# Interaction analysis between damaged DNA bases and DNA-binding/recognizing enzymes

백승필*, 장의경, 조찬희, 여기백, 민기하
고려대학교
(spack@korea.ac.kr*)

Nitric oxide (NO) causes DNA damage, generating xanthine (Xan, X) and oxanine (Oxa, O) from guanine (Gua, G) and hypoxanthine (Hyp, H) from adenine (Ade, A) by nitrosative oxidation. In this study, we investigated the effect of NO-induced lesions on the activities of DNA-binding/recognizing enzymes such as T4 polynucleotide kinase (T4 PNK), DNA ligases (T4 DNA ligase, Taq DNA ligase) and DNA polymerases (E. coli DNA polymerase I, Klenow fragment, T4 DNA polymerase). The phosphorylation efficiencies of T4 PNK are dependent on the base type at the 5′-end of single-stranded DNA, where Oxa □ Hyp □ Gua > Xan □ Ade. The enzymatic reactions efficiencies of DNA ligases or DNA polymerases were observed to be dependent on the base-pairing type bound by the enzymes, where G:C > H:C > O:C > X:C and A:T □ H:T > O:T > X:T. These results suggested that NO-induced lesions and their base-pairs could participate in the interaction mechanisms of the DNA-binding/recognizing enzymes in a similar manner as natural nucleobases.