Invitrogen GeneArt Gene Synthesis API
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What is an API?

An API (Application Programming Interface) is a set of rules that let programs talk to each other, exposing data and functionality across the internet in a consistent format.

With GeneArt APIs we enable programs on the customer’s side to allow access to services and algorithms through thermofisher.com to automate design and ordering for clones and fragments.

Three ways to design/order genes

Offline
- Call or email our customer care team

Online
- Use our online design and ordering portals

Online with API
- Set up GeneArt API for programmatic level design and ordering.
Who can benefit from GeneArt APIs?

GeneArt APIs will bring benefit to:

- Customers ordering large amounts of sequences frequently.
- Customers having an automated pipeline to design genes before ordering.
- Third-party developers offering commercial platforms for gene design or open source libraries for bioinformaticians.
What we offer

Design & Diagnostics APIs
- Check sequences against production acceptance criteria and get a detailed description of the found problems
- Optimize sequences for expression in a selected host organism and/or producibility

Upload & Ordering APIs
- Validate a project.
  - Get a brief problem summary for the rejected constructs and prices for the accepted ones
- Upload a project.
  - Validation is done in the background, only fully accepted projects can be uploaded
- Submit an uploaded project to the cart.
  - Checkout is to be done manually on the thermofisher.com website
- Review the status of the uploaded project

Supported products: Strings, High-Q Strings, Gene Syntheses into pMX vectors and direct Gene Synthesis into one of the 9 standard expression vectors.
How to get started

• Each user need be enabled manually. Send a request to geneartapi@thermofisher.com to get instructions.

• To try the API in action use the provided Postman collection with examples for requests.
  ✓ Install Postman tool (postman.com)
  ✓ Import “GeneArtApis April2020.postman_collection.json” as a collection.
  ✓ Select individual requests from the tree on the left.

• To see detailed specifications and to 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
Design & Diagnostics API example: diagnostics-gs webservice

- Web-service name is part of the URL
- Data is exchanged in the JSON format, that is a set of key-value pairs.
- In the request body, “acgtSequence” is a key, while “AAGAGATTGA…” is a value, representing a sequence that needs to be checked.
- In the response, is the list of key-value pairs, with “isPrimePossible”: true and “isValuePossible”: false, indicating that this sequence can be ordered as a Prime product, but not as a Value product.
- In addition, is a list of problems, preventing a sequence from being ordered as Value.

More information can be found in DesignAndDiagnosticsBulk.yaml file
Upload & Ordering API example: construct upload

- Request body consists of the two main parts: Authentication and Project.
  - Authentication information consists of the thermofisher.com username and access token provided when access is requested.
    - For the purpose of testing one can use example access data, but no confidential sequences should be uploaded with it.
  - Project contains list of constructs, each with name, sequence, product type and (optionally) details.
    - I.e. for “geneSynthesisPrime” product details can include vector name, delivery quantity and some other options.
  - Most important value in Response is project id, which can be later used to add project to cart or review status.

More information can be found in UploadAndOrdering.yaml file.