

LIFE TECHNOLOGIES™
SYNTHETIC BIOLOGY



Engineered for predictability

GeneArt® seamless cloning, assembly, and mutagenesis tools

life
technologies™

Cut, edit, create. Break through with GeneArt® genetic assembly tools.



GeneArt® products are developed to provide innovative, robust solutions to meet the vast needs of genetic engineers, synthetic biology researchers, and molecular biologists. We've made every effort to provide easy-to-implement workflow solutions to deliver fast, quality results.

Free online construct and primer design tool

Convenient and intuitive, our GeneArt® design tool is accessible to all researchers—free of charge—and is built to ease your workflow and maximize downstream results.

Step by step, the online tool guides users through experimental design and ordering—designing oligos for assembly or mutagenesis of DNA molecules *in silico*.

Explore this one-of-a-kind online tool at lifetechnologies.com/GeneArt

The background of the page is decorated with numerous pink and purple capsules, some of which are clustered together and others are scattered. The capsules have a textured, slightly irregular surface.

Contents

Seamless cloning and assembly 4

Flexible workflow solutions to streamline your research

High-order genetic assembly 5

Works well with complicated cloning designs

Site-directed mutagenesis 6

Conveniently mutate 1, 2, or 3 sites from a single plasmid

Ordering information 7

Seamless cloning and assembly

Flexible workflow solutions to streamline your research

GeneArt® Seamless Cloning and Assembly Kits enable *in vitro* cloning of up to 4 DNA fragments simultaneously into virtually any linearized vector, typically in 30 minutes, without extra DNA sequences, restriction endonucleases, or ligation. With potential construct sizes of up to 40 kb, our kits offer researchers the flexibility and convenience to complete basic, standard, and advanced cloning and assembly protocols.

GeneArt® Seamless Cloning Enzyme Mix

- Chemically competent cell transformation
- Linear cloning vector included
- Good for high throughput (HTP)
- Maximum construct size of 13 kb

GeneArt® Seamless Cloning and Assembly Kit

- Good cloning efficiency
- Chemically competent *E. coli* host and linear cloning vector included
- Maximum construct size of 13 kb

GeneArt® Seamless PLUS Cloning and Assembly Kit

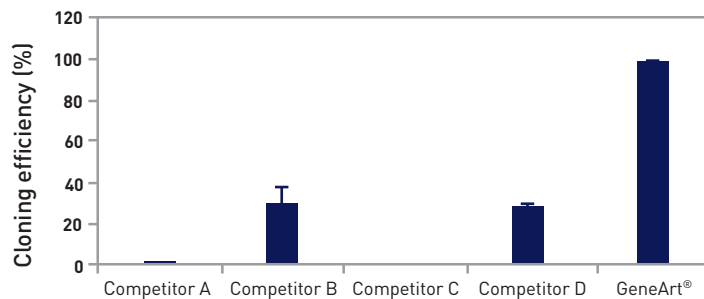
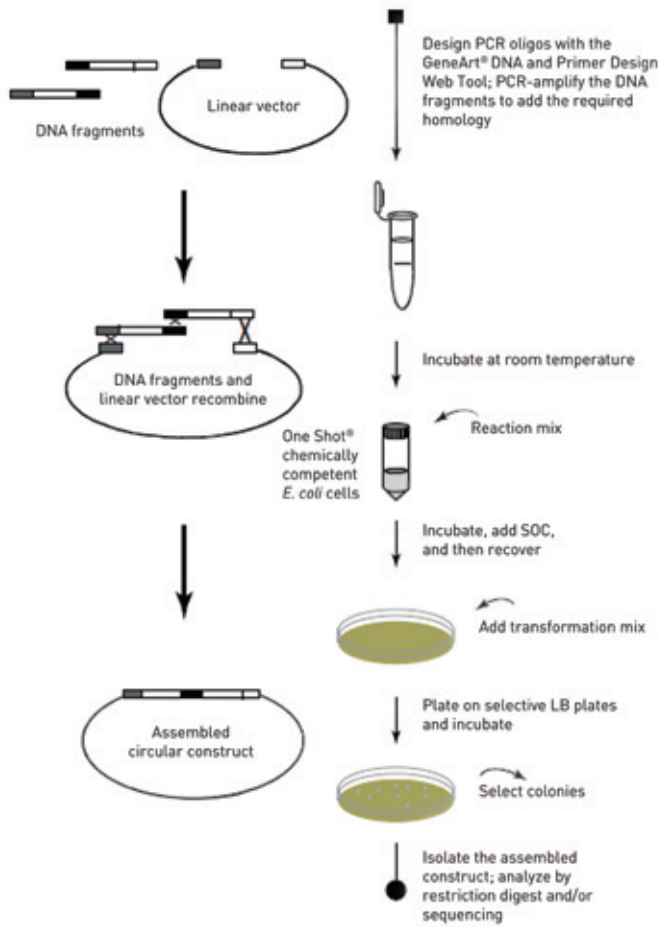
- Superior cloning efficiency
- Chemically competent *E. coli* host, media, linear cloning vector
- Maximum construct size of 40 kb
- Good for HTP
- Conjugative gene transfer to most gram-negative bacteria

