

Evaluation and Licensing Opportunities

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Patent Literature

US Patent No. US 7,229,829

Novel Tobacco Rattle Virus VIGS Vectors

Improvements to PBL's gene function analysis methods in plants

PBL has secured rights from Yale University to an improvement of its Tobacco Rattle Virus (TRV) virus induced gene silencing (VIGS) system. The TRV VIGS technology (PBL Tech ID 99.192) is now complemented by new, modified vectors and modifications building on the strength of the TRV VIGS system for studying gene function in plants.

The modified system has been developed by Professor Dinesh-Kumar and co-workers at Yale University; this second generation TRV vector has already been successfully applied in Arabidopsis, tomato and Nicotiana to identify and characterize gene functions.

This new technology incorporates all the advantages of PBL's existing TRV VIGS system (see tech sheet 99.192), namely the ability to mediate VIGS in the absence of virus-induced symptoms, to target host RNAs in the growing points of plants (e.g. the meristem) and the broad host range – (TRV has a reported host range of over 60 species from 12 families including monocots).

In addition, the modified TRV vectors and methods deliver the following further benefits:

- More efficient silencing
- Demonstrated efficient silencing in other plant species, e.g. tomato
- Modifications to the vector to allow high throughput and rapid gene discovery:
 - Ribozyme at the C-terminus for more efficient production of viral RNA
 - Changes to the amino acid sequence
 - Modified TRV2 clone has a multiple cloning site allowing fast and easy cloning (allowing efficient subcloning of a large number of cDNAs from EST libraries)
- The inventors have also perfected the delivery of TRV by using spraying of the Agrobacterium mixture, resulting in substantial improvements in the silencing efficiency to 90%.

The resulting gene silencing system offers a rapid means of gaining insight into gene function in plants.

References:

*Burch-Smith TM, *Anderson JC (*contributed equally), Martin GB, Dinesh-Kumar SP (2004). Applications and advantages of virus induced gene silencing (VIGS) for gene function studies in plants. *Plant Journal* 39:734-746.

Liu Y *et al* (2002). Virus-induced gene silencing in tomato. *Plant Journal* 31(6): 777-786.

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