all your next-generation cloning needs. The Agilent expression system, BL21 CodonPlus cells, are unique to Agilent.

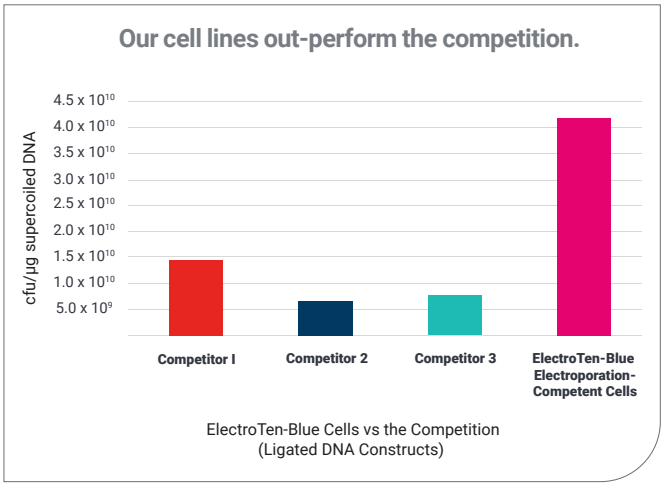
Agilent BL21-CodonPlus competent cells dramatically improve protein expression in E. coli by overcoming codon bias. Codon bias occurs when forced high-level expression of a gene containing codons rarely expressed in E. coli depletes internal tRNA pools. This often results in poor protein synthesis, early termination of the polypeptide chain, or mis-incorporation of amino acids into the expressed protein.

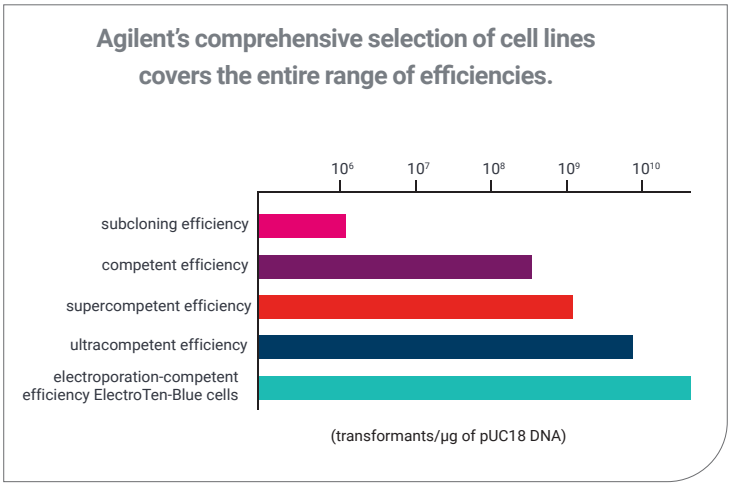
Overcoming codon bias saves time and labor by eliminating the need for site-directed mutagenesis or for expressing the protein in a eukaryotic expression system. BL21-CodonPlus competent cells are derivatives of BL21-Gold cells that have been engineered to include extra copies of genes that encode tRNAs for these rare *E. coli* codons.

Cloning Cells

The highest efficiency

Our Ultracompetent Cells provide the highest transformation efficiency in the world, making it easier and faster to obtain an accurate clone. At Agilent Technologies, we understand the less time you spend worrying about cloning, the more time you can spend answering your research questions.



