

T4 RNA Ligase 2, truncated K227Q



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M0351S 001120614061

M0351S



2,000 units **200,000 U/ml** **Lot: 0011206**
RECOMBINANT **Store at -20°C** **Exp: 6/14**

Description: T4 RNA Ligase 2, truncated K227Q (T4 Rnl2tr K227Q) specifically ligates the pre-adenylated 5' end of DNA or RNA to the 3' OH end of RNA. The enzyme does not use ATP for ligation but requires pre-adenylated linkers.

T4 Rnl2tr K227Q is a point mutant of T4 RNA Ligase 2, truncated (NEB #M0242). Mutation of K227 in T4 RNA Ligase 2 reduces enzyme lysyl adenylation (1). This mutation further reduces the formation of undesired ligation products (concatemers and circles) by T4 Rnl2tr (2,3),

by reducing the trace activity of T4 Rnl2tr in transfer of adenyl groups from linkers to the 5'-phosphates of input RNAs (3).

The exclusion of ATP, use of pre-adenylated linkers, and the reduced enzyme lysyl adenylation activity provide the lowest possible background in ligation reactions. This enzyme has been used for optimized linker ligation for the cloning of microRNAs (2).

Source: T4 Rnl2tr K227Q is expressed as an MBP fusion from a plasmid in *E. coli* which encodes the first 249 amino acids of the full length T4 RNA Ligase 2 with a lysine to glutamine mutation at position 227.

Applications:

- Ligate a pre-adenylated DNA or RNA sequence tag to any RNA 3'-end
- Join a single stranded adenylated primer to small RNAs for cDNA library creation
- Join a single stranded adenylated primer to RNA for strand-specific cDNA library construction.

Supplied in: 10 mM Tris-HCl (pH 7.5), 100 mM NaCl, 0.1 mM EDTA, 0.1 mM DTT and 50% glycerol.

Reagents Supplied with Enzyme:

10X T4 RNA Ligase Reaction Buffer and 50% PEG 8000.

Reaction Conditions: 1X T4 RNA Reaction Buffer. Incubate at 25°C.

1X T4 RNA Reaction Buffer:

50 mM Tris-HCl
10 mM MgCl₂
1 mM DTT
pH 7.5 @ 25°C

Note: In our tests, this ligase can be used interchangeably with T4 RNA Ligase 2, truncated (NEB #M0242), but may require increased incubation time. Ligation activity is stimulated by adding PEG (See FAQ).

Unit Definition: 200 units is defined as the amount of enzyme required to give 80% ligation of a 31-mer RNA to the pre-adenylated end of a 17-mer DNA [Universal miRNA Cloning Linker (NEB #S1315)] in a total reaction volume of 20 µl in 1 hour at 25°C.

5'-FAM- rArGrUrCrGrUrArGrCrUrUrUrArUrCrCrGrArGrArUrUrCrArGrCrArArUrA-3'

5'-rAppCTGTAGGCACCATCAAT-NH₂-3'

Unit Assay Conditions: 1X T4 RNA Ligase Reaction Buffer supplemented to 10% (w/v) PEG MW 8000, 20 pmol of 5'-FAM labeled RNA, and 40 pmol preadenylated DNA linker. After incubation at 25°C for 1 hour, the ligated product is detected on a 15% denaturing polyacrylamide gel.

Molecular Weight: 71,406.97 daltons.

Specific Activity: 200,000 U/mg

Molarity: 14 µM

Heat Inactivation: 65°C for 20 minutes.

(see other side)

CERTIFICATE OF ANALYSIS

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CERTIFICATE OF ANALYSIS

Quality Control Assays

RNase Assay: A 10 µl reaction in T4 RNA Ligase Reaction Buffer containing 40 ng of labeled RNA and 200 units of T4 Rnl2tr K227Q is incubated at 25°C. After incubation for 16 hours, >90% of the substrate RNA remains intact as determined by polyacrylamide electrophoresis.

Exonuclease Activity: Incubation of a 50 µl reaction containing 200 units of T4 Rnl2tr K227Q with 1 µg of a mixture of single and double-stranded ³H *E. coli* DNA (200,000 cpm/µg) for 4 hours at 37°C released < 0.1% of the total radioactivity.

Endonuclease Activity: Incubation of a 50 µl reaction containing 200 units of T4 Rnl2tr K227Q with 1 µg φX174 RF I DNA for 4 hours at 37°C resulted in < 10% conversion to RFI as determined by agarose gel electrophoresis.

Phosphatase Activity: Incubation of 200 units of enzyme with 2.5 µmol *p*-nitrophenyl phosphate (PNPP) in 50 µl Reaction Buffer for 3 hours at 37°C released less than 0.05 µmol inorganic phosphate.

Page 2 (M0351)

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Page 2 (M0351)

References:

1. Yin, S., Ho, C.K. and Shuman S. (2003) *J. Biol. Chem.* 278, 17601–17608.
2. Hafner, M., et al. (2008) *Methods* 44, 3–12.
3. Viollet, S., et al. (2011) *BMC Biotechnology* 11, 72.



References:

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