Multiple Reporter Gene Assays for the Assessment and Estimation of Chemical Toxicity

Junko Takahashi* and Hitoshi Iwahashi1

Daikin Environmental Laboratory, Ltd.,
3 Banchi, Miyukigaoka, Tsukuba, Ibaraki 305-0841, Japan
1National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 6,
1-1-1 Higashi, Tsukuba, Ibaraki 305-8566, Japan

(Received June 30, 2004; accepted October 15, 2004)

Key words: reporter gene assay, promoter, yeast, green fluorescent protein (GFP), microarray

To detect chemical toxicity, we are making new bioassay systems that use promoters selected from yeast DNA microarray experiments. We performed multiple reporter gene assays using the promoters of these genes; the promoter regions were inserted upstream of green fluorescence protein (GFP). In this report, six genes (HSP26, MET17, YLL057C, FIT2, CUP1 and OYE3) were selected and assays were carried out for 55 chemicals. The promoters of these genes showed different responses to chemicals within 4 h. This result indicates that this technique enables us to predict the toxicity of chemicals in the environment and to understand toxicities of newly synthesized chemicals.

*E-mail: junko.takahashi@daikin.co.jp