



invitrogen

## Tools for DNA cloning

Providing over 300 products ranging from restriction enzymes to gene synthesis

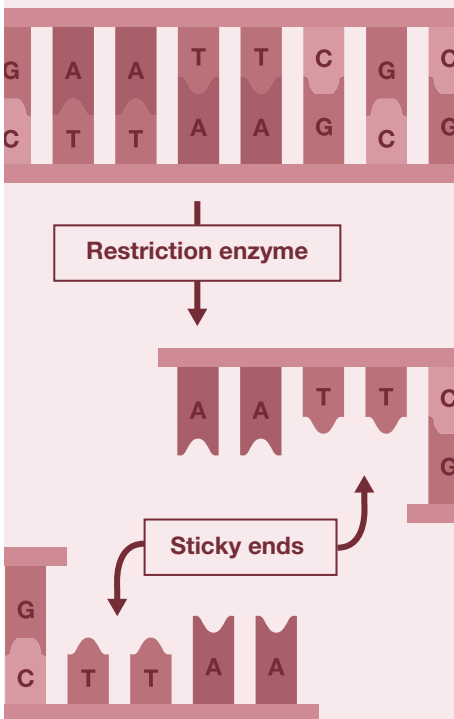
**ThermoFisher**  
SCIENTIFIC

For over 25 years we have provided superior tools for DNA cloning, continually improving upon old technologies and developing new ones. From restriction enzymes to gene

## Methods used for DNA cloning

### Anza Restriction Enzyme Cloning

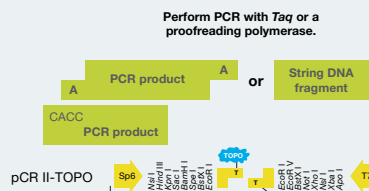
- Convenient single-buffer system of 128 restriction enzymes and 5 DNA-modifying enzymes
- Excellent for subcloning
- Single protocol for faster, complete digestion in 15 minutes
- Flexibility of overnight 16 hour digestion with no star activity



[thermofisher.com/anza](http://thermofisher.com/anza)

### TOPO Cloning Technology

- Excellent choice for subcloning and sequencing of PCR or other DNA fragments
- 95% efficiency and fast 5-minute reactions
- Expression and Gateway entry formats also available
- Vectors come bound with DNA topoisomerase I, which functions as a ligase



1. Add 1  $\mu$ L of PCR reaction to 1  $\mu$ L of TOPO cloning vector.



2. Incubate 5 min at room temperature.



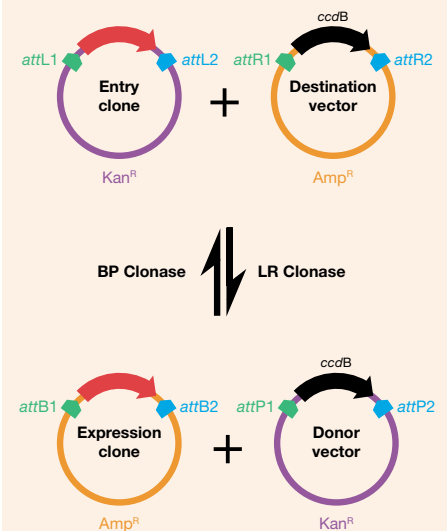
3. Transform with competent cells.



[thermofisher.com/topo](http://thermofisher.com/topo)

### Gateway Cloning Technology

- Flexible system for shuttling between various protein expression systems, such as mammalian and bacterial
- No need to reclone or resequence DNA
- Uses site-specific recombination technology

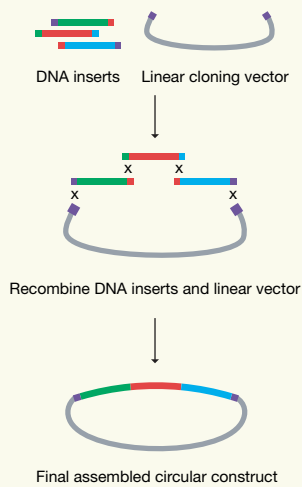


[thermofisher.com/gateway](http://thermofisher.com/gateway)

synthesis, we offer a comprehensive portfolio of tools and resources that help you save time and money while obtaining high-quality cloned DNA to facilitate your next discovery.

## GeneArt Seamless Cloning Technology

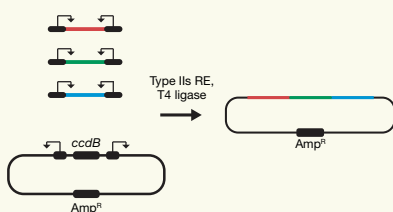
- Directionally clone up to 4 fragments at one time
- Uses overlapping primers and homologous recombination
- Does not require or leave any extra DNA sequences



[thermofisher.com/seamless](http://thermofisher.com/seamless)

