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Use of yeast in the study of DNA topoisomerase IIα mutants: expression of functional recombinant rat enzyme in yeast.

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For analyzing *in vivo* and *in vitro* functions of a mammalian protein, it is informative to obtain mutations and apply them to the rat genetic system. *Saccharomyces cerevisiae* provides a convenient system for studying genetic and biochemical properties of mutated enzymes. Several plasmids were constructed for the expression of rat DNA topoisomerase IIα in yeast from a galactose-inducible promoter of the yeast *GAL1* gene. Expression of recombinant rat enzymes with partial deletion or mutation could rescue the lethal phenotype caused by yeast *top2* null mutation. Also, the *in vivo* activity of each construct was analyzed.

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Characterization of *uvi31*$^+$ Gene, a UV-inducible Gene from *Schizosaccharomyces pombe*

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The *uvi31*$^+$ gene of *Schizosaccharomyces pombe* has been isolated as a UV-inducible gene, using subtraction and differential hybridization. The level of transcripts of *uvi31*$^+$ gene maximally increased at 4 hr after UV-irradiation of 240 J/m^2. DNA sequence analysis indicated that *uvi31*$^+$ gene encodes a protein of about 12 kDa with 36, 46 and 42 % sequence similarity to *E. coli*, *V. alginolyticus* and *H. influenzae* BolA respectively. *E. coli* BolA is involved in the switching between the cell elogation and septation systems during the cell division cycle. Through the primer extension and S1 nuclease mapping analyses, the transcription initiation site was located at -230 position from the AUG triplet initiation codon. Also the *uvi31*$^+$ gene was found to exist as a single copy gene using Southern blot analysis.