



Synthetic biology

GeneArt Gene Synthesis products and services

Your gene, your way—complete experimental workflow solutions
from gene synthesis to protein expression and purification

invitrogen

Your trusted partner in reliable gene synthesis

Invitrogen™ GeneArt™ Gene Synthesis

Advance your research with this fast and easy alternative to do-it-yourself cloning.



- Obtain customized DNA constructs with 100% sequence accuracy
- Sequence optimization with Invitrogen™ GeneOptimizer™ software may result in up to a 15-fold increase in expression
- Monitor the manufacturing status of your order in the Invitrogen™ GeneArt™ Services Dashboard—updated daily so you can effectively plan your research

Easy online ordering

Invitrogen™ GeneArt™ Subcloning Services

Get your gene ready to use in your downstream applications.



- Express cloning option provides expression-ready genes in all major expression systems (mammalian, insect, yeast, and bacteria)
- Standard subcloning option includes Invitrogen™ vectors or your own custom plasmid
- Sole provider of Invitrogen™ Gateway™ recombination cloning technology

Easy online ordering

1. Gene synthesis

GeneArt Gene Synthesis

You get 100% sequence-match assurance, and your sequence delivered as cloned plasmid DNA. Use the GeneArt Services Dashboard for easy editing, optimization, and ordering to save time and labor.

Deliverables:

- Your gene of interest cloned into a pMX cloning vector
- ~5 µg lyophilized plasmid DNA
- A detailed synthesis report including a plasmid map, sequence alignment, and restriction map

Standard production time:* starting at 5 business days

Gene length (bp)	Production time (business days)	
	Non-complex sequence	Complex sequence
100–1,000	5–8	5–14
1,001–3,000	5–10	9–19
3,001–5,000	7–17	16+
5,001–7,000	12+	19+
7,001–12,000	NA	19+

Note: Actual production time depends on length and complexity of the sequence and will be communicated prior to production. Optional SuperSPEED service can reduce production time to as few as 5 business days for non-complex sequences up to 1.2 kb.

Invitrogen™ GeneArt™ Strings™ DNA Fragments

We offer custom-made, uncloned, linear DNA fragments from 200 to 3,000 bp in length—ready for cloning and screening with any vector of your choice. They're also available as Invitrogen™ GeneArt™ Strings™ DNA Libraries, up to 2 kb with randomized IUPAC nucleotides.

Deliverables:

- Double-stranded DNA fragments, pool sequenced to help ensure you get your gene of choice
- ≥200 ng lyophilized DNA

Production time*

Fragment length (bp)	Production time (business days)
200–1,000	3–5
1,001–3,000	4–6
DNA libraries: IUPAC mixed bases	10–15

2. Subcloning

GeneArt Express Cloning Service (up to 5 kb)

We make your gene expression-ready, and we directly clone your gene into one of the following vectors in the same time as standard gene synthesis.

pcDNA3.1(+)	pcDNA3.3-TOPO	pcDNA3.4-TOPO
pFastBac1	pET100/D-TOPO	pET151/D-TOPO
pRSET A	pYes2.1V5-His TOPO	pDONR221

Deliverables:

- Your synthesized gene in the selected expression vector
- ~5 µg lyophilized plasmid DNA
- A detailed synthesis report including a plasmid map, sequence alignment, and restriction map

Production time:* same as standard production time for gene synthesis

GeneArt Subcloning Service

Get individual subcloning into your favorite commercial or personal vector.

Deliverables:

- Your synthesized gene in the selected expression vector and in the pMX cloning vector
- ~5 µg lyophilized plasmid DNA
- A detailed synthesis report including a plasmid map, sequence alignment, and restriction map

Production time:* starting at 6 business days following standard gene synthesis production

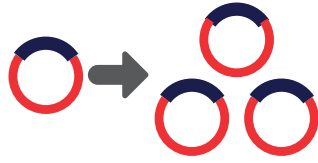
* Production time does not equate to delivery time.

Comprehensive services through protein production

Invitrogen™ GeneArt™ Plasmid Preparation Services

Obtain consistent, high-quality plasmid preparations for research applications.

- Microgram- to milligram-scale production
- Extremely low levels of endotoxin: <0.1 EU/μg pDNA
- Fill and finish service available—get your plasmid DNA aliquoted and labeled for immediate use, per your specifications



Easy online ordering

Invitrogen™ GeneArt™ Protein Purification Services

Let us do your protein expression and purification for you.

- We have the entire workflow solution, with complete in-house production from gene to protein
- Reliable and advanced expression system: e.g., with Gibco™ Expi293™ Expression System, greater than 1 g/L can be achieved
- 30 mL to 25 L: shaker and WAVE cell culture, plus experience with large projects



Contact us

3. Plasmid and vector services

GeneArt Plasmid Preparation Services

Get highly pure, homogeneous plasmid DNA at 100 μg–10 mg scale production. Larger scales include low-endotoxin plasmid prep technology for transfection-ready DNA.

