custom oligos • qPCR • next generation sequencing • RNAi • genes & gene fragments • CRISPR genome editing

IDT™
INTEGRATED DNA TECHNOLOGIES

YOUR ADVOCATE
FOR THE GENOMICS AGE

PRODUCTS & SERVICES

See what we can do for **you** at **www.idtdna.com**

custom oligos • qPCR • next generation sequencing • RNAi • genes & gene fragments • CRISPR genome editing

Custom DNA Synthesis

Synthesis Scale	Length (bases)
25 nmol	15 - 60
100 nmol	10 - 90
250nmol	5 - 100
1 µmol	5 - 100
5 µmol	5 - 100
10 µmol	5 - 100

Custom DNA Synthesis in Plates

Synthesis Scale	Length (bases)
500 picomole DNA Plate Oligo*	15 - 60
25 nmol DNA Plate Oligo	15 - 60
100 nmol DNA Plate Oligo	10 - 90
250 nmol DNA Plate Oligo	5 - 100
1 µmol DNA Plate Oligo	5 - 100

Minimum order of 24 oligos required per plate for 25 nmol to 1µmol scale.
Free normalization service for plates.
*A minimum order of 288 oligonucleotides is required for the 500 pmol scale

Ultramer Oligonucleotide Synthesis (45–200 bases)

Product	Purification	Guaranteed Yield
4 nmol Ultramer DNA Oligo	Standard Desalt	4 nmol
20 nmol Ultramer DNA Oligo	Standard Desalt	20 nmol
PAGE Purification for Ultramer Oligos	PAGE Purification	Inquire
200 picomole Ultramer DNA Plate Oligo	Standard Desalt	200 pmol / well
4 nmol Ultramer DNA Plate Oligo	Standard Desalt	4 nmol / well
20 nmol Ultramer DNA Plate Oligo	Standard Desalt	20 nmol / well

See www.idtdna.com for modifications for Ultramer Oligonucleotides and more details.

IDT offers many analytical and preparative services for oligos including;

- Mass spectrometry QC offered for all oligos
- LabReadyOligo Service - shipped in IDTE at 100 µM
- Standard mixed-base sites
- Custom analytical services

Custom RNA Synthesis

Synthesis Scale	Length (bases)
100 nmol	5 - 60
250 nmol	5 - 60
1 µmol	5 - 60
5 µmol	5 - 60
10 µmol	5 - 60

Ultramer RNA Oligonucleotides Synthesis (60-120 bases)

Product	Purification	Guaranteed Yield
Ultramer RNA Oligo, 4 nmol	Standard Desalt	4 nmol
Ultramer RNA Oligo, 20 nmol	Standard Desalt	20 nmol
Ultramer RNA Oligo, 80 nmol	Standard Desalt	80 nmol

Purification

Purification	25 nmol	100 nmol	250 nmol	1 µmol	5 µmol	10 µmol
PAGE	N/A	√	√	√	√	√
HPLC	N/A	√	√	√	√	√
IE-HPLC	N/A	√	√	√	√	√
RNase-Free HPLC	N/A	√	√	√	√	√
Dual HPLC	N/A	√	√	√	√	√
Dual PAGE & HPLC	N/A	N/A	√	√	√	√

PAGE provides extremely high purity, especially for unmodified and Ultramer Oligonucleotides. PAGE purification is strongly recommended for oligos >60 bases. For unmodified oligos, purity > 90% is guaranteed.

Reverse-Phase HPLC (RP-HPLC) is suitable for purifying any modified or unmodified oligo sequence ≤60 bases.

Ion-exchange HPLC (IE-HPLC) is suitable for purifying long DNA oligos. For unmodified oligos, purify >85% is routinely achieved.

RNase-Free HPLC purification is available for isolating RNA and DNA oligonucleotides which will be used in applications with a high sensitivity to ribonucleases.

Dual Purification results in oligos of the highest possible purity. It is suitable for the most demanding applications.

Modifications

Modification	5′	Internal	3′	DNA	RNA
Attachment Chemistry / Linkers					
Amino Modifier C12	/5AmMC12/	x	x	√	√
Amino Modifier	/5AmMC6/	/iAmMC6T/	/3AmMO/	√	√
Biotin	/5Biosg/	/iBiodT/	/3Bio/	√	√
Digoxigenin (NHS Ester)	/5DigN/	/iDigN/	/3Dig_N/	√	○
Thiol Modifier S-S	/5ThioMC6-D/	○	/3ThioMC3-D/	√	√
Phosphorylation					
Phosphorylation	/5Phos/	x	/3Phos/	√	√
Modified Bases					
deoxyUridine	/5deoxyU/	/ideoxyU/	/3deoxyU/	√	√
deoxyInosine	/5deoxyI/	/ideoxyI/	/3deoxyI/	√	√
5-Methyl dC	/5Me-dC/	/iMe-dC/	/3Me-dC/	√	√
Flurophores					
6-FAM (Fluorescein)	/56-FAM/	x	/36-FAM/	√	√
TET	/5TET/	x	/3AmMO/	√	√
HEX	/5HEX/	x	/3Bio/	√	√
JOE (NHS Ester)	/56-JOEN/	○	/3JOE_N/	√	○
Cy 3	/5Cy3/	/iCy3/	/3Cy3Sp/	√	√
ROX (NHS Ester)	/56-ROXN/	○	/3Rox_N/	√	○
Cy 5	/5Cy5/	/iCy5/	/3Cy5Sp/	√	√
Quenchers					
Iowa Black FQ	/5IABkFQ/	○	/3IABkFQ/	√	√
Iowa Black RQ	/5IAbRQ/	○	/3IAbRQSp/	√	√
Black Hole Quencher 1	/5BHQ_1/	○	/3BHQ_1/	√	○
Black Hole Quencher 2	/5BHQ_2/	○	/3BHQ_2/	√	○
Spacers					
Spacer 18	/5Sp18/	/iSp18/	/3Sp18/	√	√
C3 Spacer	/5SpC3/	/iSpC3/	/3SpC3/	√	√

√ Available ○ Inquire x Not available

Freedom Dye Fluorophores

IDT has created a class of royalty-free dyes for any purpose, including diagnostic and commercial applications. Our in-house chemistry research and licensing efforts with dye suppliers have enabled us to offfer a comprehensive set of Freedom Dyes that spans the entire spectrum.

Freedom Dye*	Comparable Dyes
FAM	FAM
MAX 550	JOE, VIC
TYE 563	Cy 3
TEX 615	Texas Red-X
TYE 665	Cy 5
TYE 705	Cy 5.5

* Most Freedom Dye Fluorophores are also available for 3′ end-labeling.

