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Toxicities of Difenoconazole on the Development of *Xenopus laevis*

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We investigated the toxic effects of Difenoconazole in *Xenopus laevis* embryogenesis. Embryos were exposed to various concentrations of Difenoconazole up to 30 μM. The total lethal concentration for *Xenopus* embryos by Difenoconazole was 30 μM. The exposure to Difenoconazole resulted in 9 different types of external malformations including axial malformation and edema. In histopathological study, various dysplasias were observed in eyes, gut, liver, muscle, and pronephric ducts. For the investigation of tissue-specific toxic effects, an animal cap assay was performed. As a result, the differentiation of blood cells was inhibited by Difenoconazole. Electron micrographs of tested embryos showed severe degeneration of somatic muscle and pronephric cells but it showed weak degeneration of mitochondria.

Key words: Difenoconazole, *Xenopus laevis,* Toxic effects, Malformation

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Global Gene Expression Changes in Response to Capsaicin Treatment

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To know whether phytochemical capsaicin could affect cancer cell viabilities, human colorectal HCT116 cells were treated with capsaicin in a dose-dependent manner. Capsaicin decreased cancer cell viabilities detected by MTS assay and the cytotoxic effects showed a dose-dependent manner. To unveil the molecular mechanism of cell death in response to capsaicin treatment, we carried out oligo DNA microarray analysis. We found that 103 genes were up-regulated more than 2-folds, whereas 8 genes were down-regulated more than 4-folds by 24 hr treatment of 100 μM capsaicin. Among the up-regulated genes, we selected five genes (*NAG-1, DDIT3, PCK2, GADD45A and GDF9*) and performed RT-PCR to confirm microarray results. The results of RT-PCR were highly associated with those of microarray experiment. And also, we detected changes of NAG-1 protein expression with Western blot analysis. The result indicates that capsaicin could also induce NAG-1 protein expression in a dose-dependent manner. Overall, these results may provide clues to understand the molecular mechanisms of the anti-cancer activities by capsaicin in human colorectal cancer.

Key Words: Capsaicin; Anti-cancer activity; Oligo DNA microarray; Gene expression