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Alternative carcinogenicity prediction system: Quantitative PCR based system using colon cancer stem cells

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The carcinogenic potential of chemicals in the environment is a major concern. Recently, various studies have attempted to develop methods for predicting carcinogenicity, such as rodent and cell-based approaches. But, rodent testing is time-consuming and costly to evaluate the carcinogenic potential of chemicals. Therefore, we focused on the development of an alternative method for predicting carcinogenicity using quantitative PCR (qPCR) and colon cancer stem cells. A toxicogenomic method, mRNA profiling, is useful for predicting carcinogenic potential of chemicals. Using microarray analysis, we optimized 16 predictive gene sets from five carcinogens (azoxymethane, 3,2'-dimethyl-4-aminobiphenyl, N-ethyl-n-nitrosourea, metronidazole, 4-(n-methyl-n-nitrosamino)-1-(3-pyridyl)-1-butanone) used to treat colon cancer stem cell samples. The 16 genes were evaluated by qPCR using 22 positive and negative carcinogens in colon cancer stem cells. These six genes could differentiate between positive and negative carcinogens with a p-value of ≤0.05. Our qPCR based prediction system for colon carcinogenesis using colon cancer stem cells is cost and time-efficient. Thus, this qPCR-based prediction system is an alternative to *in vivo* carcinogenicity screening assays.

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