Landes Highlights

Phages as specific detectors of clinically relvant pathogens

David Schofield and his colleagues review the potential and use of phages as specific tools to identify bacterial pathogens in clinical specimens.

Phage diagnostics can rapidly and sensitively detect their specific host in a variety of culture, food, water, clinical and environmental matrices. Despite these attributes, there are only a few phage diagnostic technologies currently used in the clinical field to detect *Mycobacterium tuberculosis*, *Yersinia pestis*, *Bacillus anthracis*, and *Straphylococcus aureus*.

While no other phage products appear to be currently used in clinical diagnostic laboratories, wild-type phages, genetically engineered phages and phage components are being evaluated as potential bacterial detectors in research and development laboratories. Most of this research is directed toward the detection of food-borne pathogens in various food matrices.

Reference

1. Schofield D, Sharp NJ, Westwater C. Phage-based platforms for the clinical detection of human bacterial pathogens. Bacteriophage 2012; 2: In press; http://www.landesbioscience.com/journals/bacteriophage/article/19274/.

Transgenic cassava plants for East Africa

The VIRCA (Virus Resistant Cassava for Africa) project was conceived in 2005 as an initiative to bring effective solutions to the viral diseases that suppress cassava (*Manihot esculenta*) yields and reduce farmer incomes in East Africa. Based entirely within public sector research organizations, the project's goal is to develop the intellectual and technical capacity to improve cassava varieties for resistance to cassava brown streak disease (CBSD) and cassava mosaic disease (CMD) and to field test, obtain regulatory approval and deliver these products to small landholder farmers. No financial profit is intended for the technology developers. VIRCA's strategies for generating resistance to CMD and CBSD are based on pathogen-derived RNAi technology and will develop two products. First will be the cultivar TME204 modified for resistance to CBSD and second, Ebwanateraka modified for resistance to both CBSD and CMD.

Reference

1. Taylor NJ, Halsey M, Gaitán-Solis E, Anderson P, Gichuki S, Miano D, Bua A, Alicai T, Fauquet CM. The VIRCA Project: Virus resistant cassava for Africa. GM Crops Food 2012; 3:93-103; http://www.landesbioscience.com/journals/gmcrops/article/19144/.

Improved method for Agrobacterium-mediated transformation

The authors describe a simple, rapid and improved genetic transformation protocol that has been developed for the indica rice cultivar IR64 using Agrobacterium-mediated genetic transformation.

Indica rice cultivar IR64 is most recalcitrant to regenerate, which affects the transformation efficiency, especially when mature seed-derived callus tissues are used as explants. The copy number of transgenes has been found to vary from 1 to 2 in transgenic plants. By using this improved method, the authors have successfully raised transgenic rice plants within 3 months from seed inoculation to plant regeneration.

Reference

1. Sahoo RK, Tuteja N. Development of Agrobacterium-mediated transformation technology for mature seed-derived callus tissues of indica rice cultivar IR64. GM Crops Food 2012; 3:123-128; http://www.landesbioscience.com/journals/gmcrops/article/20032/.

Environmental effects of agricultural biotechnology

In this analytical report, the authors assess the impact of commercialized agricultural biotechnology on global agriculture, from some important environmental perspectives. It focuses on the changes in pesticide use and greenhouse gas emissions arising from the use of biotech crops. The technology has reduced pesticide spraying by 443 million kg (-9.1%) and, as a result, decreased the environmental impact associated with herbicide and insecticide use on these crops, as measured by the indicator the Environmental Impact Quotient (EIQ), by 17.9%. According to the authors, the technology has also significantly reduced the release of greenhouse gas emissions from this cropping area, which, in 2010, was equivalent to removing 8.6 million cars from the roads.

Reference

1. Brookes G, Barfoot P. Global impact of biotech crops: Environmental effects, 1996–2010. GM Crops Food 2012; 3:129-137; http://www.landesbioscience.com/journals/gmcrops/article/20061/.