Additional purification may be required for some modifications.

For complete listing, please visit www.idtdna.com

TruGrade DNA Oligos

TrueGrade oligos are manufactured by proprietary methods that are proven to reduce index cross-talk and increase success of multiplex NGS experiments. The TruGrade synthesis and processing service is available on HPLC-purified DNA oligos and Ultramer DNA oligos. They are available in plates and tubes, and can be formualted to your specifications. TruGrade DNA oligos can be used in a variety of applications including, but not limited to:

- Library preparation to incoporate barcoded adapters for multiplexing nex-generation sequencing
- PCR using barcoded fusion primers for multiplex amplicon sequencing
- Other molecular biology applications that are sensitive to oilgo crosstalk

Parameter	HPLC purified DNA oligos	Ultramer DNA Oligos
Typical cross-contamination[1]	0.10 - 0.50%	0.01 - 0.05%
Typical time to shipment[2]	5 to 15 business days	3 to 10 business days
Synthesis scale	100 nmol, 250 nmol, or 1 µmol	N/A
Yield delivered	Variable	4 nmol or 20 nmol

[1] Typical cross-contamination levels were determined using in-house proprietary QC techniques and information from our customers.
[2] Production time depends on the number of oilgos ordered. Please inquire for an estimated ship date specific to your order.

RxnReady Primer Pools & Duplexed DNA

All PCR and qPCR primers are produced with industry-leading coupling efficiencies, resulting in higher quality DNA products. Our specialized platforms allow us to deliver the purest primers for your research needs.

2 oligos premixed in a single tube.
Shipped dry, or resuspended to your specifications.

Product	Length	Guranteed yield*
RxnReady Oligos, 25 nmol	15 - 60 bases	3 ODs
RxnReady Oligos, 100 nmol	10 - 90 bases	6 ODs
RxnReady Oligos, 250 nmol	5 - 100 bases	15 ODs

* Guaranteed yield for standard, desalted oligos.

2 oligos, annealed and delivered in a single tube. Shipped dry.

Product	Length	Guranteed yield*
100 nmol Duplex Oligo	10 - 90 bases	6 ODs
250 nmol Duplex Oligo	5 - 100 bases	15 ODs
1umole Duplex Oligo	5 - 100 bases	50 ODs

oPools DNA Oligo Pools

Oligo pools are individually synthesized single-stranded DNA sequences that range from 40 to 200 bases. Each pool can be designed with up to 20,000 oligos in a single tube. Delivered dry.

Scale (pmol/oligo)	Number of oligos per pool	Oligo length (bases)
1	100 to 20,000	40 to 200
10	10 to 2,000	40 to 200
50	2 to 384	40 to 200

*For oligo lengths greater than 200 bases, please contact genes@idtdna.com

GMP Manufacturing

Our GMP manufacturing services include dedicated ordering, production, final-fill, and shipping systems that meet the elevated quality standards required for products used in clinical or molecular diagnostic applications. IDT is a contract GMP manufacturer of oligonucleotide reagent components for in vitro diagnostic devices (IVDs) and analyte-specific reagents (ASRs) for laboratory developed tests (LDTs). IDT's GMP facilities are located in Coralville, IA, and Leuven, Belgium, and are:

- ISO 13485:2003 certified (since 2008)
- Compliant with US Food & Drug Adminstration (FDA) Quality System Regulation (QSR) 21 CFR Part 820
- US FDA registered (3004613294)

PrimeTime qPCR Probes

Primetime qPCR probes are non-extendable oligonucleotides, labeled with a 5′ fluorescent reporter and a 3′ quencher dye, licensed for use in5′ qPCR assays.

Minimum Guaranteed Yield in nmol			
Reporter/Quencher	100 nmol scale	250 nmol scale	1 µmol scale
5′ 6-FAM / ZEN / 3′ Iowa Black FQ	15	25	50
5′ 6 FAM / 3′ BHQ 1	10	25	50
5′ 6-FAM / 3′ TAMRA	10	25	50
5′ HEX / ZEN / 3′ Iowa Black FQ	10	25	50
5′ HEX / 3′ BHQ 1	10	25	50
5′ YAK / ZEN / 3′ Iowa Black FQ	NA	25	50
5′ TET / ZEN / 3′ Iowa Black FQ	10	25	50
5′ TET / 3′ BHQ 1	10	25	50
5′ JOE / ZEN / 3′ Iowa Black FQ	NA	8	20
5′ MAX / ZEN / 3′ Iowa Black FQ	2	8	20
5′ TYE 563 / 3′ Iowa Black RQ	2	8	20
5′ TYE 665 / 3′ Iowa Black RQ	2	8	20
5′ TEX 615 / 3′ Iowa Black RQ	2	8	20
5′ Cy 5 / TAO / 3′ Iowa Black RQ	2	8	20
5′ Cy 5 / 3′ BHQ 2	2	8	20
5′ Cy 3 / 3′ Iowa Black RQ	2	8	20
5′ Cy 3 / 3′ BHQ 2	2	8	20

The ZEN /TAO internal quencher decreases the length between the fluorophore and quencher resulting in:

- Less background
- Reduced C_q values
- Improved Precision

For more information on ZEN / TAO internal quenchers, visit www.idtdna.com. For other fluorophore / quencher combinations, please enquire.

PrimeTime qPCR Mini Probes and Eco Probes

The Primetime Mini qPCR probes are ideal for testing new probes and screening to measure the expression levels of many genes. The Primetime Eco qPCR probe is the ideal scale for researchers who need to perform ~500 reactions for gene expression analysis. The combination of medium scale and low cost is ideal for initial screening of large sample sets. Both Mini and Eco Probes are available as double-quenched probes, with 5′FAM and a 3′ IBFQ quencher in combination with an internal ZEN quencher and are shipped within 3 - 5 business days.

Product	5′ Reporter Dye(s)	Quencher(s)	Delivery Amount
Mini	FAM	ZEN / Iowa Black FQ	0.5 nmol
Eco			2.5 nmol

MGB Eclipse Probes and Primers*

PCR is an important tool for in vitro diagnosis and patient management. The gold standard for qPCR is 5′ nuclease assays, using probes that incorporate a minor groove binder.

MGB Eclipse Probes.
The incorporation of a minor groove binder (MGB) stabilizes probe-target hybridization and increases melting temperature, allowing the use of shorter probes which are better suited for allelic discrimination and targeting AT-rich regions in qPCR assays.

We have combined our oligo manufacturing expertise and ISO 13485 certified production process to deliver MGB Eclipse Probes and companion GMP primers for use as components in clinical diagnostic tests.

