

# A breakthrough in genetic modification of grains

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Although the commercialization of transgenic, or "genetically modified", plants has stirred widespread controversy, much research remains focused on improving techniques to create such plants. As people familiar with the controversy likely know, transgenic technology allows breeders to add genes for desirable traits to valuable breeding materials. However, transgenic plants are also widely used in basic scientific research. The ability to add a single gene to a plant allows researchers to explore what that gene does, for instance.

Despite years of effort, it has been remarkably difficult to develop efficient methods for [transformation](#) (i.e., genetic modification) of grain crops. The preferred methods generally involve infecting tissue with *Agrobacterium* - a bacterium that naturally transfers DNA to its host genome - and then stimulating that tissue to regenerate into whole plants. However, *Agrobacterium* infects only a narrow range of grain cultivars, and many cultivars are recalcitrant to regeneration. A paper published in *The Plant Cell* reports a breakthrough in transformation technology that greatly expands the range of cultivars and species that can be transformed.

A team of researchers from DuPont added so-called morphogenic genes - known from [basic research](#) to promote the production of embryonic tissue - to the other genes being transformed (in this case to express [green fluorescent protein](#) as a marker of transformation). When they did so, transformation rates increased for a large number of maize cultivars - in many cases going from essentially no transformation to rates high

enough for efficient use in commercial and research applications. The technique also worked in sorghum, rice and sugarcane. This work extends the range of species, cultivars and tissues that can be used for efficient transformation and is a beautiful example of what can be accomplished by combining basic research, technical expertise, and knowledge of practical problems facing mainstream applications.

**More information:** Keith Lowe et al, Morphogenic Regulators Baby boom and Wuschel Improve Monocot Transformation, *The Plant Cell* (2016). [DOI: 10.1105/tpc.16.00124](https://doi.org/10.1105/tpc.16.00124)

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