

## Expression and purification of human insulin growth factor-1 (hIGF-1) from *Chlorella ellipsoidea*

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### Summary

Insulin-like growth factor-I (IGF-I) is a mitogenic protein with structural homology to insulin and shows both insulin-like metabolic effects and growth-promoting effects.<sup>1</sup> In order to express obtained the mature human IGF-I to the eukaryotic expression host, chlorella, we constructed the modified PCTV vector containing the cauliflower mosaic virus 35S promoter and hIGF-I gene and transformed to protoplast of *C. ellipsoidea*. A chlorella is an attractive organism for complex recombinant protein production because of its eukaryotic characteristics and low cost for large-scale production.<sup>2</sup> The presence of introduced DNA was determined by PCR amplification of the hIGF-1 gene from genomic DNA isolated from transformants and the expression of hIGF-1 protein was detected by immunoblot analysis. Stable integration of introduced DNA was confirmed by Southern blot analysis. In order to purify the expressed hIGF-I protein, we efficiently extracted chlorella using the French press homogenizer and obtained the total proteins containing hIGF-1 protein.<sup>3</sup> We have developed the process for the purification of the hIGF-I from the extract of transformed *C. ellipsoidea* using fast-performance liquid chromatography (FPLC). The purification steps included ion exchange chromatography, gel filtration chromatography and affinity chromatography.

### References

1. Upton, F. Z., Francis, G. L., Ross, M., Wallace, J. C., and Ballard, F. J. 1992. *J Mol Endocrinol* 9, 83-92.
2. Kim, D. H., Kim, Y. T., Cho, J. J., Bae, J. H., Hur, S. B., Hwang, I. H., and Choi, T-J. 2002. *Mar. Biotechnol.* 4, 63-73.
3. Takeda, T., Yoshimura, K., Ishikawa, T., and Shigeoka, S. 1998. *Biochimie* 80, 295-30.