Discovery of plant 'nourishing gene' brings hope for increased crop seed yield and food security

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University of Warwick scientists have discovered a "nourishing gene" which controls the transfer of nutrients from plant to seed - a significant step which could help increase global food production.

The research, led by the University of Warwick in collaboration with the University of Oxford and agricultural biotech research company Biogemma, has identified for the first time a gene, named Meg1, which regulates the optimum amount of nutrients flowing from mother to offspring in maize plants.

Unlike the majority of genes that are expressed from both maternal and paternal chromosomes, Meg1 is expressed only from the maternal chromosomes.

This unusual form of uniparental gene expression, called imprinting, is not restricted to plants, but also occurs in some human genes which are known to regulate the development of the placenta to control the supply of maternal nutrients during fetal growth.

While scientists have known for a while of the existence of such imprinted genes in humans and other mammals, this is the first time a parallel gene to regulate nutrient provisioning during seed development has been identified in the plant world.

The findings mean that scientists can now focus on using the gene and understanding the mechanism by which it is expressed to increase seed size and productivity in major crop plants.

Dr Jose Gutierrez-Marcos, Associate Professor in the University of Warwick's School of Life Sciences, said: "These findings have significant implications for global agriculture and food security, as scientists now have the molecular know-how to manipulate this gene by traditional plant breeding or through other methods to improve seed traits, such as increased seed biomass yield.

"This understanding of how maize seeds and other cereal grains develop – for example in rice and wheat - is vital as the global population relies on these staple products for sustenance".

"To meet the demands of the world's growing population in years to come, scientists and breeders must work together to safeguard and increase agricultural production."

Professor Hugh Dickinson of Oxford University's Department of Plant Sciences added: "While the identification of MEG1 is an important discovery in its own right, it also represents a real breakthrough in unravelling the complex gene pathways that regulate the provisioning and nutritional content of seeds."

The research, supported by the European Union, the Biotechnology and Biological Sciences Research Council and the Royal Society (BBSRC), is published in *Current Biology*.

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