

New Promoter for Driving Tissue-Specific Gene Expression in Plants

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New Promoter Provides Useful Molecular Tool in Agricultural Biotechnology

Market Overview

This promoter drives constitutive and/or tissue-specific expression of genes in transgenic plants. A promoter is a specific DNA sequence that regulates the expression of downstream coding or other noncoding nucleic acids. As such, promoters are important molecular tools for agricultural biotechnology. There are two main constitutive promoters currently used in transgenic plants, mosaic virus 35S (CaMV 35S) and maize ubiquitin. While strong, these promoters are inefficient in some cases and can cause adverse consequences such as growth suppression. To overcome the shortcomings of current promoters, Clemson University researchers have identified a strong new tissue-specific promoter that could be used to drive foreign genes in transgenic plants. This newly identified promoter operates with higher efficiency and allows better control of gene expression.

Technical Summary

Clemson University researchers have identified and cloned a promoter named Srf3 from the upstream sequence of a leaf specific protein kinase gene, Stress Responsive Factor 3 (SRF3) from *Arabidopsis thaliana* genomic DNA. The analysis of this promoter in stable transgenic *Arabidopsis* showed that different versions of the Srf3 promoter have as strong activity as CaMV 35S, while they exhibited much higher activity than maize ubiquitin promoter. This promoter is stronger than the two current promoters primarily utilized and would provide a very useful molecular tool in agricultural biotechnology.

Application

Agriculture production;
biotechnology

Development Stage

Field Trials Underway

Advantages

- Enhances efficiency and flexibility in genetically engineering crop species for trait modifications
- Provides tissue-specific promoters in transgenic plants, allowing use for modulating gene expression

| App Type | Country | Serial No. | Patent No. | CURF Ref. No. | Inventors |
|-------------|---------------|------------|------------|---------------|---------------------------|
| Utility | United States | 15/002,819 | NA | 2014-074 | Dr. Hong Luo Ning Yuan |
| Provisional | United States | 62/106,298 | NA | | |

About the Inventors



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Dr. Hong Luo earned his Ph.D. in Molecular Biology from Catholic University of Louvain. Dr. Luo is the author of numerous publications and was the recipient of the 2013 Clemson University Godley-Snell Agricultural Award for Excellence in Agricultural Research. His research interests focus on transgenic plants and genomics.

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