# Achieve New Breakthroughs in RNA with the Benchling R&D Cloud

The Promise of RNA

Given the seminal role of RNA in nature, scientists continue to use RNA sequences and oligonucleotides for a variety of research, diagnostic, and therapeutic applications. Because RNA therapeutics can target conditions that small molecules and proteins cannot address, researchers are now on the verge of treating previously 'undruggable' diseases. From the approval of the first antisense oligonucleotide, aptamer, and small interfering RNA, to the now famous launch of mRNA-based COVID-19 vaccines and significant interest in RNA-based gene therapies and guide RNA-based CRISPR gene editing technology, the pipeline of RNA therapies and vaccines has expanded dramatically. RNA molecules are fundamentally changing our understanding of biology and how we address disease.
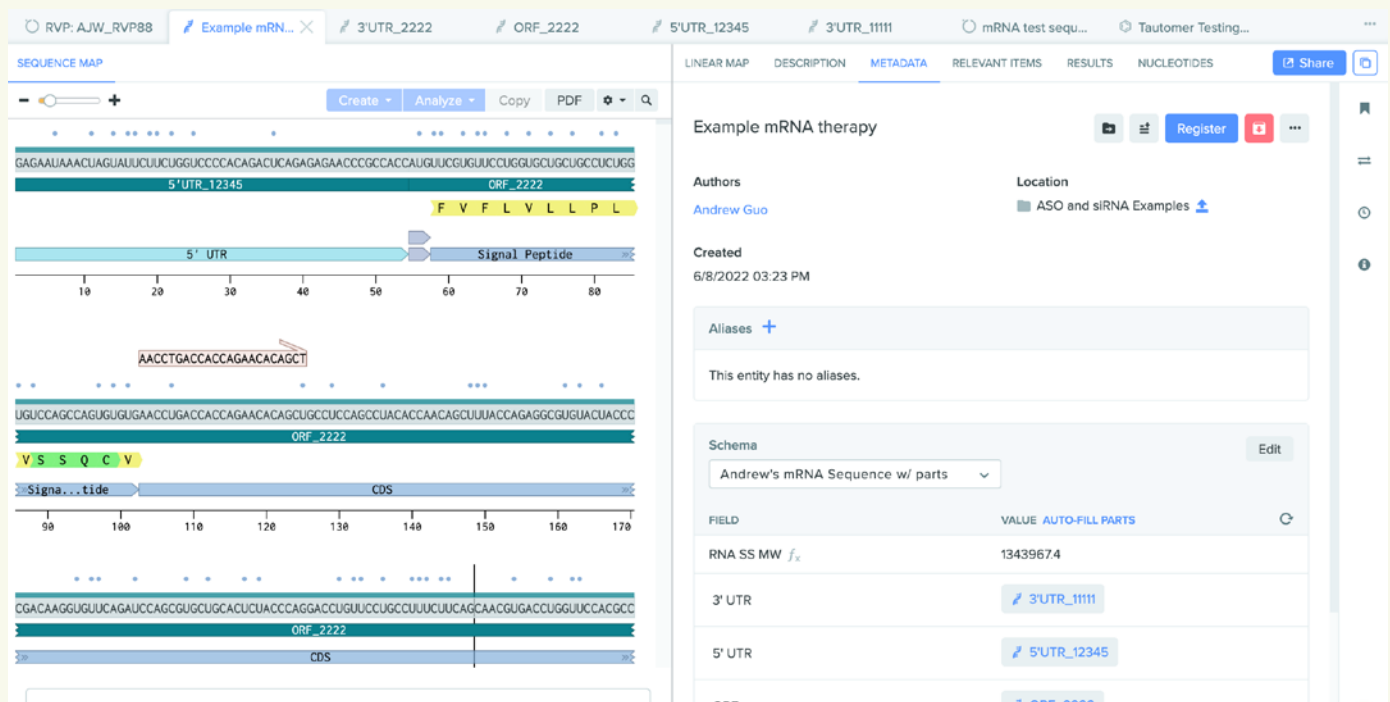
RNA R&D requires more advanced, dynamic software

As RNA molecules have gained traction scientifically and clinically, the software tools to engineer them have been frustratingly limited. The design of these sequences / oligos, study of functional properties, and analysis of results require an evolving solution that can adeptly handle both chemistry and biology workflows.

