

## Avesthagen-ProFuse™

A concerted team effort by the Food for Medicine group at Avesthagen making use of the state of art technology to produce a library of novel compounds by the fusion of protoplasts from two different cell lines of Taxus species, thereby engineering living cells to a state of desired metabolite concentrations and fluxes. The resulting product will possess distinctive compounds of therapeutic value coupled with a fast growing nature.

**Avesthagen-ProFuse™** – A tool that will aid in the production of a novel, combinatorial, compound library that has significant medicinal, curative properties. The usefulness of **Avesthagen-ProFuse™** lies in its generating a repertoire of compounds possessing novel, distinctive, medicinal properties. The protoplasts isolated from the synchronised cultures of two independent cell lines of Taxus species were fused in the presence of Poly Ethylene Glycol and Calcium Chloride.

**Avesthagen-ProFuse™** technology is based on the observation that primary explants and *in vitro* cell cultures derived from plants of the genus Taxus, especially T. brevifolia, multiplied with differences in the log phase of growth. Based on this observation, and using a specific selection method, a fast growing cell line was established. Similarly a cell line with high content of Taxane alkaloid was also selected. The method consists of isolating protoplast from these two different cell lines; fusion of these two different cell lines to produce a hybrid cell with rapid growth and high Taxane and other metabolite contents.

**Avesthagen-ProFuse™** can be used to take up macromolecules (nucleic acids and proteins), viruses, cell components like chromosomes and chloroplasts by phagocytosis.

**Avesthagen-ProFuse™** can also be used for interspecific fusions and bio-prospecting novel active principles. Furthermore, protoplasts transformed with Ti-DNA of *Agrobacterium tumefaciens* and Ri-DNA of *Agrobacterium rhizogenes* made the system interesting for introducing novel genes that enhances the metabolite production.

The fusion product of **Avesthagen-ProFuse™** can be regenerated into complete plantlets thereby encompassing a factory of compounds.

**Avesthagen-ProFuse™** offers the choice of analysis of protein information of the plastids and nucleus of the parental species within the fusion product.

**Avesthagen-ProFuse™** can be utilized to generate variants with increased ploidy levels as well as producing plants containing chromosomes from other varieties of taxus to generate the characteristics of both varieties. Since protoplasts are suitable for the study of the molecular architecture of different plant cells, **Avesthagen-ProFuse™** can be extended to a number of medicinal species for producing novel compound libraries.

### References:

- Pattanavibool, R., K. Klimaszewska, and P. von Aderkas.(1998) Interspecies protoplast fusion in *Larix*: comparison of electric and chemical methods. In Vitro Dev Biol-Plant Vol. 34: 212-217.
- Schieder,O. and I. K. Vasil (1980) Protoplast fusion and somatic hybridization. Int. Rev. Cytology, Suppl **11**, 21-46
- Shepard, J. F., D. Bidney, T. Barsby, R. Kemble (1983) Genetic transfer in plants through interspecific protoplast fusion. Science **219**, 683-688.
- Naton, B., Ecke, M. & Hampp, R. (1992) Production of fertile hybrids by electrofusion of vacuolated and evacuated tobacco mesophyll protoplasts. Plant Science 85, 197-208.