** For use as a component in the Purchaser's Human IVD applications only.*

PrimeTime qPCR Assays

PrimeTime qPCR Assays consists of a forward primer, a reverse primer, and a hydrolysis probe delivered in a single tube. With the added capabilities of selecting from multiple dye-quencher combinations, primer-to-probe ratio, and qPCR design parameters, optimizing qPCR reactions is no longer complicated or expensive. PrimeTime qPCR Assays are offered in three different sizes to meet any qPCR experimental need. In addition, for the Standard and XL sizes, selection of dye-quencher combination and primer-to-probe ratio can be specified to meet unique experimental demands.

Assays ship in 2 - 4 days from order placement. Each oligo undergoes 100% QC by mass spetometry, and all QC results are provided free of charge on the IDT website.

Product	Reactions (20 µL)	Probe (nmol)	Primers (nmol)
PrimeTime Mini	100	0.5	1
PrimeTime Standard	500	2.5	2.5–10
PrimeTime XL	2500	12.5	12.5–50

Order qPCR assays using the PrimeTIme qPCR Assay Library Selection Tool, the RealTime PCR design tool, or provide custom sequences.

Dye / Quencher Combinations

Dye	Quencher	Mini	Standard	XL
5′ FAM	ZEN / 3′ Iowa Black FQ	√	√	√
5′ FAM	3′ TAMRA		√	√
5′ HEX	ZEN / 3′ Iowa Black FQ		√	√
5′ TET	ZEN / 3′ Iowa Black FQ		√	√
5′ Cy 5	3′ Iowa Black RQ		√	√

PrimeTime qPCR Primers

PrimeTime qPCR Primers are ideal for SYBR Green, EvaGreen, and other intercalating dye assays, where no probe is needed. These predesigned primer pairs are identical to those in PrimeTime Predesigned qPCR Assays for human, mouse, and rat transcriptomes.

Product	No. of Reactions (20 µL)	Quantity (nmol)
PrimeTime qPCR Primers (Tube)	500	5
PrimeTime qPCR Primers (Plate)	500	5

Probe-Based qPCR Master Mix

PrimeTime Gene Expression Master Mix is a 2X solution designed for use in two-step RT-qPCR. Each order includes a 2X master mix solution (antibody-mediated, hot-start DNA polymerase; dNTPs; MgCl2; enhancers; and stabilizers) and a separate reference dye stock solution. Ambient Shipping.

- Achieve high efficiency qPCR with fast or standard cycling, or singleplex or multiplex conditions.
- Obtain consistent results from overnight experiments with exceptional benchtop stability.
- Attain optimal performance at an optimal price.
- Inquire about license-free options for commercial or diagnostic use.

Product	Catalog #	Unit Size	Reactions
1 mL PrimeTime Gene Expression Master Mix	1055770	1 x 1 mL	100 x 20µL
5 mL PrimeTime Gene Expression Master Mix	1055772	1 x 5 mL	100 x 20µL
25 mL PrimeTime Gene Expression Master Mix	1055771	5 x 5 mL	2500 x 20µL

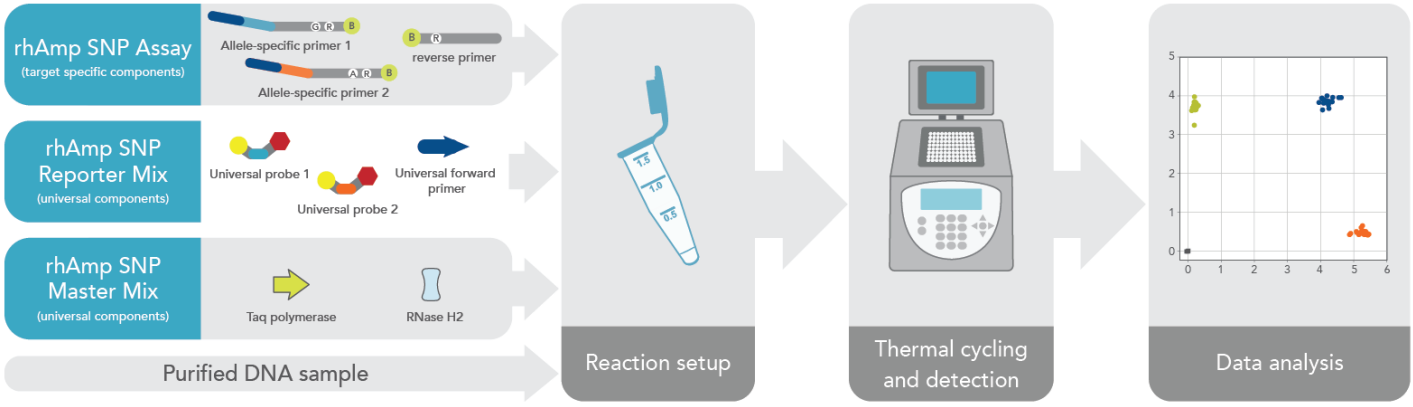
Ambient temperature shipping

As part of our sustainability efforts, IDT scientists conducted extensive testing to show that ambient temperature shipping conditions do not impact the function of the master mix. Elimination of shipping on dry ice maximizes your research budget, minimizes shipping delays, and benefits the environment. Visit www.idtdna.com/qPCRmastermix to know more.

rhAmp SNP Genotyping

rhAmp SNP Assays provide a simple, highly accurate, complete solution for SNP analysis that increases assay specificity through the use of RNase-H2–activated primers. rhAmp SNP Assays offer the best mix of performance and price. The rhAmp SNP Genotyping System is a complete solution requiring the following 3 components:

- rhAmp SNP Assays, or rhAmp ADME SNP Assays
- rhAmp Genotyping Master Mix, required for activation and PCR amplification of all rhAmp SNP Assays
- rhAmp Reporter Mix, available with or without reference dye for compatibility with all common qPCR instruments



A simple, single-tube reaction chemistry supports streamlined lab processes. All reagents are combined in the initial reaction setup, which is then stable for up to 24hr at room temperature before cycling. rhAmp SNP Genotyping is compatible with common qPCR platforms.

