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Mass Production of Somatic Embryos Expressing *Escherichia coli* Heat-labile Enterotoxin B Subunit in Siberian Ginseng

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Objectives

We established embryogenic cell strains in a liquid medium and used to produce transgenic somatic embryos in a large quantity. After producing potent transformed somatic embryos, we analyzed the LTB expression and GM1-ganalioside binding for the transgenic somatic embryos.

Materials and Methods

1. Materials
   - Transgenic somatic embryos of Siberian ginseng
   - *Agrobacterium* strain : LBA4404

     Plasmid pMYO111 containing synthetic LTB gene under the control of ubiquitin promoter
2. Methods

Bioreactor culture, PCR analysis, Northern blot analysis, Immunblot detection of LTB protein, Quantification of LTB protein level, G_{M1}-ganglioside binding assay, Siberian ginseng

Results and Discussion

The B subunit of *Escherichia coli* heat-labile toxin (LTB) is a potent mucosal immunogen and immunoadjuvant for co-administered antigens. In order to produce large scale of LTB for the development of edible vaccine, we used transgenic somatic embryos of Siberian ginseng, which is known as medicinal plant. When transgenic somatic embryos were cultured in 130 L air-lift type bioreactor, they were developed to mature somatic embryos through somatic embryogenesis and contained approximately 0.36% LTB of the total soluble protein. Enzyme-linked immunosorbent assay indicated that the somatic embryo-synthesized LTB protein bound specifically to G_{M1}-ganglioside, suggesting the LTB subunits formed active pentamers. Therefore, the use of the bioreactor system for expression of LTB proteins in somatic embryos allows for continuous mass production in a short term period.

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