Scientists advance understanding of how flowers are formed

12 August 2012

(Phys.org) -- Scientists from the Smurfit Institute of Genetics at Trinity College Dublin have made a significant breakthrough in understanding the genetic processes underlying flower development. The research funded by Science Foundation Ireland has just been published in the leading international journal, *Proceedings of the National Academy of Sciences* (*PNAS*).

Lead authors of the study are Dr Samuel Wuest and Dr Diarmuid O'Maoileidigh, who carried out the research in the Plant Developmental Genetics laboratory of the Smurfit Institute of Genetics, which is headed by Assistant Professor Frank Wellmer.

Flowers and the seeds and fruits that they produce are important sources of food and energy and are therefore of great economical importance. How flowers are formed has been studied intensively over the past three decades and many genes that are involved in this important biological process have been identified, especially in the small weed Arabidopsis thaliana. Arabidopsis belongs to the mustard family and is closely related to agriculturally important plants such as oilseed rape and cauliflower and is widely used by researchers for studying the biological processes underlying plant growth and development.

Flowers are typically composed of four different types of floral organs: sepals, petals, stamens and carpels. The development of these organ types is controlled by a small number of master regulatory genes, the so-called floral organ identity genes. Using state-of-the-art experimental approaches, the Trinity researchers have identified the processes that are regulated by some of these genes.

Commenting on the significance of the findings, Professor Wellmer said: "For almost two decades we have wondered how the floral organ identity genes control the development of floral organs. Our new findings provide detailed insights into their activities as well as opened up new avenues for investigation. This is an exciting step forward for our understanding of how flowers form. Ultimately, we may be able to use this information to generate crops with higher yields or improved traits."

More information: The full title of the paper is: 'Molecular basis for the specification of floral organs by APETALA3 and PISTILLATA'

Provided by Trinity College Dublin