Product	Package size	Reactions*	Concentration
rhAmp SNP Assay or rhAmp ADME SNP Assay	XS	100	20X
	S	750	20X
	M	2500	80X
	L	6000	80X

* Reaction size is for a 10 µL reaction volume

LNA PrimeTime Probes

LNA PrimeTime Probes are dual-labeled DNA probes designed for use in 5′ nuclease assays. LNA PrimeTime Probes have increased sensitivity for distinguishing DNA base-pair mismatches, and are commonly used for SNP genotyping assays

Product / Synthesis Scale	5′ Reporter Dye	3′ Quencher	Delivery Amount
Mini LNA PrimeTime Probes	FAM, HEX or Yakima Yellow	Iowa Black FQ or Black Hole Quencher 1	0.5 nmol normalized yield
250 nmol	FAM, HEX or Yakima Yellow	Iowa Black FQ or Black Hole Quencher 1	8 nmol minimum guaranteed yield
	Cy 3, Cy 5, TEX, TYE	Iowa Black RQ-Sp or Black Hole Quencher 1	8 nmol minimum guaranteed yield
1 µmol	FAM, HEX or Yakima Yellow	Iowa Black FQ or Black Hole Quencher 1	20 nmol minimum guaranteed yield
	Cy 3, Cy 5, TEX, TYE	Iowa Black RQ-Sp or Black Hole Quencher 1	20 nmol minimum guaranteed yield

gBlocks Gene Fragments

gBlocks Gene Fragments are double-stranded, sequence-verified genomic blocks up to 3000 bp in length which enable easy gene construction or modification. gBlocks Gene Fragments are typically shipped within 5 business days (up to 1 kb) or 8 business days (up to 3 kb).

Length (bp)	Typically Shipped (business days)
125 - 500	2 - 4
501 - 750	2 - 4
751 - 1000	3 - 5
1001 - 1250	5 - 8
1251 - 1500	5 - 8
1501 - 1750	5 - 8
1751 - 2000	5 - 8
2001 - 2250	5 - 8
2251 - 2500	5 - 8
2501 - 2750	5 - 8
2751 - 3000	5 - 8

Specifications

- Purified double-stranded DNA, delivered dried down
- Can be ordered 5′ phosphorylated or un-phosphorylated, depending on intended cloning method
- Delivered with a short protocol that summarizes cloning methods - complete assembly and cloning protocols are available online
- Free codon optimisation tool available online
- Available with N and K mixed bases

For further details, visit www.idtdna.com/gblocks.

Business Days: shipping time for gBlocks Gene Fragments is dependent on length and complexity, and in a few cases, may exceed these estimated times.

Custom Gene Synthesis

Product	Yield	Length (bp)	Typically Shipped (business days)
MiniGene Synthetic Genes	4 µg purified plasmid DNA	Up to 500	8
Custom Gene Synthesis	4 µg purified plasmid DNA	501 - 1500	12
		1501 - 3000	18
		3001 - 5000	25
	1 µg in a BAC	Over 5000	Inquire

Genes can be used in a number of applications, including:

- Protein expression
- miRNA genes
- Template for in vitro transcription
- DNA vaccines and vectors
- Gene variants and SNPs

Megamer Single-Stranded DNA Fragments

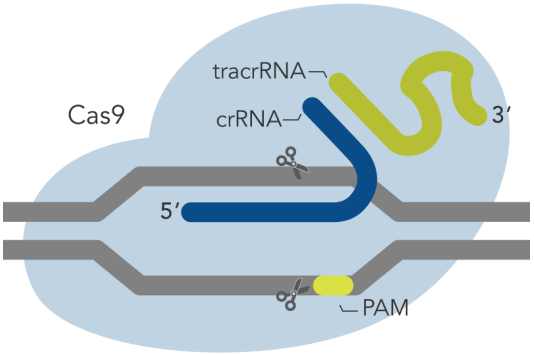
Megamer ssDNA Fragments are single-stranded genomic blocks for applications such as homology-directed repair of CRISPR-mediated genome editing, in vitro transcription, and more. They range in length from 201-2000 bases and are synthesized with clonally purified DNA, which offers the greatest purity available. Megamer ssDNA fragments are sequence-verified via next generation sequencing and are typically shipped within 20 business days*. They are composed of A, T, G, and C nucleotides only.

Product	Final Deliverable
Megamer™ ssDNA Fragments—Sense + Antisense, 201–500 bases (paired)	3 µg
Megamer™ ssDNA Fragments—Sense + Antisense, >500 bases (paired)	
Megamer™ ssDNA Fragment, 201–500 bases (individual)	
Megamer™ ssDNA Fragment, >500 bases (individual)	

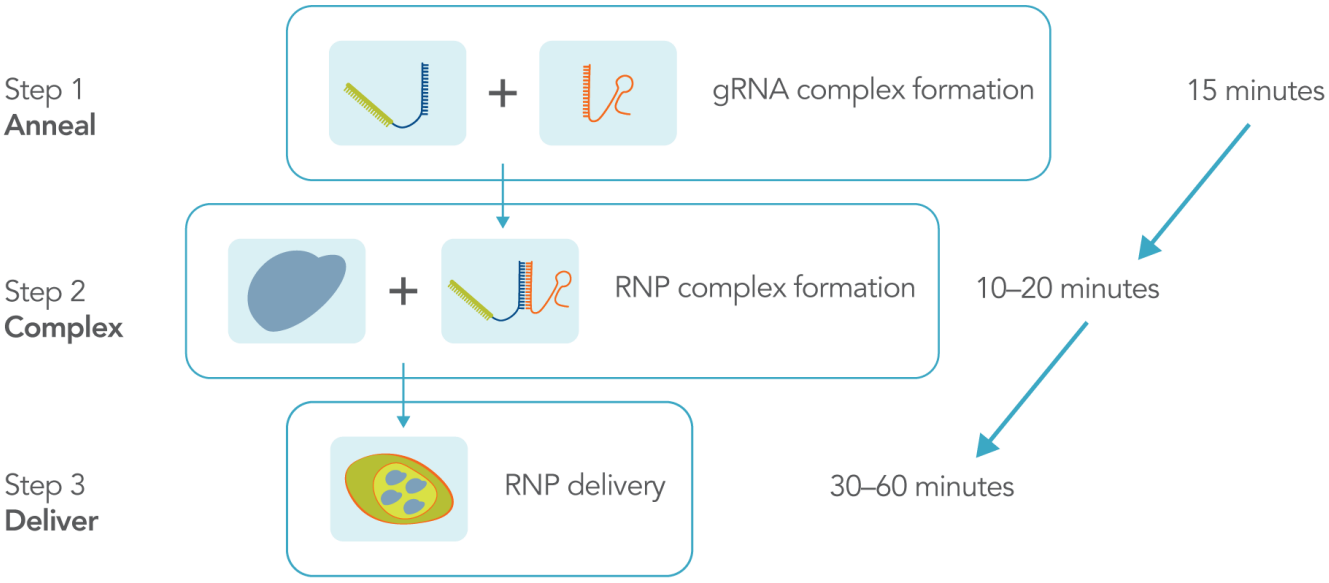
Alt-R CRISPR-Cas9 System

The Alt-R CRISPR-Cas9 System includes all of the reagents needed for successful genome editing based on the natural S. pyogenes CRISPR-Cas9 system. Discover what makes the Alt-R CRISPR-Cas9 system best in class.

