

Increased Epigenetic Variation in Plants

A team at the University of Warwick has developed technology to increase the epigenetic variety of plants without the usual undesired side effects. The novel strategy allows a much greater range of epigenetic and phenotypic differences to be introduced than was previously possible.

BACKGROUND

A key hurdle in plant breeding is how to manipulate quantitative traits without introducing undesirable chromosomal changes and stably transmitting desired phenotypic changes to successive generations. Genetic lesions or chemical treatments can induce heritable changes in the epigenomic landscape of plants that are associated with novel traits. However, these approaches also induce undesirable side effects, such as poor heritability, and genetic changes, which can affect plant viability. Therefore, this strategy is usually associated to costly and lengthy breeding programs aimed to remove these undesirable side effects.

THE WARWICK TECHNOLOGY

A team at the University of Warwick has developed a novel strategy to generate novel epigenetic variation in plants avoiding these undesirable effects. The strategy allows reprogramming of somatic cells into zygotic initials that later develop into fertile plants. New plant materials, generated using this technique, have been grown over three generations to assess their genetic and epigenetic structure. This analysis has revealed that while no genetic changes are detected, regenerated plants have extensive epigenetic variation. This epigenetic variation is stable over several generations and more importantly can generate functional diversity. Plants can be exposed to a wide range of abiotic and biotic stress prior to reprogramming to further increase the epigenetic variability and novel phenotypic traits of the regenerated offspring. Collectively, this novel approach allows the generation of an unlimited source of epigenetic



variation in plants, circumventing the undesirable effects of using genetic lesions or chemical treatments.

KEY BENEFITS

The invention has a wide-range of applications for plant breeding and biotechnology companies. It has the potential to generate novel phenotypic variants which are genetically stable and do not change the genetic structure. The newly formed biological material can improve resistance to pathogens and environmental stress, increase yield and enable the production of new metabolic compounds.

PROJECT STATUS

The initial discover has been made, verified and protected by means of a patent application, but research is ongoing and a number of other exciting indications have developed from this initial study. The University is now looking for commercial partners who will be interested in collaborating with the research team to transfer the technology from Arabidopsis to commercial crops such as cereals.

PATENT & PUBLICATION

This technology is the subject of an un-published UK priority patent application:

1504309.4 Stable epigenetic plant variants

CONTACT

Further information is available on request from:
Dr Suzanna Wood, Warwick Ventures Ltd, Tel: +44 (0) 24 7657 5490, or via s.k.wood@warwick.ac.uk