

# Which reverse transcriptase is right for you?

Choosing the right components for reverse transcription is important to help ensure robust and reliable cDNA synthesis. Use the tables below to narrow down which enzyme makes the most sense for your workflow.

**Table 1. Advantages of an engineered MMuLV reverse transcriptase over AMV and wild-type MMuLV.**

	Engineered MMuLV reverse transcriptase (Maxima H Minus Reverse Transcriptase)	AMV reverse transcriptase	MMuLV reverse transcriptase
<b>RNase H activity</b>	None	High	Medium
<b>Reaction temperature (recommended)</b>	50–55°C*	42°C	37°C
<b>Reaction time</b>	15–30 min	60 min	60 min
<b>Target length</b>	≤20 kb	≤5 kb	≤7 kb
<b>Relative yield (with challenging or suboptimal RNA)</b>	High	Medium	Low

\*Temperature may be increased up to 65°C

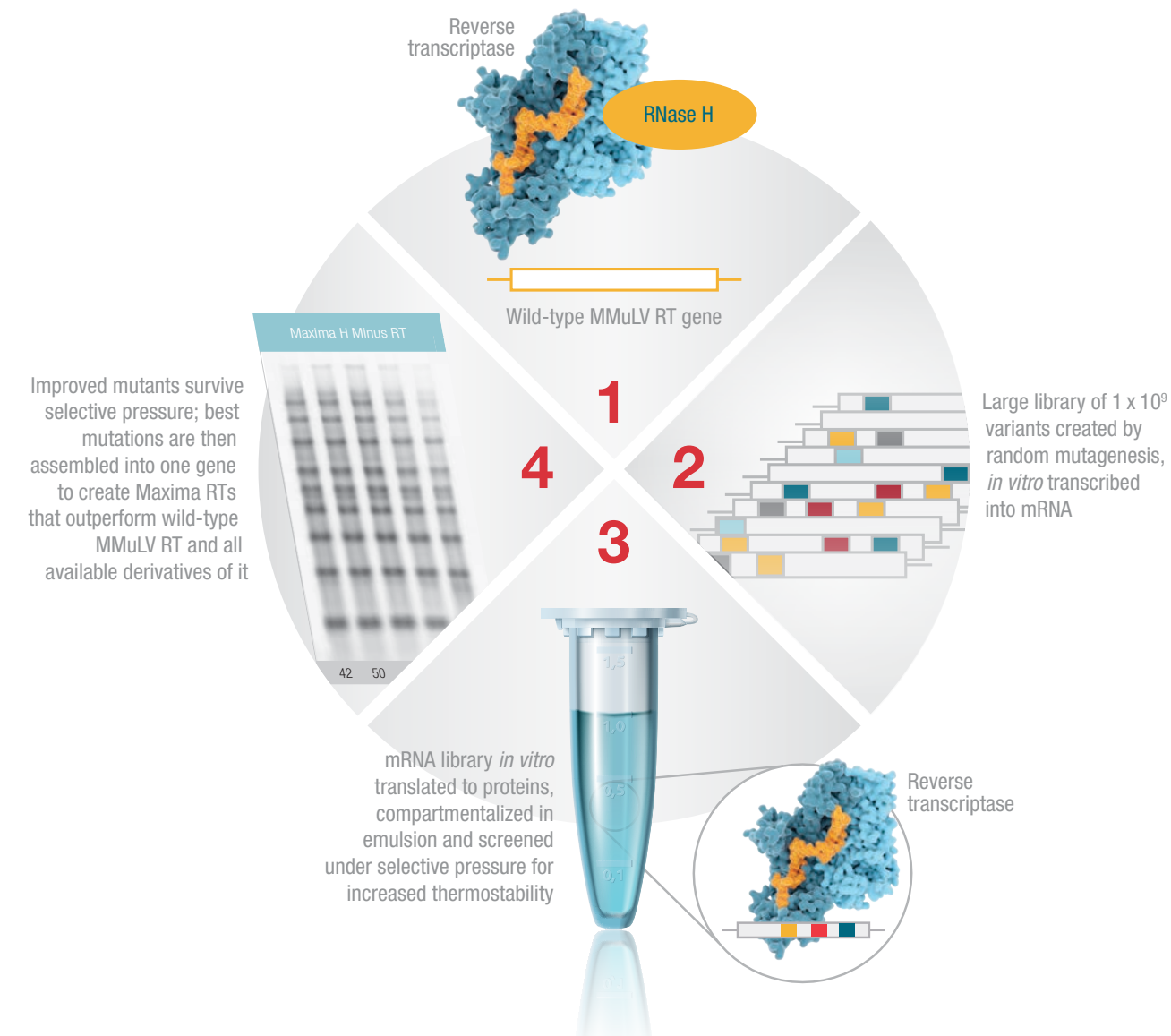
**Table 2. Comparison between various formats of reverse transcriptase.**

