

F3

DNA Chip Analysis of Hot Pepper from Low Temperature-induced cDNA Library Reveals Many Novel Genes That May Play a Role in Cold Stress Resistance

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We isolated differentially expressed cold-elevated or cold-repressed genes among 2304 cDNAs in hot pepper (*Capsicum annuum* L.) using cDNA chips. Dual labeling of cDNA probe pairs with Cy3-dUTP for cold-treated mRNA sample and Cy5-dUTP for unstressed sample allowed simultaneous hybridization to DNA elements on microarrays and facilitated direct quantitative measurements of gene expression between two different conditions, stressed and unstressed. As the result, about 500 cDNAs for cold-inducible genes were isolated, and among them 60 genes were novel stress-inducible genes that have not been reported as cold-inducible genes previously. Five stress-repressed genes were also identified as novel genes. One of these already reported, was the light-harvesting chlorophyll1 a/b binding protein. We divided analysed data into 8 classes such as cold-repressed, cell cycle regulation, protein degradation, metabolism, transcription factor, transport, signal transduction, and unknown genes. To find out the signal transduction mechanism of each gene and protein, we are analysing them by yeast two-hybrid protein interaction and immuno-histochemistry using monoclonal antibody.

Keywords: cDNA, microarray, pepper, cold, stress, chip