

Deoxyribonuclease I

CAS Number : 9003-98-9

Synonyms: DNase I; Deoxyribonucleate 5'-Oligonucleotidohydrolase

Storage Temperature: -20 °C

Product Description

DNase I is found in most cells and tissues. In mammals the pancreas is one of the best sources for the enzyme. Pancreatic DNase I was the first DNase isolated. DNase I is an endonuclease that acts on phosphodiester bonds adjacent to pyrimidines to produce polynucleotides with terminal 5'-phosphates. A tetranucleotide is the smallest average digestion product. In the presence of Mg^{2+} ions, DNase I attacks each strand of DNA independently and the cleavage sites are random. If Mn^{2+} ions are present, both DNA strands are cleaved at approximately the same site. DNase I hydrolyzes single and double-stranded DNA and chromatin (reaction rate is restricted by DNA association with histones).

DNase I is used to remove DNA from protein and nucleic acid samples, and to nick DNA as a first step to incorporate labeled bases into DNA.

Molecular mass: 30,072 Da (peptide, calculated), exists as a mixture of glycoproteins with two disulfide bridges.

Activators:

DNase I has an absolute requirement for divalent metal cations. The most commonly used is Mg^{2+} ; however, Mn^{2+} , Ca^{2+} , Co^{2+} , and Zn^{2+} will activate DNase I. A concentration of 5 mM Ca^{2+} will stabilize DNase I against proteolytic digestion; 0.1 mM is needed to reduce the rate of inactivation by one-half.

Inhibitors:

2-Mercaptoethanol (the reduced enzyme is inactive, but can be reactivated in the presence of Ca^{2+} or Mg^{2+} ions); chelators; sodium dodecyl sulfate (SDS); and actin. There is no general inhibitor specific for DNase I. Citrate inhibits Mg^{2+} -activated DNase I, but not Mn^{2+} -activated DNase I.

Preparation Instructions

This enzyme is soluble in 0.15 M NaCl (5 mg/ml), yielding a clear solution.

Storage/Stability

DNase I retains activity for at least three years when stored at -20 °C.

Solutions of DNase I (10 mg/ml) in 0.15 M NaCl may lose <10% of its activity stored for a week in aliquots at -20 °C. The same solutions stored in aliquots at -8 °C can lose ~20% activity. DNase I remains active in solution between pH 5 and 7 up to 60 °C for at least five hours. A 1 mg/ml solution in acetate buffer (pH 5.0) or Tris buffer (pH 7.2) loses activity at the rate of 6%/hour. At 68 °C DNase I loses activity in <10 minutes.

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.