Deliverables:

- Plasmid DNA solution (1 mg/mL); select a buffer from TE, H₂O, and PBS
- A detailed synthesis report, including standard and optional quality control data

Production time:* starting at 6 business days following standard gene synthesis production

4. Protein expression

GeneArt Protein Purification Services

We provide fast and reliable transient protein production in Gibco™ ExpiCHO™ or Expi293 Expression Systems at a range of scales to support you from screening through preclinical development.

High-throughput expression

Excellent for comparing design variations in your functional assay

Deliverables:

- Purified protein or supernatant in 24-well plates
- Quality control and documentation, including yield and concentration data

Production time:** 4 weeks

Gene-to-protein specified culture volume

Protein expression and purification from customer-specified culture volumes ranging from 30 mL to 100 L and above.

Deliverables:

- All protein purified from specified culture volume (alternatively, culture supernatant or cells)
- Quality control documentation, including data from SDS-PAGE and western blot
- Expression plasmid

Production time:** 4–5 weeks

Gene-to-protein specified protein amount

Protein expression and purification of customer-specified protein amount. Projects proceed in two stages.

Gene-to-protein pilot

Feasibility study for determination of production yield

Deliverables:

- All resulting protein from pilot study
- Quality control documentation, including data from SDS-PAGE and western blot
- Price quote for production of a customer-specified protein amount
- Expression plasmid

Production time:** starting at 4 weeks

Scale-up protein production

Production of a customer-specified protein amount

Deliverables:

- Purified protein amount as specified by customer
- Quality control documentation, including data from SDS-PAGE and western blot

Production time:** starting at 3 weeks

Note: A timecourse may be needed for some proteins—not generally required for antibodies.

* Production time does not equate to delivery time.

** Gene synthesis and plasmid preparation is included in protein expression production times.

Invitrogen™ GeneArt™ Directed Evolution Services

Directed evolution strategies are an efficient method for creating proteins with improved or novel properties. GeneArt Directed Evolution technologies help evolve proteins in a goal-oriented, systematic process.



- GeneArt Mutagenesis Service
- GeneArt Site-Saturation Mutagenesis
- GeneArt Combinatorial Libraries
- GeneArt Controlled Randomization Service
- GeneArt Truncation Libraries

Contact us

The GeneArt Services Dashboard

Ordering made easy

Access a single online destination for designing, ordering, and tracking your GeneArt gene synthesis clones and GeneArt Strings DNA Fragments. You can also get a detailed quote, a quick pricing estimate, and the dedicated support you need. Save time and have full control and flexibility with these features.



Easy online ordering

Directed evolution

Site-directed mutagenesis

Introduce single or multiple mutations (substitutions, insertions, or deletions) into existing DNA sequences—up to 5 regions covering 40 bp each can be modified within the template sequence.

Deliverables:

- Receive separate constructs made from a template sequence as 5 µg of plasmid preparation
- All variants are 100% insert-verified

Combinatorial libraries

DNA sequences will be diversified using preassembled trinucleotides as building blocks (trinucleotide mutagenesis, or TRIM, technology) for the chemical synthesis process. This allows for the complete customization of the amino acid composition at randomized sites and thus helps avoid the occurrence of unwanted stop codons or amino acids.

Deliverables:

- Receive the library as linear dsDNA (>2 µg), or have the library cloned and transformed into the *E. coli* strain of your choice with transformation rates of $>1 \times 10^9$
- With the cloned library, at least 30 µg of plasmid DNA and 12 x 0.5 mL glycerol stocks will be provided
- Also available with optional next-generation sequencing quality control

GeneArt Services Dashboard

Order your genes when and where it's convenient for you

Features:

- Upload or copy and paste your sequences for easy import
- Use personal templates for your favorite vector and sequence configurations
- Add to cart and obtain price quote for easy ordering
- Check the status of your order in the manufacturing process—available 24 hours a day

For more information on how to use the GeneArt Services Dashboard, please go to thermofisher.com/geneartdashboard.

Maximize your efficiency with the GeneOptimizer algorithm

Optional sequence optimization is easy in the GeneArt Services Dashboard.

- Optimize your coding sequence for increased expression in your chosen host system
- Sequence optimization decreases the complexity of your sequence, which can save you time and money on gene synthesis

To see expression data and learn more about the GeneOptimizer algorithm, go to thermofisher.com/geneoptimization

For more general information, please contact geneartsupport@thermofisher.com.

Learn more at thermofisher.com/geneart

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