



A Novel Estrogen-Inducible Gene Expression System for Plants

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Technology Summary

In basic plant biology research and biotechnological applications, it is highly desirable to express genes in a controllable fashion. The development of transgenic techniques has allowed researchers to introduce homologous or heterologous genes into plants, with modified functions and altered expression patterns. It is evident, however, that there is a need for better and more flexible gene expression systems, such as inducible transcription systems to generate plants with conditional phenotypes.

Our scientists have developed an estradiol-mediated transcriptional induction system by constructing a chimeric transcription factor, referred to as XVE. The XVE fusion protein consists of the DNA-binding domain of bacterial repressor LexA, the transactivating domain of herpes viral protein VP16, and the regulatory region of the human estrogen receptor. This chimeric protein is introduced into plants with a bioluminescent reporter gene under the control of an element that XVE can bind to, resulting in good expression of the reporter when estrogens (i.e. estradiol) are added.

Advantage

- The XVE system is not toxic to the plants
- The system is reliable, efficient, and specific for estrogen inducers.
- Target genes are induced without pleiotropic effects.
- The system responds to a broad range of inducer concentrations in a dose-dependent manner, therefore allowing stringent chemical control of transcription.
- Components of the XVE system are from non-plant sources.
- The XVE system is very flexible; each functional domain is exchangeable.

Area of Application

Basic plant biology research and plant biotechnology.

Stage of Development

The XVE system has been successfully tested in transgenic tobacco and *Arabidopsis thaliana*.

Lead Inventor

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Patent Information

U.S. Patents 6,784,340 B1 and 7,230,157

References

Zuo, et al., 2000. *Plant J.* 24:265-273.

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