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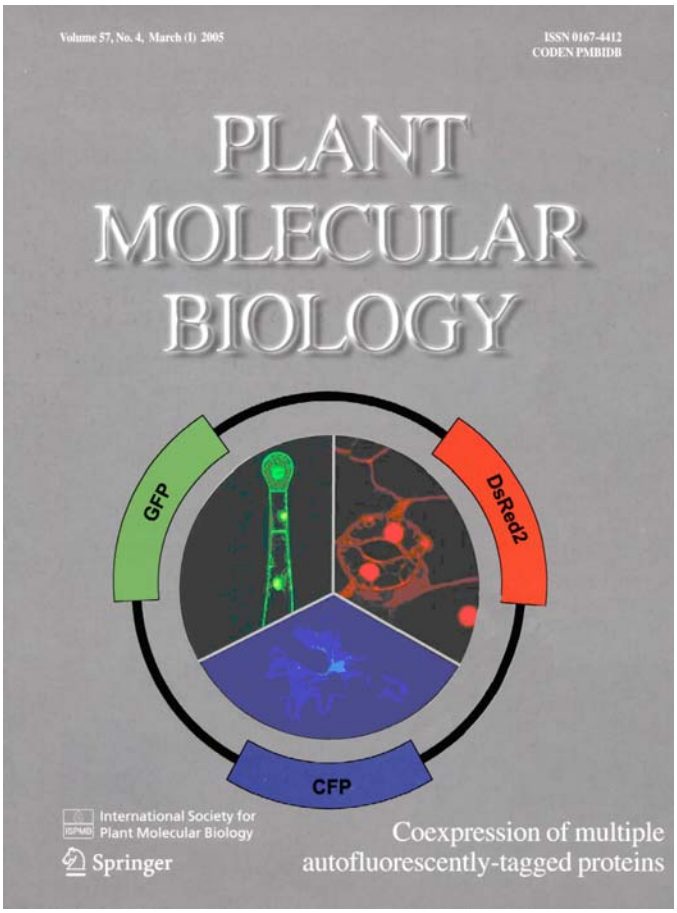
Major Scientific Publications Featuring NRI-funded Research

T. Tzfira, G. Tian, B. Lacroix, S. Vyas, J. Li, Y. Leitner-Dagan, A. Krichevsky, T. Taylor, A. Vainstein, and V. Citovsky. 2005. pSAT Vectors: A Modular Series of Plasmids for Autofluorescent Protein Tagging And Expression of Multiple Genes in Plants. ***Plant Molecular Biology*** *57(4): 503-516.*



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Autofluorescent proteins can be visualized in living cells by artificially exciting them to glow yellow, cyan, green, blue, or red. The use of autofluorescent proteins as "living" tags presents a possible tool for basic plant research and biotechnology to visualize cellular structures, determine intra- and intercellular localization of proteins, monitor gene expression, study *in vivo* protein-protein interactions and cellular dynamics, and other important biological experimentation.

This technique requires generating the correct fusion between the target protein and the autofluorescent protein tag. In order for the tool to be effective, a basic set of genetic vectors for simple cloning as well as fusion of genes encoding the target proteins to the coding sequences of various autofluorescent protein tags must be available and efficiently expressing in living plant cells.

A new modular satellite (SAT) vector system was designed to support fusions to five different autofluorescent tags. The multiple cloning sites allow effortless cloning and exchange of the target genes between SAT vectors encoding different autofluorescence tags. Expression of the tagged proteins is controlled by strong and constitutive promoters, allowing efficient expression of the tagged target genes in living cells. For further versatility and expanded spectrum of applications, these promoters can be easily replaced with other promoters of interest, allowing researchers to control and adapt the SAT expression patterns for their needs.

To allow simultaneous expression of multiple autofluorescently-tagged proteins, which is often critical for studies of protein-protein interactions, up to seven individual SAT expression cassettes can be assembled into a single *Agrobacterium* binary plasmid. The resulting compound multi-gene SAT construct can then be used for transient or stable transgenic expression of the target proteins following its delivery by *Agrobacterium*-mediated genetic transformation. Thus, the SAT vector system, useful to many members of the research and biotech communities, will be a powerful tool for use in experimentation in plant cell biology.

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