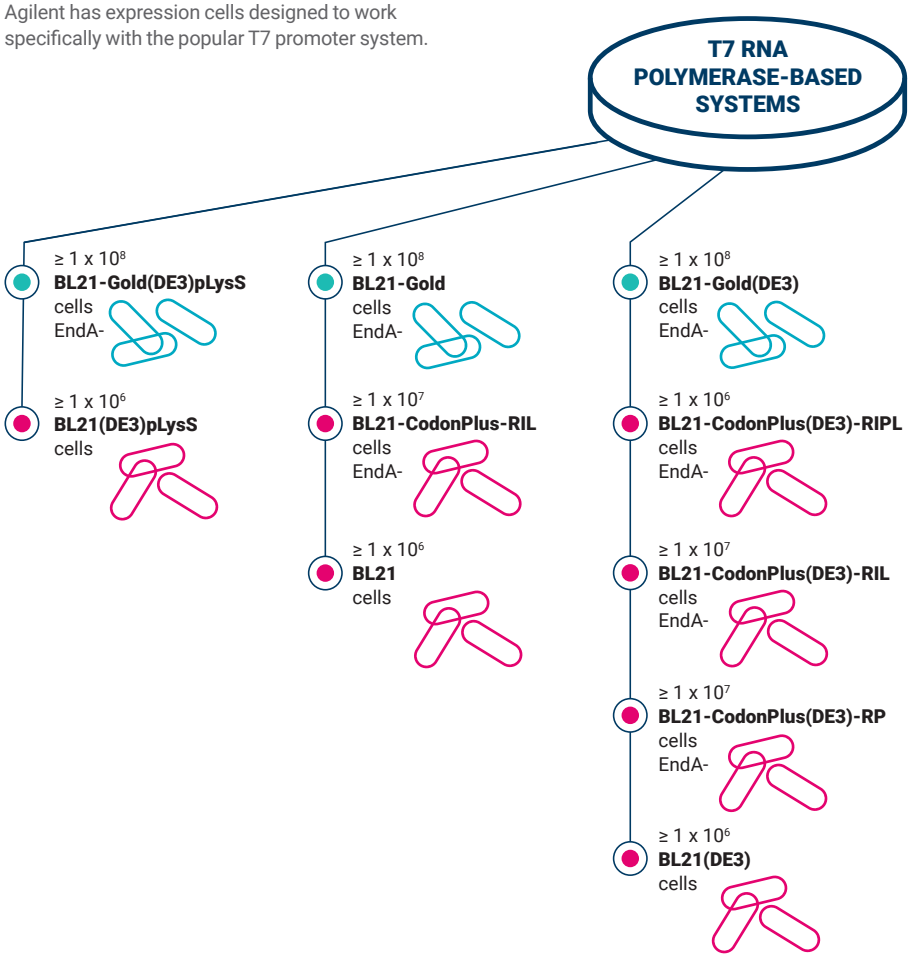


Expression Cells

The widest selection

We aren't content just to have the best competent cells. Agilent has designed strains for protein expression, plasmid stability, large plasmids and toxic proteins as well as everyday cloning. Our complete line of competent cells includes specialty cells for a huge variety of applications, each backed by Agilent's reputation for the best quality in the field.

Agilent has expression cells designed to work specifically with the popular T7 promoter system.



Product	Uses	Transformation Efficiency	Resistance	Part Number
Cloning Cells				
SURE 2 Supercompetent cells	Unstable clones; DNA with secondary structure	>1 x 10^9	Tetracycline, Kanamycin, Chloramphenicol	200152
SURE Electroporation Competent cells	DNA with secondary structure, difficult	>1 x 10^{10}	Tetracycline, Kanamycin, Chloramphenicol	200227
SURE Competent cells	DNA with secondary structure, routine	>5 x 10^8	Tetracycline, Kanamycin, Chloramphenicol	200238
ABLE K Competent cells	For toxic clones	>5 x 10^6	Tetracycline, Kanamycin	200172
TG1 Competent cells	For phage libraries; Phage display libraries	1 x 10^{10}	N/A	200123
XL10-Gold Ultracompetent cells	Large plasmids, ligated DNA, or plasmid libraries	>5 x 10^9	Tetracycline and Chloramphenicol	200314; 200315
ElectroTen-Blue Elctroporation Competent cells	Ligated DNA and generating libraries	>3 x 10^{10}	Tetracycline and Kanamycin	200159

