

## Product Information

### Ribonuclease A from bovine pancreas for molecular biology

Catalog Number **R6513**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

CAS RN 9001-99-4  
EC 3.1.27.5

Synonyms: Ribonuclease I; Pancreatic ribonuclease;  
Ribonuclease 3'-pyrimidinooligonucleotidohydrolase;  
RNase A; Endoribonuclease I

#### Product Description

Ribonuclease A (RNase A) is an endoribonuclease that attacks at the 3' phosphate of a pyrimidine nucleotide. The sequence of pG-pG-pC-pA-pG will be cleaved to give pG-pG-pCp and A-pG. The highest activity is exhibited with single-stranded RNA.<sup>1</sup>

RNase A is a single chain polypeptide containing 4 disulfide bridges. In contrast to RNase B, RNase A is not a glycoprotein.<sup>2</sup> RNase A can be inhibited by alkylation of His<sup>12</sup> or His<sup>119</sup>, which are present in the active site of the enzyme.<sup>3</sup> Activators of RNase A include potassium and sodium salts.

Molecular mass:<sup>4</sup> 13.7 kDa (amino acid sequence)

Extinction coefficient:<sup>5</sup>  $E^{1\%} = 7.1$  (280 nm)

Isoelectric point:<sup>6</sup>  $pI = 9.6$

Optimal temperature:  $60\text{ }^{\circ}\text{C}$  (activity range of  $15\text{-}70\text{ }^{\circ}\text{C}$ )

Optimal pH:<sup>7</sup> 7.6 (activity range of 6-10)

Inhibitors: ribonuclease inhibitor

This chromatographically purified product is supplied as an essentially salt-free lyophilized powder.

Activity:  $\geq 70$  Kunitz<sup>8</sup> units/mg protein

A major application for RNase A is the removal of RNA from preparations of plasmid DNA. In this application, the presence of DNase activity as an impurity is a concern. The boiling-water bath method<sup>9</sup> used to eliminate contaminating DNase activity has proven unreliable. For this reason, Sigma-Aldrich developed a proprietary chromatographic preparation method for elimination of DNase activity.

In addition to protocols related to nucleic acid isolation,<sup>10</sup> this product has been used in studies of protein absorption on to solid surfaces<sup>11</sup> and in protein fractionation with charged membranes.<sup>12</sup>

#### Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Note: RNase A is stable to both heat and detergents. In addition, it adsorbs strongly to glass. Scrupulous precautions are necessary to ensure that residual RNase A does not cause artifacts in processes that require intact RNA.

#### Preparation Instructions

When Sigma-Aldrich tests the activity of RNase A, a stock solution is prepared in water at 1 mg/mL.

Note: Boiling stock solutions of this RNase A product to inactivate residual DNase is not necessary, and may cause precipitation of RNase and possible loss of enzymatic activity. If an RNase A solution is heated at a neutral pH, precipitation will occur. When heated at a lower pH, some precipitation may occur because of protein impurities that are present.

#### Storage/Stability

This product remains active for at least 3 years when stored properly at  $-20\text{ }^{\circ}\text{C}$ .

RNase A is a very stable enzyme and solutions have been reported to withstand temperatures up to  $100\text{ }^{\circ}\text{C}$ . At  $100\text{ }^{\circ}\text{C}$ , an RNase A solution is most stable between pH 2.0 and 4.5.<sup>13</sup>

#### Procedure

For removal of RNA from preparations of plasmid DNA, DNase-free RNase A is used at a final concentration of 10  $\mu\text{g}/\text{ml}$ .<sup>14</sup>

## References

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