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Production of human cytokine by plant cell suspension culture

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Recently, progress of molecular biology has made it possible to utilize transgenic plants as hosts for the recombinant protein expression. Production of valuable proteins through plant cell culture has several advantages over either prokaryotic or animal cell expression systems. For example, plant cells are generally inexpensive to grow on a large scale, and their production is not limited to fermenter capabilities. In addition, post-translational modification in plant cell is more similar to that in animal cells than prokaryotes. Also, the proteins produced by plant cell culture are safer than those through prokaryotic and animal expression systems, especially for the production of therapeutic proteins applied for human disease treatment. Finally, purification of the target protein is much more economical and easier than other expression systems, because the medium consists of inorganic salts, vitamins, hormones, and amino acids without proteins.

In order to test if the multimeric heterologous protein could be produced through plant cell suspension culture, we tried to produce human IL-12, which is consisted of p35 and p40 subunits. Genes encoding p35 and p40 of hIL-12 were introduced independently into the plant expression vector and transformed to tobacco via *A. tumefaciens* harboring the gene for each subunit of hIL-12 gene. Two transgenic tobacco plants were generated. The expression of the genes for p35 and p40 subunits of hIL-12 has been confirmed by Northern blot analyses. Successive sexual crosses were performed between these plants, and filial recombinants resulted in plants expressed two protein subunits simultaneously. These subunits were assembled into a functional heterodimer, p75, and secreted into the liquid media. A mature heterodimeric p75 of hIL-12 was derived from plant cell suspension culture and detected by ELISA. This result suggests that the multimeric heterologous proteins could be produced through plant cell culture. (This work was supported by NRL program from the Korean Ministry of Science and Technology).