Syntax standardization

Without a clear standard to represent chemical modifications, scientists and RNA vendors have come up with their own syntaxes. These teams spend a significant amount of time translating their bases into a shared language. Standardized nomenclature will make data sharing easier and accelerate sequence / oligo design.

Support for both chemistry and biology

Biology teams are studying intracellular delivery mechanisms and RNA biology. While chemistry teams seek to improve the biophysical properties of RNA therapeutics with chemical modifications. Software tools must be able to design chemically modified RNA while connecting the biological assays with complete context.
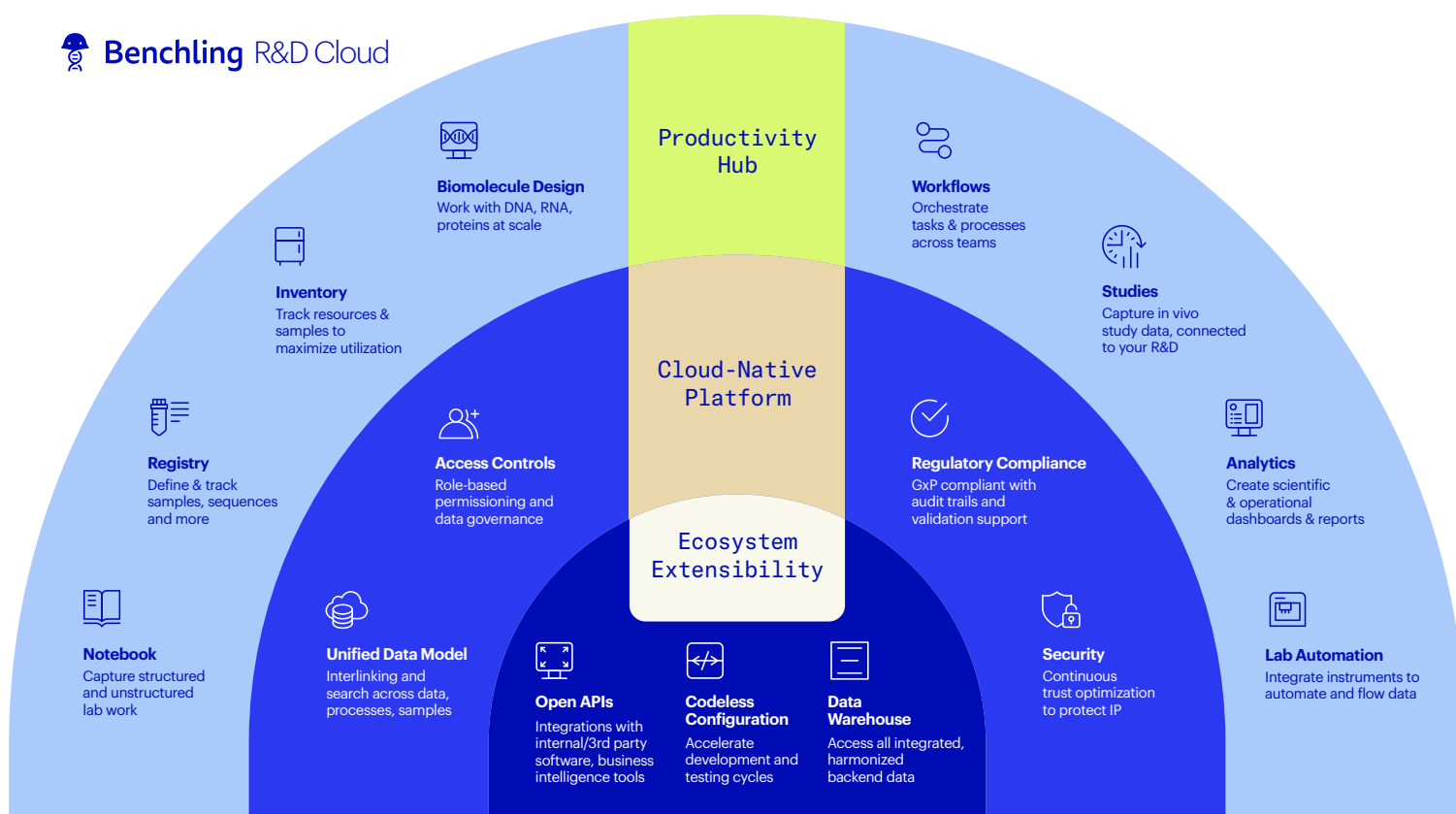
Iterative sequence and oligo design