Product	Uses	Transformation Efficiency	Resistance	Part Number
Cloning Cells				
SoloPack Gold Supercompetent cells	High efficiency, single reaction format	>1 x 10^9	Tetracycline and Chloramphenicol	230350
SoloPack Gold Competent cells	Routine cloning single reaction format	>1 x 10^8	Tetracycline and Chloramphenicol	230325
XL1-Blue Electroporation Competent cells	Electroporation	>10 x 10^{10}	Tetracycline	200228
XL1-Blue MRF Electroporation Competent cells	Electroporation, Methylated DNA	>10 x 10^{10}	Tetracycline	200158
XL2-Blue Ultracompetent cells	Highest cloning efficiency	>5 x 10^9	Tetracycline and Chloramphenicol	200150
XL2-Blue MRF Ultracompetent cells	Highest cloning efficiency for methylated DNA	>5 x 10^9	Tetracycline and Chloramphenicol	200151
XL1-Blue Supercompetent cells	Highest cloning efficiency	>1 x 10^9	Tetracycline	200236
XL1-Blue MR Supercompetent cells	For cloning without the F' episome	>1 x 10^9	N/A	200229
XL1-Blue Competent cells	For routine cloning	>1 x 10^8	Tetracycline	200249
XL1-Blue Subcloning Grade Competent cells	Cloning when DNA is not limited	>1 x 10^6	Tetracycline	200130
Expression Cells				
TKX1 cells	For phosphoprotein generation	>5 x 10^7	Tetracycline, Kanamycin	200124
TKB1 cells	For phosphoprotein generation	>5 x 10^5	Tetracycline	200134
ArticExpress Competent cells	Enhanced solubility	>5 x 10^6	Tetracycline	230191
ArticExpress (DE3) Competent cells	Enhanced solubility	>5 x 10^6	Tetracycline	230192
ArticExpress (DE3) RIL Competent cells	Enhanced Solubility	>5 x 10^6	Tetracycline	230193
ArticExpress (DE3) RP Competent cells	Enhanced solubility	>5 x 10^6	Tetracycline	230194
ArticExpress RIL Competent cells	Enhanced solubility	>5 x 10^6	Tetracycline	230195
BL21-CodonPlus (DE3)RIPL Competent cells	Eliminate codon bias, use with pET or pCAL	>1 x 10^6	Chloramphenicol and Streptomycin/ Spectinomycin	230280
BL21-CodonPlus (DE3)RIL Competent cells	Eliminate codon bias, use with pET or pCAL	>1 x 10^7	Tetracycline and Chloramphenicol	230245
BL21-CodonPlus (DE3)RP Competent cells	Eliminate codon bias, use with pET or pCAL	>1 x 10^7	Tetracycline and Chloramphenicol	230255
BL21-CodonPlus RIL Competent cells	Eliminate codon bias, for non-T7 expression systems	>1 x 10^7	Tetracycline and Chloramphenicol	230240
BL21-Gold	Increased efficiency and EndA-, use with toxic proteins and non-T7 systems	>1 x 10^8	Tetracycline	230130
BL21-Gold (DE3)	Increased efficiency and EndA-, use with non-toxic proteins	>1 x 10^8	Tetracycline	230132

Product	Uses	Transformation Efficiency	Resistance	Part Number
Expression Cells				
BL21-Gold (DE3) pLysS	Increased efficiency and EndA-, use with non-toxic proteins	>1 x 10^8	Tetracycline and Chloramphenicol	230134
BL21	Use with non-T7 systems or with lambda-CE6 for toxic proteins	>1 x 10^6	Tetracycline	200133
BL21 (DE3)	Use with non-toxic proteins	>1 x 10^6	Tetracycline	200131
BL21 (DE3) pLysS	Use with toxic or non-toxic proteins	>1 x 10^6	Chloramphenicol	200132
XL1-Red cells	For random mutagenesis	N/A	Tetracycline	200129

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