

GeneArt Gene Synthesis API

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What is an API?

- An Application Programming Interface (API) is a set of rules that lets programs talk to each other in a consistent format
- A GeneArt Gene Synthesis API allows programs on the customer's side to access services and algorithms through thermofisher.com to automate design and ordering for clones and fragments

Three ways to design and order genes



Offline

Call or email our customer care team



Online

Use our online design and ordering portal



Online with API

Set up Invitrogen™ GeneArt™ Gene Synthesis API for programmatic-level design and ordering

Who can benefit from API implementation?



Customers ordering large numbers of sequences frequently



Customers with an automated pipeline to design genes before ordering



Third-party developers offering commercial platforms for gene design or open-source libraries for bioinformaticians

What do we offer?

Design and diagnostic APIs

- Check individual sequences against production acceptance criteria and provide detailed descriptions of any identified problems
- Optimize sequence for producibility and/or to maximize expression in a selected host organism

Upload and order APIs

- Validate a project—get a brief problem summary for the rejected constructs, and prices and turnaround time for the accepted ones
- Upload a project—validation is done in the background; only fully accepted projects can be uploaded
- Submit a project to the cart—allows for manual checkout on thermofisher.com
- Direct ordering—upload, validation, and checkout done in one step

Status tracking and QAD APIs

- Search for open and past projects
- View production status
- Download quality assurance documentation (QAD)

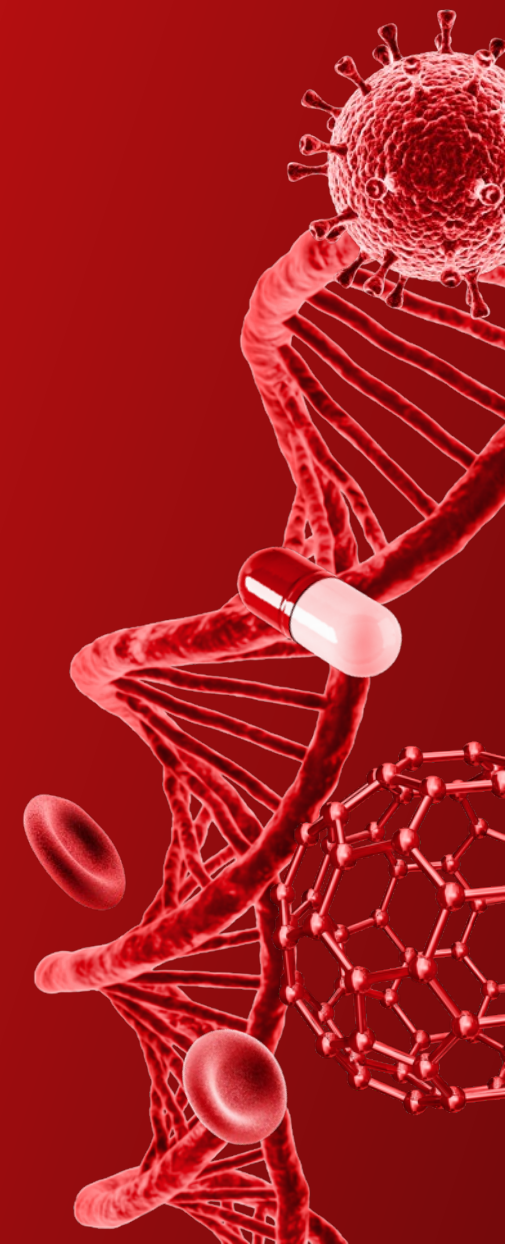
Supported project types: Invitrogen™ GeneArt™ Strings™ DNA Fragments, Invitrogen™ GeneArt™ Gene Synthesis, plasmid reorder



How to get started

1. Each user must be manually enabled to use the GeneArt Gene Synthesis API for ordering
 - Send a request to geneartsupport@thermofisher.com to get instructions
2. To try API in action, use provided Postman™ collection with the examples of the requests
 - Install Postman tool (postman.com)
 - Import examples collection
 - Select individual requests from the tree on the left side of the screen
3. To see detailed specifications and start implementation
 - Go to Swagger Editor™ (editor.swagger.io)
 - Upload one of the documentation files: UploadAndOrdering.yaml or DesignAndDiagnosticsBulk.yaml
 - Automatically generate client code in the language of your choice

Appendix



Response body

- More information can be found in the `DesignAndDiagnosticsBulk.yaml` file

Upload and ordering API example: construct upload

The screenshot displays a REST client interface with a POST request to `https://api.thermofisher.com/api/store/geneart/directordering/upload/v2/`. The request body is a JSON object containing user and project information. The response body is a JSON object containing the assigned project ID and construct details.

Request body

```
1 {
2   "username": "geneuser5@lifetech.com",
3   "project": {
4     "constructs": [
5       {
6         "name": "simpleGSconstruct",
7         "sequence": "CCGGCGTCGCATTGTCCGCATTCGCGTGGCCGCCTCTATACCGTAATCGCTCGCGCCGATGTAAGGAACCTCTGCTACCCCAT
8         GAGTCCACCGTATCTTGGCTGACACGCCGATGT",
9         "product": "geneSynthesis"
10      },
11      {
12        "name": "exprVectorAndPPrep",
13        "sequence": "GTTTGTAGTTGGATCACGCAGTGCTTCGCACCTTTATACCCACAAGTACAATCCTTGACTTTCTTATACAAAGCGATAGCTCTAC
14        TCCTCCGAATTCGGCAAATGATAATTACACTG",
15        "product": "geneSynthesis",
16        "details": {
17          "geneSynthesis": {
18            "vector": {
19              "name": "pcDNA3.4-TOPO"
20            }
21          },
22          "deliveryQuantity": "H2O 250ml"
23        }
24      }
25     ]
26   }
27 }
```

Response body

```
1 {
2   "project": {
3     "projectId": "2025AABWX",
4     "constructs": [
5       {
6         "constructId": "25AAP6X",
7         "name": "simpleGSconstruct"
8       }
9     ]
10   }
11 }
```

- Request body consists of the username and the project
- In the case of a one-step ordering call, some additional information, such as purchase order number or alternative shipping address details, can be provided
- Project contains a list of constructs, each with name, sequence, product type, and optional details (i.e., for “geneSynthesis” product details, can include vector name, delivery quantity, and other options)
- The most important value in the response is projectId, which can later be used to add a project to the cart or review status

More information can be found in the UploadAndOrdering.yaml file

Thank you

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