- **Flexible**—use any vector of your choice
- **Precise**—no scars; clone what you want where you want it
- **Efficient**—>90% cloning efficiency
- **Convenient**—use our free online web tool to design oligos and assemble DNA molecule *in silico*
- **Fast**—fragment assembly typically in half a day

GeneArt® Seamless Cloning and Assembly Kits use a proprietary enzyme mix to recognize and precisely assemble DNA fragments sharing end homology. End homology is created by PCR amplification using primers designed to generate the correct overlap between adjacent DNA fragments to be assembled.



GeneArt® seamless cloning and assembly workflow.



Cloning efficiency of the GeneArt® Seamless PLUS Cloning and Assembly Kit with 4 precloned DNA fragments of 5 kb each, compared to other manufacturer's kits.

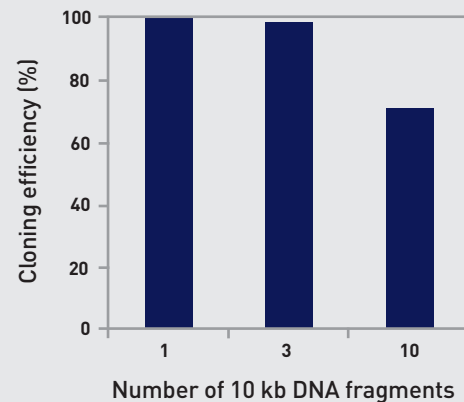
High-order genetic assembly

In addition to seamless assembly and high efficiency, the vector-independent GeneArt® High-Order Genetic Assembly System for *in vivo* assembly delivers on:

Speed—clone up to 10 DNA fragments simultaneously into a single vector (up to 110 kb total)

Convenience—assemble existing DNA fragments without restriction digestion or PCR amplification

The GeneArt® High-Order Genetic Assembly System relies on yeast's ability to take up and recombine DNA fragments with high efficiency via transformation-associated recombination, greatly reducing *in vitro* handling of DNA and eliminating the need for restriction digestion and ligation.



Cloning efficiency of the GeneArt® High-Order Genetic Assembly System with increasing numbers of 10 kb PCR fragments.

Site-directed mutagenesis

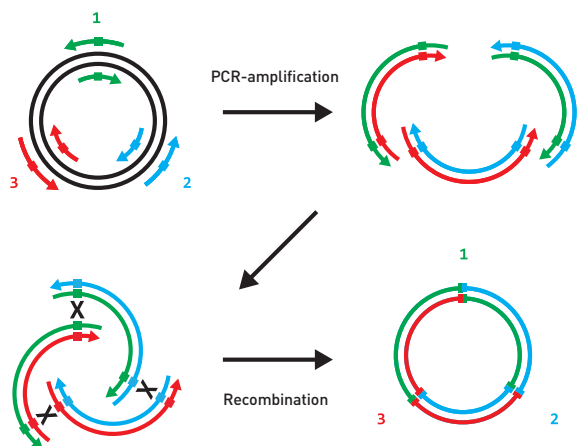
Conveniently mutate 1, 2, or 3 sites from a single plasmid

GeneArt® Site-Directed Mutagenesis Systems provide a simple and highly efficient method for *in vitro* site-directed mutagenesis. These systems can generate base substitutions, deletions, or insertions in plasmids purified from *E. coli*, without specialized vectors, host strains, or restriction sites—an ideal solution for routine or complex mutagenesis.

- **Flexible**—choose from single-site or multisite directed mutagenesis products
- **Precise**—alter up to 25 nucleotides when only one site is mutated
- **Efficient**—mutagenesis efficiency >90% (using a 3 kb plasmid)
- **Convenient**—use our free online web tool to design oligos and mutate DNA molecules *in silico*
- **Fast**—time-to-results is typically less than 3 hours (using a 10 kb or smaller plasmid)

The GeneArt® Site-Directed Mutagenesis Systems utilize mutagenic oligonucleotide primers to generate mutations. The mutagenesis protocol is streamlined by combining DNA methylation and amplification steps into a single reaction, eliminating post-mutagenesis digestion and purification steps.

These systems deliver superior mutagenesis performance with a wide range of plasmid sizes.