## GeneArt Type IIs Assembly Kits

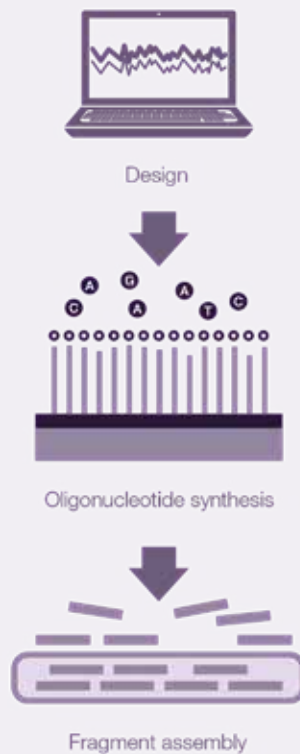
- Directionally clone up to 8 fragments at one time
- Great for cloning repetitive or small inserts
- Uses simultaneous cleavage and ligation; not based on recombination



[thermofisher.com/typeii](http://thermofisher.com/typeii)

## GeneArt Strings DNA Fragments

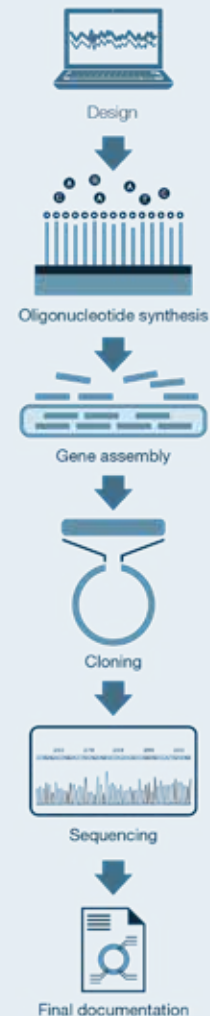
- Synthetic DNA fragments, ready to clone
- Specify ends to facilitate cloning method of choice
- No starting DNA required
- Free optimization of gene with
- GeneOptimizer™ software for maximum protein expression
- Libraries with full IUPAC code of mixed, randomized DNA nucleotide options also available



[thermofisher.com/strings](http://thermofisher.com/strings)

## GeneArt Gene Synthesis

- Synthetic gene, ready to transfect
- Select from several vectors (custom options available)
- 100% sequence-verified and ready for downstream applications
- No starting DNA required
- Free optimization of gene with
- GeneOptimizer™ software for maximum protein expression



[thermofisher.com/genesyntesis](http://thermofisher.com/genesyntesis)

	Anza™ Restriction Enzyme Cloning System	TOPO™/TA Cloning™ Kits	Gateway™ Cloning System	GeneArt™ Seamless Cloning and Type IIs Assembly Kits	GeneArt™ Strings™ DNA Fragments and Gene Synthesis
Needs DNA source material (plasmid with gene, library, etc.)	Yes	Yes	Yes	Yes	No
Requires knowledge of sequence	Some	Some	Some	Some	Yes
Sequence optimization and easy mutation addition	No	No	No	No	Yes
Requires vector	Yes	Yes	Yes	Yes	Strings: Yes Gene synthesis: No
Online tools available	Vector selection tool	Vector selection tool	Vector selection tool	GeneArt™ Primer and Construct Design Tool	GeneArt™ portal for design and optimization
Simplified traditional cloning	Best choice				
Fast and reliable PCR product or DNA fragment cloning		Best choice			
Easy to move DNA of interest among a variety of host vector systems			Best choice		
Easy assembly of multiple DNA fragments				Best choice	
Optimize sequence, easy mutation, and sequence verified					Best choice
Recommended additional materials	<ul style="list-style-type: none"> <li>Ligation enzymes</li> <li>Clean-up kit</li> <li>Competent cells</li> <li>Purification kit</li> <li>E-Gel™ precast gels</li> <li>DNA markers/ladders</li> </ul>	<ul style="list-style-type: none"> <li>Competent cells</li> <li>Purification kit</li> <li>GeneArt Strings DNA Fragments</li> </ul>	<ul style="list-style-type: none"> <li>Gateway cloning kit with competent cells</li> <li>Gateway™ BP and LR Clonase™ enzymes</li> <li>Purification kit</li> </ul>	<ul style="list-style-type: none"> <li>PCR cloning kit with competent cells or GeneArt Strings DNA Fragments</li> <li>Purification kit</li> </ul>	<ul style="list-style-type: none"> <li>Subcloning and plasmid prep services</li> <li>Mutagenesis or gene variants</li> <li>Libraries</li> </ul>
The bottom line	<ul style="list-style-type: none"> <li>Good for subcloning into a multiple cloning site</li> <li>Requires restriction mapping</li> </ul>	<ul style="list-style-type: none"> <li>Good for cloning PCR products and GeneArt Strings DNA Fragments</li> </ul>	<ul style="list-style-type: none"> <li>Good for protein expression in multiple systems, such as bacterial and mammalian</li> </ul>	<ul style="list-style-type: none"> <li>Good for simultaneous, multi-fragment cloning</li> </ul>	<ul style="list-style-type: none"> <li>Get your gene of interest ready to use</li> <li>Focus on your research while we take care of the cloning</li> </ul>



**In the United States:**

For customer service, call 1-800-766-7000  
 To fax an order, use 1-800-926-1166  
 To order online: fishersci.com

**In Canada:**

For customer service, call 1-800-234-7437  
 To fax an order, use 1-800-463-2996  
 To order online: fishersci.ca



Find out more at [thermofisher.com/cloning](http://thermofisher.com/cloning)