

Evaluation of stress effects of environmental toxic compounds in *E. coli* by gene expression analysis

김연석, 구만복*

고려대학교

(mbgu@korea.ac.kr*)

E. coli is known to respond to certain toxic chemicals through an increased expression of the *recA*, *katG*, *fabA* and *grpE* genes. In this study, therefore, the expression of each of these genes was used as a representative for DNA, oxidative, membrane and protein damage, respectively. To accomplish this, the expression levels of these four genes were quantified using a real-time RT-PCR analysis when *E. coli* cultures were under stressful conditions, caused by an exposure to toxic compounds. It was found that the primary toxic effect of each chemical is clearly seen when the expression levels of the different genes are compared. Tests with the polycyclic aromatic hydrocarbons (PAHs) showed naphthalene and benzo[a]pyrene to be genotoxic, while phenanthrene had no clear effect on the expression of any of these genes. Results for the endocrine disrupting chemicals (EDCs) showed bisphenol A to be genotoxic and styrene to be oxidative damage by hydroxyl radical, while 17 β -estradiol had no clear effect on the expression of any of these genes. Based on these results, the effects due to these toxic chemicals and the extent of each stress can be evaluated with ease using the expression levels of different stress responsive genes.