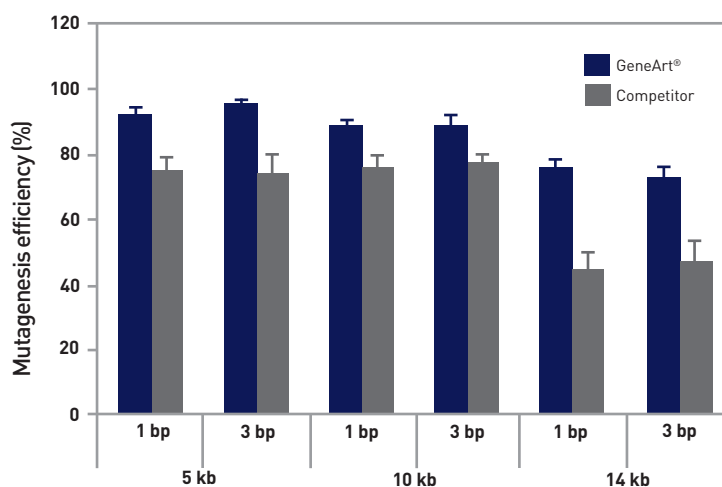
Principle of method for multisite directed mutagenesis.

GeneArt® Site-Directed Mutagenesis System

- 1 site/plasmid
- Efficiency >90%

GeneArt® Site-Directed Mutagenesis PLUS System

- Perform mutagenesis on 1, 2, or 3 sites—all in the same plasmid
- Efficiency >90%



GeneArt® Site-Directed Mutagenesis PLUS System vs. competitor.

Ordering information

GeneArt® Seamless Cloning and Assembly Systems

Product			Quantity		Cat. No.
GeneArt® Seamless PLUS Cloning and Assembly Kit			20 reactions		A14603
Component	Size	Quantity	Component	Size	Quantity
2X GeneArt® Enzyme Mix	100 µL/tube	1 tube	pUC19 Control (10 pg/µL)	10 µL/tube	1 tube
Linear pYES7L Vector (50 ng/µL)	40 µL/tube	1 tube	S.O.C. Medium	6 mL/bottle	1 bottle
One Shot® DH10B™ T1® SA Cells	21 x 50 µL/tube	1 tube	Control Insert (50 ng/µL)	5 µL/tube	1 tube
Control lacZ Insert	5 µL/tube	1 tube	Stbl3™/pRK2013 Glycerol Stock*	1 mL/tube	1 tube
Linear pUC19L Vector (50 ng/µL)	40 µL/tube	1 tube			
GeneArt® Seamless Cloning Enzyme Mix			20 reactions		A14606
Component	Size	Quantity			
2X GeneArt® Enzyme Mix	100 µL/tube	1 tube			
Linear pUC19L Vector (50 ng/µL)	40 µL/tube	1 tube			
Control Insert (50 ng/µL)	5 µL/tube	1 tube			
GeneArt® Seamless Cloning and Assembly Kit			20 reactions		A13288
Component	Size	Quantity	Component	Size	Quantity
10X Enzyme Mix	45 µL/tube	1 tube	One Shot® TOP10 Chemically Competent <i>E. coli</i>	50 µL/tube	21 tubes
5X Enzyme Buffer	90 µL/tube	1 tube	pUC19 Control (10 pg/µL)	10 µL/tube	1 tube
Linear pUC19L Vector (50 ng/µL), 4 control reactions	8 µL/tube	1 tube	S.O.C. Medium	6 mL/bottle	1 bottle
Control Insert (50 ng/µL)	5 µL/tube	1 tube			
GeneArt® Linear pUC19L Vector for Seamless Cloning			20 reactions		A13289

