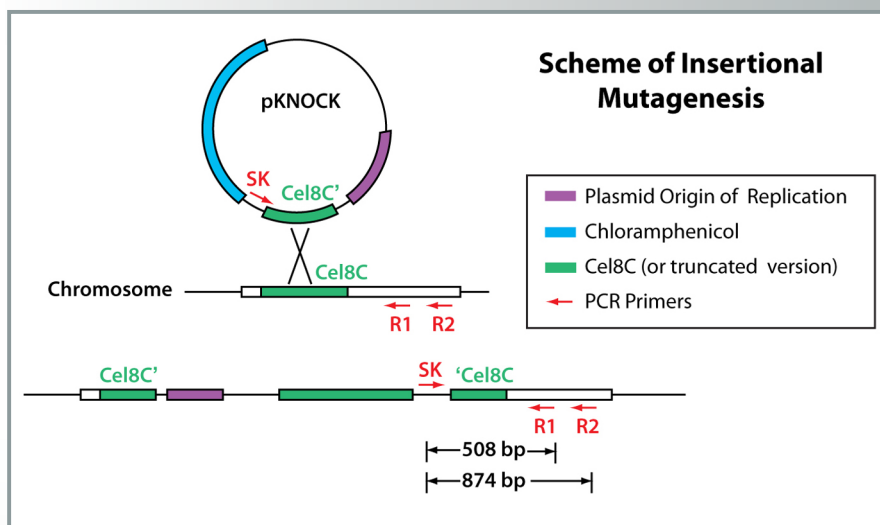


Targeted Mutagenesis Tool in Mesophilic Cellulolytic Clostridia Species

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Technology Summary

ORNL researchers invented a targeted mutagenesis method to genetically modify Gram-positive bacteria, especially within the class of Clostridia. *Clostridium cellulolyticum* ATCC35319 is the model system of mesophilic cellulolytic Clostridia species. These anaerobic bacteria are capable of degrading cellulose and can contribute to the production cellulose-derived ethanol. This is the only system of its kind for these species.

Current functional studies of cellulose degradation have been frustrated by the lack of efficient genetic tools for these microorganisms. This invention provide researchers a tool for better understanding the cellulolytic process involved in the hydrolysis/saccharification of cellulose from biomass. The system can also generate genetically modified bacteria for biofuel production. With this method, it is also possible to disrupt a cellulosome subunit and generate mutants. The technology may lead to reductions in enzyme and saccharification costs associated with the cellulose degradation of biomass.

Advantages

- Only targeted mutagenesis system for *Clostridium cellulolyticum*
- Possible reductions in enzyme/saccharification costs

Potential Applications

- Identification and characterization of structural and regulatory genes critical for cellulosome function in *C. cellulolyticum*.
- Hydrolysis/saccharification of cellulose
- Improved biomass ethanol production

Patent

Yunfeng Yang, *A Targeted Mutagenesis Tool in Mesophilic Cellulolytic Clostridia Species*, U.S. Patent Application 12/233,806, filed September 19, 2008.

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