METHOD OF UNLOCKING HORMONE-FREE REGENERATION OF PLANTS

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PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2025/085785	04/24/2025	2023-109

BRIEF DESCRIPTION

Within the plant kingdom, a wide variety of species possess an extraordinary ability to regenerate whole organs and tissues naturally. Invasive weeds such as Japanese knotweed can regenerate from tiny root fragments in the soil, and many gardeners' favorites can be propagated by taking cuttings from fully-grown plants. However, this flexible ability to regenerate organs is missing from most economically important crop species, and is currently the single biggest bottleneck for plant biotechnology. While there is an increasingly impressive array of tools to edit the genes of a plant cell, regenerating whole organs and body plans from edited cells via labor-intensive tissue culture remains a painstaking process – often requiring a year or more – and resulting in undesirable mutations and chromosome instability.

UCB researchers have discovered that complete genetic knockout of the DNA demethylation pathway in the model plant Arabidopsis dramatically enhances the ability of plant organs to regenerate after wounding. In many plants, including Arabidopsis, regeneration after wounding does not occur naturally and requires intensive tissue culture. By contrast, quadruple homozygous mutant plants harboring loss of function mutations to all four DNA demethylase enzymes capably regenerate all organs and complete body plans after cutting, even in the absence of exogenous plant hormones and tissue culture.

SUGGESTED USES

» Generating drdd knockouts in crop species

» Small molecule inhibition of DRDD enzymes

ADVANTAGES

» Ability to regenerate a fully intact and morphologically normal body plant using a hormone-free process

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OTHER INFORMATION

CATEGORIZED AS

» **Agriculture & Animal Science**

» Other

» Plant Varieties

» **Biotechnology**

» Genomics

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