- Benefit from the latest improvements in on- and off-target design and chemical modifications, as well as easy ordering of custom or predesigned guide RNAs.
- Get optimal editing with high on-target potency and reduced off-target activity with Alt-R HiFi CRISPR-Cas9 nuclease
- Precisely control editing with efficient delivery of the RNP by lipofection or electroporation
- Protect your cells from toxicity or innate immune response activation



Simple, 3-step delivery of ribonucleoprotein complexes (crRNA:tracrRNA:Cas9)



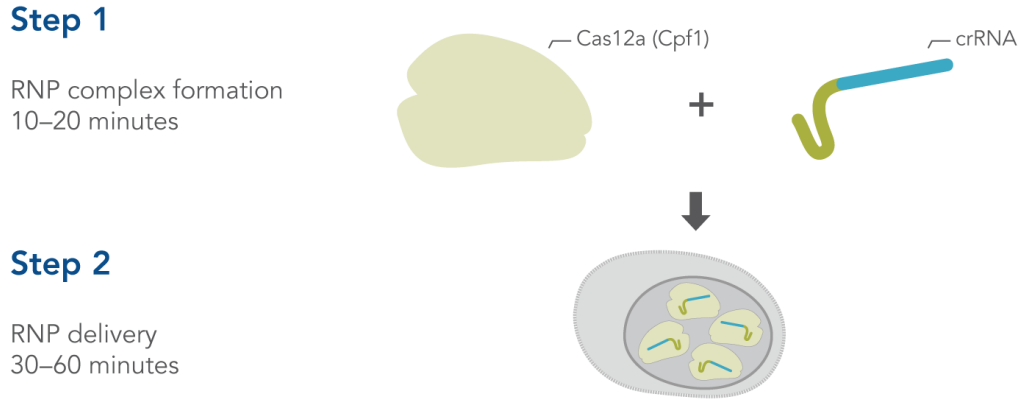
Overview of Alt-R CRISPR-Cas9 System experiments for ribonucleoprotein delivery by lipid-mediated transfection, electroporation, or microinjection.

Alt-R CRISPR-Cas12a System

The Alt-R CRISPR-Cas12a System allows targeting of alternative sites that are not available to the CRISPR-Cas9 System and produces a staggered cut with a 5′ overhang.

- Enables genome editing in organisms with AT-rich genomes
- Allows interrogation of additional genomic regions compared to Cas9
- Requires simple complexing of crRNA with the Cas12a protein—no tracrRNA needed

Simple, 2-step delivery of ribonucleoprotein complexes (crRNA:Cas12a)



Overview of Alt-R CRISPR-Cas12a System experiments for ribonucleoprotein (RNP) delivery by electroporation.

Guaranteed editing with predesigned crRNA designs

We guarantee the performance of our predesigned crRNAs targeting human, mouse, rat, zebrafish, or nematode genes. For details about the predesigned crRNA guarantee, see www.idtdna.com/CRISPR-Cas9. For other species or to target intergenic regions, you may use our proprietary algorithms to design custom crRNAs. If you have crRNA protospacer designs of your own or from publications, use our design checker tool to assess their on-and off-targeting potential before ordering crRNAs that are synthesized incorporating Alt-R crRNA modifications.

Alt-R design tool	URL
Predesigned crRNA selection	www.idtdna.com/Cas9Predesigned
Custom crRNA design	www.idtdna.com/Cas9Custom
User-defined crRNA design checker	www.idtdna.com/Cas9Checker

Required ribonucleoprotein components

Alt-R CRISPR-Cas9 crRNA

- Target-specific RNA oligo, custom synthesized based on your sequence
- Contains proprietary chemical modifications to protect from degradation by cellular RNases

Product	Tube	Plate
Alt-R CRISPR-Cas9 crRNA	√	√
Alt-R CRISPR-Cas9 crRNA XT	√	√

Alt-R CRISPR-Cas9 tracrRNA

- Universal RNA oligo (unlabeled or fluorescently labeled) that forms an RNA duplex with the crRNA and subsequently complexes with Cas9 nuclease
- Contains proprietary chemical modifications to protect from degradation by cellular RNases

Product	Amount		
Alt-R CRISPR-Cas9 tracrRNA	5 nmol	20 nmol	100 nmol
Alt-R CRISPR-Cas9 tracrRNA, ATTO™	5 nmol	20 nmol	NA

Alt-R CRISPR-Cas9 sgRNA

- A single RNA containing both crRNA and tracrRNA regions
- Contains additional chemical modifications for challenging conditions

Product	Tube	Plate
Alt-R CRISPR-Cas9 sgRNA	√	√

Alt-R S.p. Cas9 Nuclease/ Nickase

- Protein that binds the crRNA:tracrRNA duplex, creating an experiment-ready, active ribonucleoprotein (RNP) complex
- Contains nuclear localization sequence (NLS) and C-terminal 6-His tag.

Product	Amount	
Alt-R S.p. Cas9 Nuclease V3	100 µg	500 µg
Alt-R S.p. HiFi Cas9 Nuclease V3	100 µg	500 µg
Alt-R S.p. Cas9 D10A Nickase V3	100 µg	500 µg
Alt-R S.p. Cas9 H840A Nickase V3	100 µg	500 µg
Alt-R S.p. dCas9 Protein V3	100 µg	500 µg

Alt-R CRISPR-Cas12a (Cpf1) crRNA

- Target-specific RNA oligo, custom synthesized based on your sequence

Product	Tube	Plate
Alt-R CRISPR-Cas12a crRNA	√	√

Alt-R CRISPR-Cas12a (Cpf1) Nuclease

- Protein that binds the Cas12a crRNA, creating an experiment-ready, active ribonucleoprotein (RNP) complex
- Contains nuclear localization sequence (NLS) and C-terminal 6-His tag.

Product	Amount	
Alt-R A.s. Cas12a (Cpf1) Ultra	100 µg	500 µg
Alt-R A.s. Cas12a (Cpf1) V3	100 µg	500 µg

Additional reagents and kits

Alt-R CRISPR-Cas9 Control Kits
- Human, rat, or mouse
- Contains HPRT positive control crRNA, negative control crRNA, tracrRNA, PCR primers for analysis of samples transfected with the positive control crRNA

Alt-R CRISPR-Cas9 Electroporation Enhancer
- For primary and difficult-to-transfect cells (human, rat, or mouse).