Format	Stand-alone enzyme	First-strand cDNA synthesis kit	One-tube master mix
<b>Benefits</b>	More options for reaction setup and optimization	All-inclusive kit containing everything you need for cDNA synthesis	Fewer pipetting steps and lower variability in results
<b>Components</b>	RT enzyme and buffer	RT enzyme, oligo(dT) <sub>18</sub> primer and random hexamers, RT buffer, dNTP mix, and nuclease-free water	RT master mix containing enzyme, no-RT control, and nuclease-free water
<b>Product</b>	Maxima H Minus Reverse Transcriptase, 200 U/μL (Cat. No. EP0751)	Maxima H Minus First Strand cDNA Synthesis Kit (Cat. No. K1652)	Maxima H Minus cDNA Synthesis Master Mix (Cat. No. M1661)

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## Enzymes engineered through molecular evolution

Thermo Scientific™ Maxima™ reverse transcriptases were developed through molecular evolution of the traditional MMuLV reverse transcriptase to maximize performance in cDNA synthesis. Here's how it works:



Learn more about molecular evolution and find additional articles, webinars, and videos at [thermofisher.com/mbresources](https://thermofisher.com/mbresources)

Find more molecular biology products at [thermofisher.com/tsmolbio](https://thermofisher.com/tsmolbio)

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## RNA workflow brochure

A guide to help optimize your cDNA synthesis and RNA analysis

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# Breeze through the RNA workflow

RNA analysis and related techniques are used to study genetic regulation, investigate gene expression, and decipher the role of RNA in biological processes. Whatever your downstream application may be, it is critical to use reliable high-quality, high-purity reagents in your RNA workflow. Use this guide for tips to get the results quickly and easily.

## RNA purification

RNA integrity is critical. Complex RNA purification protocols can result in low yield and poor-quality RNA. Thermo Scientific™ GeneJET™ RNA Purification Kits can help achieve high RNA yields with short and simple protocols.

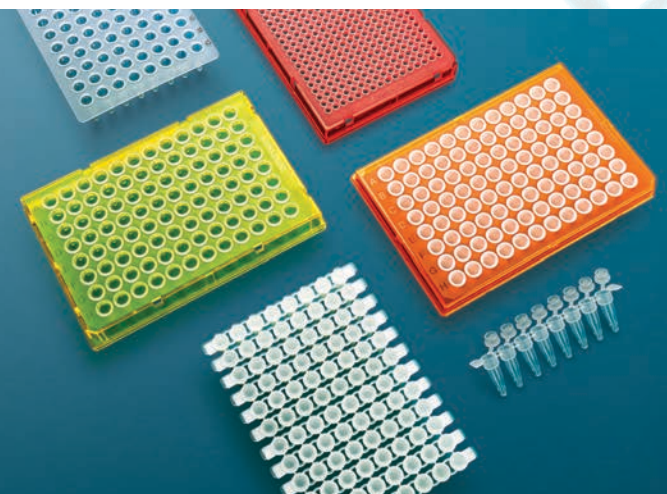
[thermofisher.com/genejet](http://thermofisher.com/genejet)

