

Construction of Recombinant Bioluminescent Bacteria Applicable to Diagnosis of DNA Synthesis Mechanism

황이택, 안주명, 김병찬¹, 구만복*
고려대학교; ¹Institut Pasteur Korea
(mbgu@korea.ac.kr*)

The promoter of *nrdA* gene which is related with DNA synthesis was used to construct a DNA damage sensitive biosensor. A recombinant bioluminescent *E. coli* strain, BBTNrdA, harboring a plasmid with the *nrdA* promoter fused to the *luxCDABE* operon, was successfully constructed. Its response to various chemicals including genotoxic chemicals substantiates it as a DNA damage biosensor. In characterization, three different classes of toxicants were used: DNA damaging chemicals, oxidative stress chemicals, and phenolics. BBTNrdA only responded strongly to DNA damaging chemicals, such as nalidixic acid (NDA), mitomycin C (MMC), 1-methyl-1-nitroso-N-methylguanidine (MNNG), and 4-nitroquinoline N-oxide (4-NQO). In contrast, there were no responses from the oxidative stress chemicals and phenolics, except from hydrogen peroxide (H₂O₂) which is known to cause DNA damage indirectly. Therefore, the results of the study demonstrate that BBTNrdA can be used as a DNA damage biosensor.