Alt-R CRISPR-Cas12a (Cpf1) Electroporation Enhancer
- Purified carrier DNA that is required for efficient delivery of Cpf1 ribonucleoprotein (RNP) by electroporation (human, rat, or mouse).

Alt-R HDR Enhancer
- For improved rates of homology-directed repair

Alt-R Genome Editing Detection Kit
- For mutation detection and estimating editing efficiency

Product	Catalog #
Alt-R Genome Editing Detection Kit, 25 rxn	1075931
Alt-R Genome Editing Detection Kit, 100 rxn	1075932
Alt-R Genome Editing Detection Kit, 1000 rxn	1075933

DsiRNAs and TriFECTa Kit

DsiRNAs are chemically synthesized Dicer-substrate duplex siRNAs that have increased potency in RNA interference experiments compared to traditional siRNAs. They were developed as a collaborative effort betwee John Rossi (Beckman Research Institue of the City of Hope) and IDT. Dicer-substrate siRNAs are designed to be optimally processed by Dicer and can show increased potency by engaging this natural processing pathway. Using this approach, sustained knockdown has been regularly achieved using subnanomolar concentrations. New design rules specific to DsiRNAs have been developed by IDT and are available only at www.idtdna.com.

siRNA Duplexes

Product	RNAi Tube (21 mer)	DsiRNA Tube (27 mer)	DsiRNA Plate
2 nmol	√	√	√
10 nmol	√	√	√
40 nmol	√	√	N/A

Ideal for small-scale in vitro applications

TriFECTa Kit
• Three target-specific Dicer-substrate siRNA (27 mer) duplexes (2 nmol each) • Fluorescently-labeled transfection control duplex: TYE™ 563 (1 nmol) • HPRT-S1 DS positive control duplex (1 nmol) • NC1, negative control duplex (1 nmol) • RNase-free duplex buffer (100 mM KAc/30 mM HEPES pH 7.5)

TriFECTa Kit guarantee - We guarantee that at least 2 of the 3 DsiRNAs in your TriFECTa Kit will give you ≥70% knockdown of your target mRNA when:
- The DsiRNA is used at 10 nM concentration and assayed by qPCR
- Fluorescent transfection control experiments indicate >90% of cells have been transfected
- The HPRT positive control DsiRNA works with the expected efficiency

IDT miRNA Inhibitors

These steric blocking oligonucleotides hybridize to mature miRNAs and inhibit their function. IDT miRNA Inhibitors are RNA oligonucleotides comprised of 2'-O-methyl residues that confer increased binding affinity to RNA targets and resistance to endonuclease degradation, and ZEN modifications to block exonuclease degradation.

- Effectively inhibit miRNA function in vitro using low nanomolar concentrations
- Ensure sufficient miRNA knockdown with highly potent, highly specific reagents
- Simplify your experiments with intuitive design and ordering tools

Product	Amount		
IDT miRNA Inhibitor	5 nmol	20 nmol	250 nmol
IDT miRNA Inhibitor (IE HPLC)	NA	NA	250 nmol

Custom NGS Adapters

Custom NGS Adapters are for use in DNA library preparation for Illumina platform sequencing. They are optimized for specific NGS projects through customization of indexing strategy, such as:

- Single index (SI)
- Unique dual index identifier (UDI)
- Combinatorial dual index (CDI)
- Both unique dual index identifier and unique molecular identifier (UDI-UMI)

Custom NGS Adapters are provided as either a primer mix or duplexed oligos in tubes or plates

Components	Format	Diluent
TruSeq - Compatible Indexing Primers (used with TruSeq - Compatible Stubby Adapters)	Oligo Mixes	IDTE, pH 8.0 (1x TE Solution: 10mM Tris, 0.1 mM EDTA, pH 8.0)
Nextera - Compatible Primers		
TruSeq - Compatible Full-Length Adapters	Duplexed Mixes	Nuclease-free Duplex Buffer (30 mM HEPES, pH 7.5; 100mM potassium acetate)
TruSeq - Compatible Stubby Adapters (used with TruSeq - Compatible Indexing Primers)		

Amounts are based on the selected mass (2, 8, or 24 nmol) or reaction number (16 or 96 reactions).

xGen Dual Index UMI Adapters - Tech Access

xGen Dual Index UMI Adapters—Tech Access are designed and optimized for use on Illumina platforms.

- Improve the detection of low-frequency variants with unique molecular identifiers
- Prevent sample mis-assignment with adapter sequences containing 8-bp unique, dual indexes
- Increase sample multiplexing and reduce cost per sample using predesigned indexes optimized for 2- and 4-color Illumina sequencing instruments
- Achieve high performance hybrid capture when combined with xGen Universal Blockers—TS Mix

xGen Dual Index UMI Adapter

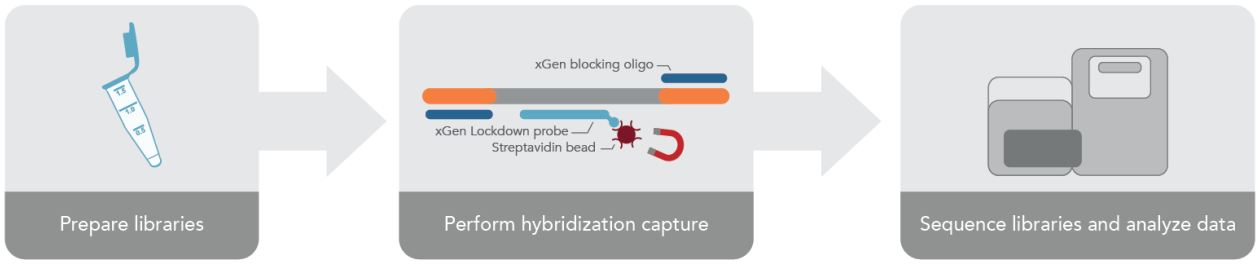
Lotus DNA Library Prep Kit

The Lotus DNA Library Prep Kit enables streamlined preparation of high-quality next generation sequencing (NGS) libraries from double-stranded DNA (dsDNA). The kit uses enzymatic fragmentation to generate libraries suitable for PCR-free, PCR-amplified, and targeted sequencing applications on Illumina platforms.