## gDNA removal

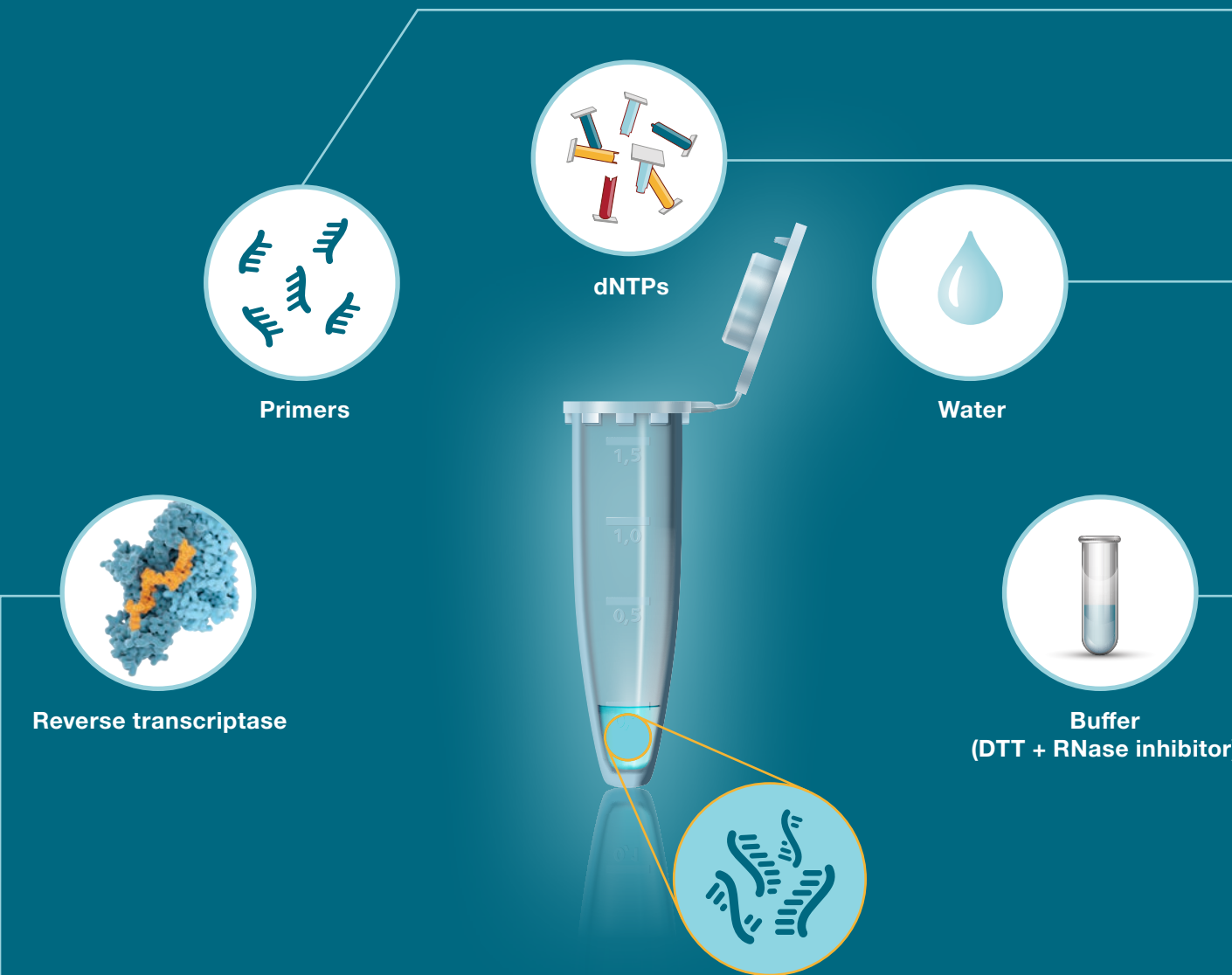
Genomic DNA (gDNA) contamination can impact sensitive downstream applications. Make sure to remove gDNA with Thermo Scientific™ dsDNase (Cat. No. EN0771) or use a reverse transcription master mix with an integrated gDNA removal step.

