

Mutation Research - Fundamental and Molecular Mechanisms of Mutagenesis 1996 vol.354 N2,
pages 203-209

SOS-inducing ability of native and mutant microbial ribonucleases

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Abstract

The results of genotoxicity testing of microbial ribonucleases from *Bacillus* species with different catalytic activity obtained by site-directed mutagenesis in SOS chromotest are reported. At the concentrations 0.1-1 mg/ml, the induction factor for wild-type bacillar binase, barnase and mutant Arg58Lys binase with 100% activity was found to be significantly higher than 1.5 (1.8-2.8). Mutant RNases having decreased catalytic activity (binases with replacements Lys26Ala, Arg61Gln, His101Glu) or through natural inhibitor barstar inactivated wild-type RNase exhibited no SOS-inducing potency. The ability of native bacillar RNases and mutant enzymes possessing high catalytic activity comparable with the activity of wild-type RNase to cause the SOS response indicates that genotoxicity is mediated through the probable cleavage of cellular RNA. The possible mechanisms of mutagenesis induced by catalytically active RNases are discussed.

[http://dx.doi.org/10.1016/0027-5107\(96\)00012-7](http://dx.doi.org/10.1016/0027-5107(96)00012-7)

Keywords

Catalytic activity, Genotoxicity, Mutant ribonuclease, SOS-inducing potency, Wild-type bacillar ribonuclease