- Get the uniform sample coverage you need without relying on expensive equipment
- Regain valuable time with a fast, simple workflow
- Create application-specific NGS libraries by adding IDT adapters and xGen products for target capture

The Lotus kit can be customized for your applications when combined with one of the many IDT adapter options. Additionally, use of xGen hybridization capture products provides a complete NGS solution that takes you from sample preparation to sequencing.

Overview of hybridization capture sequencing workflow



Lotus DNA Library Prep Kit and IDT adapters

xGen hybridization capture probes and reagents

Illumina platforms

xGen Lockdown Probes

xGen Lockdown Probes are individually synthesized pools of 5′-biotinylated probes for target capture applications in the next generation sequencing. These probes can be used for creating custom capture panels that can be optimized, expanded, and combined with other panels. xGen Lockdown Probes can also be used to enhance the performance of existing capture panel, rescuing poorly represented regions such as areas of high GC content.

Product	Reaction Sizes		
xGen Lockdown Probe Pools	16	96	4 x 96

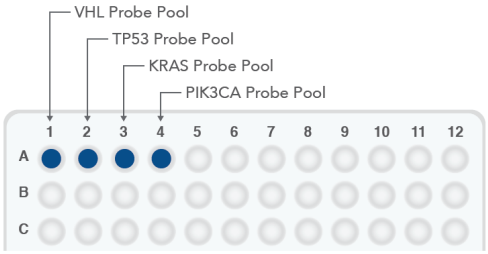
xGen target enrichment panels for maximum flexibility and performance xGen Lockdown Probe Pools contain individually synthesized Lockdown Probes pre-formulated to deliver consistent, convenient, best-in-class performance.

- Achieve higher performance with individually synthesized and quality-controlled capture probes
- Develop cost-effective custom panels that are delivered quickly (7–10 business days for orders <2000 probes)
- Optimize, expand, or combine custom panels

xGen Predesigned Gene Capture Pools and Plates

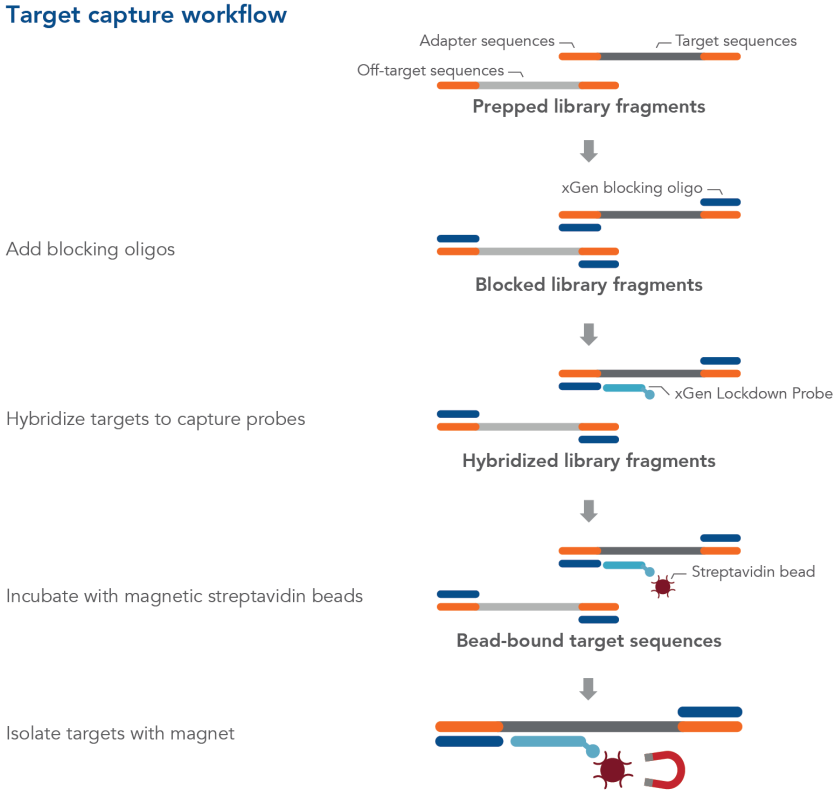
Reaction size	Format Tube	Format Plate	Minimum Order
16 rxn	√	NA	10 genes
96 rxn	√	√	10 genes

- *Human coding regions only*
- *More cost effective*
- *Use gene symbols or gene IDs (only) to identify targets*
- *You must have a minimum or 10 genes/target regions per entry*



Target capture workflow

Target capture workflow



xGen Blocking Oligos improve enrichment performance by binding to platform-specific adapters to prevent cross-reactivity between library fragments. xGen Lockdown Probes bind to target regions of interest during in-solution hybrid capture. Targeted regions are then pulled out of solution using streptavidin beads.

xGen Lockdown Panels

Functionally validated, stocked panels for targeted next generation sequencing. Highest level of enrichment for improved variant detection. Available in 2 sizes - 16 reactions and 96 reactions.

Panel	Design	Number of Probes
xGen Exome Research Panel	19,396 genes, (39 Mb of human genome)	429,826
xGen Acute Myeloid Lukemia	264 genes	11,743
xGen Pan-Cancer	127 genes	7,816
xGen Inherited Diseases	4,503 genes	116,355
xGen Human ID Research	76 polymorphic SNPs	229
xGen Human mtDNA Research	mitochorndrial DNA	138
xGen CNV Backbone	340kb genome-wide spacing	9,115

xGen Human ID Panel

Validated spike-in panel designed to capture 76 distinct, highly polymorphic sites across the human genome for unique identification of any human sample.

xGen Human mtDNA Research Panel

Validated spike-in panel designed to expand larger xGen Lockdown® Panels by targeting the entire 16 kb human mitochondrial sequence.

xGen Universal Blockers

IDT currently offers three different ready-to-use, universal blocker reagents. xGen Universal Blockers—TS Mix blocks Illumina LT (p5, p7 – 6 nt and 8 nt) and HT (i5, i7) adapters and is compatible with ligation-based library prep kits, such as Illumina TruSeq kits. xGen Universal Blockers—10 bp TS Mix is compatible with ligation-based library prep kits that use 10 bp index barcodes. xGen Universal Blockers—NXT Mix contains adapter blockers that are optimized for use with Illumina Nextera library prep kits.

xGen Universal Blockers are offered in 16-, 96-, and 4 x 96-reaction formats for convenient experiment design and for use with xGen Lockdown Panels or xGen Lockdown Probe sets.

