



# REF1

## Peptide factor for enhanced plant regeneration

### Proven in many different species

### Wide application in plant tissue culture, regeneration, gene editing, transformation, propagation etc

#### Evaluation and Licensing Opportunities

For further information on this technology and evaluation / licensing opportunities please contact:

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#### Patent Literature

Patent applications pending

Tissue culture and regeneration are widely used in plant scientific research and development, as well as in routine horticulture and plant cultivation/propagation. The regenerative capacity of plant cells can be enhanced *in vitro* when cuttings and similar explants are cultured on nutrient media supplemented with auxin and cytokinins. A routinely used protocol for *in vitro* regeneration involves pre-culture of explants on an auxin-rich medium to generate a callus that is competent for organ regeneration. The intrinsic regeneration capacity of plants provides the fundamental basis for various agricultural and biotechnological procedures for genetic interventions and for the *in vitro* propagation and production of many plant species under controlled conditions. However, regeneration capacity is very variable and extremely limited in some species and, even in “regenerative” species, often limited to certain genotypes, greatly restricting the practical implementation of such technologies.

Now, researchers at the Institute of Developmental Genetics and Biology, Chinese Academy of Sciences, Beijing have discovered a natural plant peptide that strongly promotes plant regeneration in a wide range of species. They designate the factor, **REF1** (REGENERATION FACTOR1). It is stable and, applied exogenously in culture medium, it **dramatically increases regeneration efficiency**. This brings associated enhancements in, for example, **transformation efficiency**. Inclusion in culture medium, or other form of exogenous application, is once-off and it does not need to be continuously supplied to gain an effect.

As well as restoring regeneration capacity in loss-of-function mutants lacking REF1 expression, REF1 actually increases the base line regeneration capability of WT plants, when applied exogenously.

In addition, **REF1 dramatically accelerates the tissue culture/regeneration process**. Use of REF1 typically cuts 10-20 days off the time to recover transplantable seedlings from culture (e.g. 40 days for soybean, compared to 60 days without REF1). Plants recovered are all whole, viable and fertile.

REF1 has readily identifiable orthologues in most, if not all, sequenced species of angiosperms demonstrating that it is **highly conserved in the plant kingdom**. Exogenous application of REF1 has been demonstrated by the IGDB team to significantly increase regeneration capacity in **all species of monocots and dicots so far tested**, including species and genotypes hitherto known to be recalcitrant to regeneration.

The REF1 regeneration enhancement technology is patented by PBL on behalf of IGDB. Extensive data has been generated with this important breakthrough – such as in **wheat, maize, rice, soybean, sunflower, cotton, tomato and Medicago**. For more information or licensing interest please contact PBL. Further information is available under confidentiality agreement.

#### References:

Publication in preparation