Scientists continue to improve potency, specificity, stability, and tolerability of RNA molecules, which require research teams to design, test, and refine RNA sequences and oligos quickly. Modern software should streamline iterative RNA design, R&D collaboration, and institutional knowledge sharing.

Design and develop RNA on the Benchling R&D cloud

Benchling is a modern, unified, fully configurable, and easy-to-use solution that adapts to the rapidly evolving needs of RNA R&D. For the first time, R&D teams can design natural and chemically modified oligonucleotides, gRNA, mRNA, and other RNA sequences in a single solution. They can also centralize experimental results, standardize on syntax, and collaborate with teammates more effectively on a single platform. The platform is flexible, easy-to- use, and purpose-built to drive efficient experimentation. With Benchling, researchers developing cutting edge RNA therapeutics can bring these breakthrough therapies to market faster.

Benchling R&D Cloud

Productivity Hub

Cloud-Native Platform

Ecosystem Extensibility

Biomolecule Design
Work with DNA, RNA, proteins at scale

Inventory
Track resources & samples to maximize utilization

Registry
Define & track samples, sequences and more

Access Controls
Role-based permissioning and data governance

Notebook
Capture structured and unstructured lab work

Unified Data Model
Interlinking and search across data, processes, samples

Open APIs
Integrations with internal/3rd party software, business intelligence tools

Codeless Configuration
Accelerate development and testing cycles

Data Warehouse
Access all integrated, harmonized backend data

Workflows
Orchestrate tasks & processes across teams

Studies
Capture in vivo study data, connected to your R&D

Regulatory Compliance
GxP compliant with audit trails and validation support

Analytics
Create scientific & operational dashboards & reports

Security
Continuous trust optimization to protect IP

Lab Automation
Integrate instruments to automate and flow data

Faster RNA Design

Visualize chemical modifications and sequence features in a single view

Model modified, longer length RNA sequences or short length oligos with Benchling. Use the RNA visualization tool to overlay chemical modifications over sequence features such as annotations to view key information at once.

Execute chemical modifications easily across entire sequence

Navigate between structure-based monomer management and sequence-level chemical modifications efficiently. Use "find and replace" to execute chemical modifications easily across entire sequences with just a few clicks.

Standardize design work and ensure sequence uniqueness during registration

Design or modify RNA sequences or oligo sequences with a standardized syntax and central monomer library. Automatically check sequences for uniqueness during registration to avoid duplication.

Simplified Collaboration

Customize data model to connect and track the lineage of stored entities and samples

Customize data models to fit your unique science and inventory hierarchy. Interlink stored entities and samples to improve traceability and lineage tracking across monomers, small molecules, RNA sequences, batches, containers, and other inventory items.

Share results and data with full experimental context

Automatically link all key data related to an RNA oligo or sequence entity such as experimental history, inventory location, and associated analytical results. Ensure complete experimental context is transferred during handoffs between teams across R&D life cycle.

Find part or full RNA sequences with or without chemical modifications

Use advanced search functionality, including sorting and filtering options, to quickly find natural or modified RNA sequences or oligos. Promote transparency across teams and provide ready access to all your team's sequences and related data with just a few clicks.