xGen Hybridization and Wash Kit

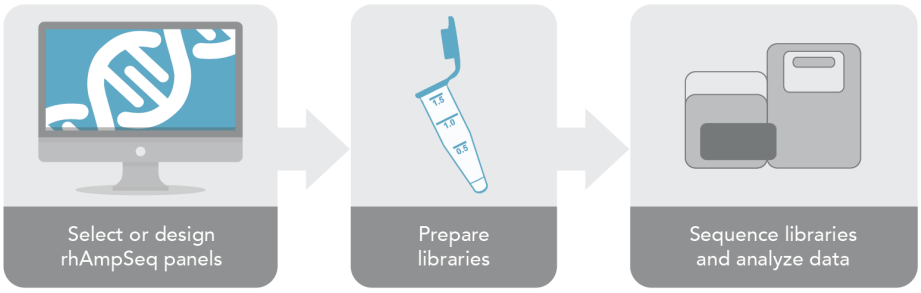
The xGen Hybridization and Wash Kit comprises buffers, Cot DNA, and streptavidin beads required for hybridization capture of DNA. The kit has been developed to work with xGen Lockdown Probes and Panels and xGen Blocking Oligos for a complete, high quality target enrichment solution. This workflow is compatible with NGS libraries prepared using ligation-based techniques, such as TruSeq library kits, and Nextera DNA library preparation kits.

- Achieve uniform coverage and robust capture performance across a broad range of xGen hybridization probe panels
- Generate highly reproducible targeted NGS data with quick and easy workflow results
- Updated, automation-friendly protocol enables various levels of throughput

rhAmpSeq amplicon sequencing system

The rhAmpSeq system enables highly accurate amplicon sequencing on Illumina® next generation sequencing (NGS) platforms. Whether you are investigating thousands of targets or a few, the fast and easy rhAmpSeq workflow, based on our proprietary RNase H2-dependent PCR (rhAmp PCR) technology, generates NGS-ready amplicon libraries for deep, targeted resequencing.

Overview of the rhAmpSeq system workflow.



Custom rhAmpSeq Panels or rhAmpSeq Predesigned Panel

rhAmpSeq Library Kit
rhAmpSeq Index Primers

Illumina platforms

Custom rhAmpSeq Panel

- Marker-assisted selection and genomic selection in agricultural genetics and breeding
- Confirmation of on-target and off-target CRISPR gene editing experiments
- Hotspot panels for oncology, rare and inherited diseases, and other disease research

Product	Amount		
Custom rhAmpSeq Panels	0.4 nmol	4 nmol	8 nmol

rhAmpSeq Sample ID Panel

- Ensure correct sample identity in your human DNA sample workflows
- Quickly generate highly reproducible targeted sequencing data
- Work confidently with difficult sample inputs, including formalin-fixed paraffin-embedded (FFPE) DNA and cell-free DNA (cfDNA)

Product	Catalog #
rhAmpSeq Sample ID Panel, 16 rxn	10000082
rhAmpSeq Sample ID Panel, 96 rxn	10000083

rhAmpSeq Library Kit

- Rapidly generate sequencing-ready amplicon libraries, even from difficult sample types or low-input DNA amounts, with this efficient 2-mix system
- Obtain robust, uniform amplification across thousands of target sites with a single panel
- Study larger sample sizes with a more economical solution

Product	Catalog #
rhAmpSeq Library Kit, 16 rxn	10000064
rhAmpSeq Library Kit, 100 rxn	10000065
rhAmpSeq Library Kit, 500 rxn	10000066
rhAmpSeq Library Kit, 5000 rxn	10000067

rhAmpSeq Index Primers

- Maximize unique sample identification opportunities with up to 9216 combinations
- Select only the sequences you need for either unique dual indexing or combinatorial indexing
- Easily add index sequences to amplicons during rhAmpSeq library preparation using rhAmpSeq Index Primers and the rhAmpSeq Library Kit

Product	Tube	Plate
Index Primers	√	√

Integrated DNA Technologies

Integrated DNA Technologies (IDT) is a leader in manufacturing and developeing products for the resarch and diagnostics life science markets. IDT serves all research areas, including academic, biotechnology, and pharmaceutical development. IDT was founded in 1987 by Dr Joseph Walder, who continues to be active in scientific research. The company's development has been guided by an uncompromising approach to quality, a belief in the value of good service, and a determination to minimize consumer costs.

Serving over 80,000 life sciences researchers, IDT is widely recognized as the industry leader in custom oligonucleotide manufacture due to its capabilities in:

- Analytical Sophisticiation - IDT pioneered the useof high throughput quality controll (QC) methods and is the only oligonucleotide manufacturer to offer purity gurantees and 100% QC. Every oligonucleotide is analyzed by mass spectrometry and purified oligonucleotides receive furhter analysis by CE and HPLC.
- Design Engineering - IDT maintains an engineering division dedicated to advancing synthesis, processing technology, and automation. An in-house machine shop provides rapid prototyping and cusotm instrument design/control.
- Customer Support - IDT received more than 100,000 calls last year with an average wait time of only 8 seconds.

IDT has more than 1,000 employees serving our worldwide customer base from headquarters in Coralville, Iowa, and facilities in San Diego, California; Leuven, Belgium; and Singapore.

SciTools Design and Analysis Tools

IDT offers free online design and analysis tools, in SciTools web tools, for designing assay components and determining the properties of any sequence entered.

Tools	Description
Oligo Analyzer Tool	Analyze the physical properties of any oligo sequence
PrimerQuest Design Tool	Design primers and probes for PCR and qPCR
RealTime PCR	Design custom qPCR assays
Predesigned DsiRNA	Select siRNA duplexes and TriFECTa Kits for gene knockdown
RNAi design	Design duplexed RNA oligos for RNA interference experiments
Alt-R Custom CRISPR-Cas9 crRNA Design Tool	Generate CRISPR-Cas9 crRNAs targeting any sequence from any species
UNAFold	Analyze secondary structure
DilutionCalc	Calculate volume needed to dilute to a lower concentration
ResuspensionCalc	Calculate the volume (µL) required to resuspend a dry oligo
xGen Lockdown Design Tool	Select xGen Predesigned Gene Capture Tools that target human coding genes
Codon Optimization Tool	Optimizes a potein sequence that is derived from one species for expression in another

Ordering and Customer Care Information

IDT offers convenient online ordering: www.idtdna.com.
Email orders are also accepted. See the IDT wesbite for email templates and instructions.

An order confirmation is sent via email shortly after and order is placed on the website. IDT offers many online ordering features,including pricing, yield gurantees, estimated ship date, and order and shipment tracking. Oligo specification sheets, and mass spectrometry and analytical traces are also provided online free of charge.

For payment, IDT accepts purchase orders, all major credit cards, electronic fund transfer and OligoCard payment cards.

For a list of ditributors worldwide, visit www.idtdna.com/pages/support/international.

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