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High Expression of a Human Lactoferrin in Transgenic Siberian Ginseng (*Acanthopanax senticosus*) Cell Cultures

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Objectives

In order to develop the transgenic cultured cells of medicinal plants expressing a human lactoferrin (hLf) protein, we generated the transgenic cell lines of Siberian ginseng using an oxidative stress-inducible peroxidase (*SWPA2*) promoter and analysed the hLf production in transgenic cultured cells.

Materials and Methods

1. Plant materials: Siberian ginseng (*Acanthopanax senticosus*) cultured cells
2. Methods
   - Vector: SWPA2pro::ERhLf/pCGN1578
   - *Agrobacterium*-mediated transformation
   - ELISA analysis
   - PCR, Southern blot, northern blot, western blot analysis

Results and Discussion

We have engineered a construct containing a targeting signal peptide from tobacco endoplasmic reticulum (ER) fused to hLf cDNA under the control of *SWPA2* promoter. Transgenic Siberian ginseng cell lines were successfully generated by *Agrobacterium*-mediated transformation and were biochemically characterized. PCR and Southern blot analyses confirmed stable integration of the hLf gene into the nuclear genome. Western blot analysis showed that full-length and partial hLf protein was synthesised in transgenic cells, but molecular weight of a hLf from Siberian cultured cells was slightly smaller than one of native hLf. The hLf production monitored by ELISA was progressively increased according to cell growth and showed a maximal level (more than 3% of total soluble protein) at the stationary growth phase in cell cultures of Siberian ginseng. These results well reflected the characteristics of *SWPA2* promoter with a high expression at *in vitro* culture stress. The purification of recombinant hLf from transgenic cells is under way. We anticipate that transgenic cultured cells in this study will be applicable for th large-scale production of hLf.

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