Higher Quality Data and Insights

**Standardize experimental record keeping and work output across team**

Keep consistent records across experiments and scientists with structured results tables. Improve data integrity and reduce the need for redundant or repeat work by standardizing data entry across users.

Centralize experimental data collected against RNA, small molecules, and monomers

Consolidate all relevant results on RNA candidates and related small molecule entities / monomers automatically in a single registry view. Enhance data traceability by making it easy to track entire experimental history.

Aggregate and visualize results across experiments, teams, and RNA candidates

Gather characterization results from diverse assays and tests and visualize the results with in-platform visualization tools. Save scientists time by automatically connecting RNA structural modifications with experimental data.
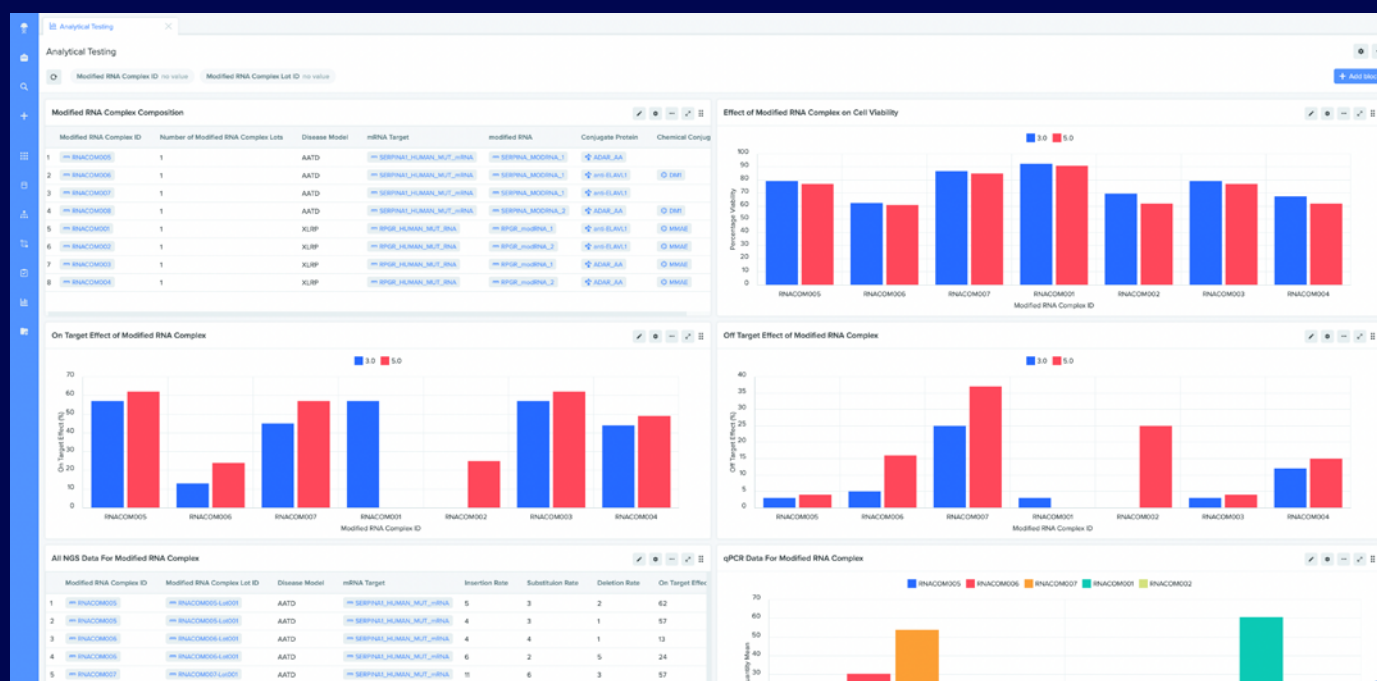
The Benchling R&D cloud is trusted by leading RNA R&D Companies

Join over 200,000 scientists using Benchling to power life science R&D.

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