Need an easy way to select high-quality RNase-free certified PCR and qPCR plastics compatible with your instrument? Use our selection tool to find the plates, tubes, tube strips, sealing options, and accessories for your experiments.

[thermofisher.com/findplastics](http://thermofisher.com/findplastics)



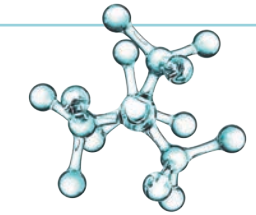
## Reaction setup and cDNA synthesis



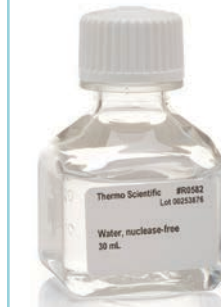
Use oligo(dT)<sub>18</sub> primers (Cat. No. SO131) for full-length reverse transcription of RNA with poly(A) tailing. Use random hexamers (Cat.No. SO142) to reverse-transcribe most RNA species.

Poor-quality NTPs and dNTPs can lead to uncertain results. Use high-quality Thermo Scientific™ NTPs and dNTPs with >99% purity for better results.

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**Did you know?** RNase contamination and poor lab practices can hinder or even ruin your experiment.



### Tips

- Use a dedicated workspace for RNA work
- Change your laboratory gloves often
- Use RNase-free certified, disposable plastics and solutions
- Use RNase-free or molecular biology-grade reagents, including water (Cat. No. R0581)

RNA is degraded by RNases. Protect your RNA with Thermo Scientific™ RiboLock™ RNase Inhibitor (Cat. No. EO0381).

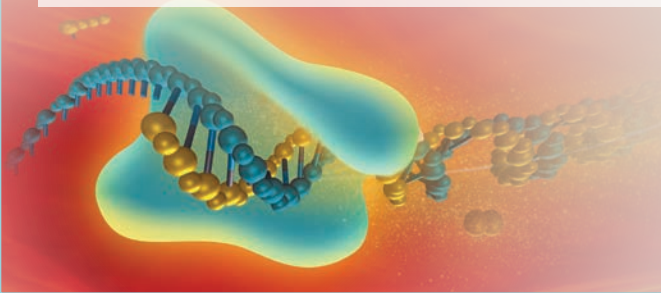


## Maximize with Maxima enzymes

**Did you know?** cDNA synthesis can be impeded by RNA with strong secondary structures (high GC content), inhibitors, or RNA preps of low yield.

Use Thermo Scientific™ Maxima™ H Minus Reverse Transcriptases, which offer high processivity (50x greater than wild-type MMuLV RT enzymes), high thermostability (maintain activity from 42°C to 65°C), and high efficiency with input ranging from 1 µg to 1 µg. Formats include stand-alone enzyme, first-strand kit, one-tube master mix, and master mix with integrated gDNA removal.

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Are you working with large numbers of RNA samples? Drastically reduce hands-on processing time while maintaining high yields by using Thermo Scientific™ KingFisher™ automated purification systems.

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For RNA fragment sizing and in-gel quantification, be sure to use RNA ladders with clear bands.

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### Did you know?

Thermo Scientific™ RNA polymerases used for *in vitro* transcription and synthesis of unlabeled and labeled RNA are available in standard (20 U/µL) and high (>100 U/µL) concentrations.

[thermofisher.com/rnapolymerases](http://thermofisher.com/rnapolymerases)

RNA polymerase illustration by David S. Goodsell and the RCSB PDB.

