#### Permalink

# (SD2022-045) RUBY Plasmids: A reporter for noninvasively monitoring gene expression and plant transformation

Tech ID: 32507 / UC Case 2021-Z08-1

# ABSTRACT

Researchers at UC San Diego in collaboration with others have constructed a new reporter RUBY that converts tyrosine to vividly red betalain, which is clearly visible to naked eyes without the need of using special equipment or chemical treatments. They demonstrated that RUBY can be used to noninvasively monitor gene expression in plants. Furthermore, they show that RUBY is an effective selection marker for transformation events.

Reporters have been widely used to visualize gene expression, protein localization, and other cellular activities, but the commonly used reporters require special equipment, expensive chemicals, or invasive treatments.

#### **TECHNOLOGY DESCRIPTION**

Researchers at UC San Diego in collaboration with others have constructed a new reporter RUBY that converts tyrosine to vividly red betalain, which is clearly visible to naked eyes without the need of using special equipment or chemical treatments. They demonstrated that RUBY can be used to noninvasively monitor gene expression in plants. Furthermore, they show that RUBY is an effective selection marker for transformation events.

The new reporter will be especially useful for monitoring cellular activities in large crop plants such as a fruit tree under field conditions and for observing transformation and gene expression in tissue culture under sterile conditions.

Subsequently a group researchers in China have developed dual-visible reporter assays to determine the DNA-protein interaction. (Sun H, Wang S, Yang K, Zhu C, Liu Y, Gao Z. Development of dual-visible reporter assays to determine the DNA-protein interaction. Plant J. 2023 Mar;113(5):1095-1101. doi: 10.1111/tpj.16094. Epub 2023 Jan 12. ) https://onlinelibrary.wiley.com/doi/full/10.1111/tpj.16094

# CONTACT

Skip Cynar scynar@ucsd.edu tel: 858-822-2672.



#### OTHER INFORMATION

#### KEYWORDS

Plant biotechnology, Genetics, plasmid, gene expression, plant transformation, protein-protein interaction, Ruby, DNA-protein interaction

#### **CATEGORIZED AS**

- Agriculture & Animal Science
  - Other
  - Transgenics
- Biotechnology
  - ► Food
- Research Tools
  - Expression System

**RELATED CASES** 

2021-Z08-1

that enables macroscopically visual PPI detection in plant leaves in real time. Chen, J., Luo, M., Hands, P., Rolland, V., Zhang, J., Li, Z., Outram, M., Dodds, P. and Ayliffe, M. (2023), A split GAL4 RUBY assay for visual in planta detection of protein-protein interactions. Plant J. Accepted Author Manuscript. https://doi.org/10.1111/tpj.16234 )

https://onlinelibrary.wiley.com/doi/10.1111/tpj.16234

#### **APPLICATIONS**



**ADVANTAGES** 



# STATE OF DEVELOPMENT

RUBY plasmid is available for licensing under property rights.

# INTELLECTUAL PROPERTY INFO

UC San Diego welcomes requests to provide tangible research materials to interested

parties.

# **RELATED MATERIALS**

He Y, Zhang T, Sun H, Zhan H, Zhao Y. A reporter for noninvasively monitoring gene expression and plant transformation. Hortic Res. 2020 Sep 19;7:152. - 09/19/2020

University of California, San Diego Office of Innovation and Commercialization 9500 Gilman Drive, MC 0910, , La Jolla,CA 92093-0910 Tel: 858.534.5815 innovation@ucsd.edu https://innovation.ucsd.edu Fax: 858.534.7345 © 2021 - 2023, The Regents of the University of California Terms of use Privacy Notice