

8. HiCEP Project: Development of a Next-generation Gene Expression Profiling Technology



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Progress of Research:

We have developed a new gene expression profiling method called HiCEP (High coverage gene expression profiling), whose principle is different from that of DNA micro-array technology. So far fundamentals of the technology have been achieved; now, we are currently focusing on the development of a high throughput system for the analysis and of the protocol for the analysis using a small amount of starting materials.

Aims in 2005 were:

- 1) Developing a high throughput system for the HiCEP reaction and for the information analysis
 - a) Reaction steps (RNA prep, cDNA synthesis, HiCEP reaction and PCR): Development of an experimental automatic machine ver2 for the HiCEP reaction, which enables us to perform 96 reactions / 3 days.
 - b) Step for the information analysis: Development of software to compare expression profiles comprehensively, rapidly and efficiently.
- 2) Developing a procedure for the analysis using a small number of cells: an analytical method for 50 to 100 eukaryotic cells and a routine system using 1,000 cells.

Results

- 1) High throughput system
 - a) We made a HiCEP protocol for an automatic reaction using a machine and then made a test machine, Version2, in which the protocol was implemented.
The version2 machine is superior to the version1 machine in terms of the following points.
 - more efficient reaction with a shorter period
 - Easy changing of the program for machine controlling
 - Down sized
 - b) Step for the information analysis:
We succeeded in preparing an algorithm for making a one-on-one correspondence in peaks between different analyses.
- 2) Developing a procedure for the analysis using a small number of cells:
We succeeded in HiCEP analyses using mouse 8 cell stage embryos and using 50 cells of cultured cells. A routine analysis using 1,000 eukaryotic cells also became possible.