GeneArt® High-Order Genetic Assembly Systems

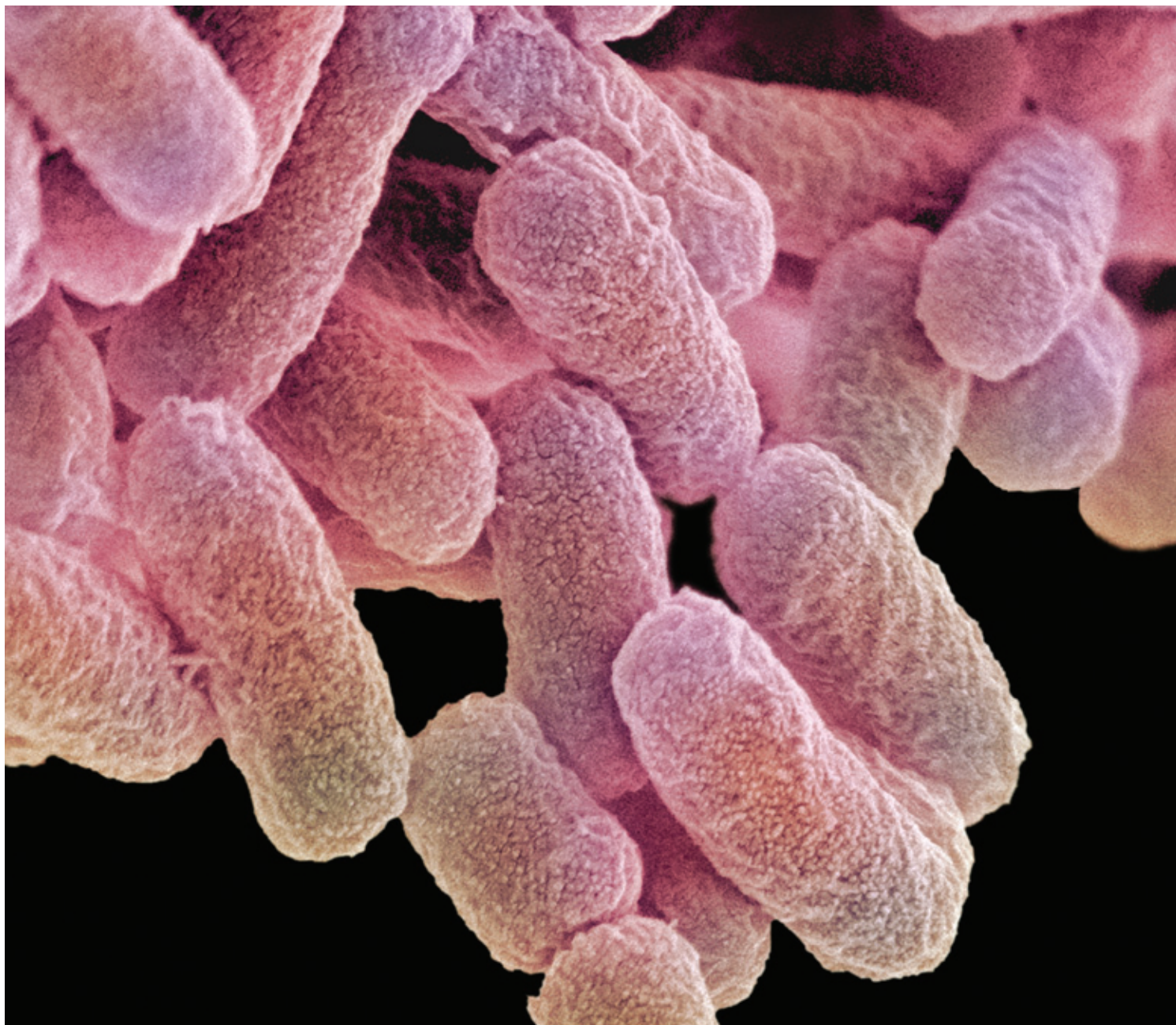
GeneArt® High-Order Genetic Assembly System	10 reactions	A13285
GeneArt® High-Order Genetic Assembly System (with Yeast Growth Medium)	10 reactions + 2 L medium	A13286
GeneArt® High-Order Linear pYES1L Vector	10 reactions	A13287
CSM Medium for Mav203 Yeast Cells	2 L	A13292
GeneArt® High-Order Vector Conversion Cassette	10 reactions	A13291

GeneArt® Site-Directed Mutagenesis Systems

GeneArt® Site-Directed Mutagenesis PLUS System			10 reactions		A14604
Component	Size	Component	Size	Component	Size
One Shot® MAX Efficiency® DH5α™ T1®	1 box	PCR Water	1.8 mL	Control Primer Mix 1 (10 µM)	25 µL
DNA Methylase (4 units/µL)	12 µL	pMSDM-White Vector (20 ng/µL)	5 µL	Control Primer Mix 2 (10 µM)	25 µL
200X SAM (S-adenosine methionine)	10 µL	0.5 M EDTA	500 µL	Control Primer Mix 3 (10 µM)	25 µL
2X GeneArt® Enzyme Mix	100 µL				
10X PCR Enhancer	100 µL				
GeneArt® Site-Directed Mutagenesis System			16 reactions		A13282
Component	Size	Component	Size	Component	Size
DNA Methylase (4 units/µL)	20 µL	pUC19WHITE Control Plasmid (20 ng/µL)	100 ng	10X Enzyme Mix	45 µL
200X SAM (S-adenosine methionine)	10 µL	Control Primer Mix (10 µM)	25 µL	One Shot® MAX Efficiency® DH5α™ T1®	1 box
10X Enhancer	100 µL	PCR Water	1.8 mL		
0.5 MEDTA	500 µL	5X Reaction Buffer	90 µL		

LIFE TECHNOLOGIES™

SYNTHETIC BIOLOGY



For more information about GeneArt® genetic assembly tools, go to lifetechnologies.com/GeneArt

For Research Use Only. Not intended for any animal or human therapeutic or diagnostic use.

© 2012 Life Technologies Corporation. All rights reserved. The trademarks mentioned herein are the property of Life Technologies Corporation or their respective owners. Printed in the USA. C0111028 0612

lifetechnologies.com

life
technologies™