

Long-sought flower-inducing molecule found

August 13 2005

Researchers at the Umeå Plant Science Centre at the Swedish University of Agricultural Sciences (SLU), Sweden, report about a breakthrough in our understanding of how plants control their flowering. In an article published in the international journal *Science*, Thursday 11th, they show how a small molecule that is formed in the plant leaves is transported to the shoot tips where it induces the formation of flowers.

This knowledge can lead to the development of new tools that can be used to control the timing of plant flowering, something that is of central importance in both agriculture and forestry.

We are all familiar with the fact that different plants flower at different times of the year. Daffodils in spring, roses in summer and other plants in fall. It is absolutely vital for the plant survival to flower at exactly the right time to secure that it can pollinate, or be pollinated, by other plants of the same species. How then does the plant know when to flower?

Intense Florigen hunt

In the 30s scientists found out that plants can tell whether they are growing in spring, summer or fall by measuring the length of the day. One could also show that plants use their leaves to sense the length of the day. By grafting leaves from plants that had been induced to flower on non-induced plants one could show that the induced leaves produce a substance that is transported to the shoot tips where it induces the formation of flowers. In the 30s a Russian scientist called this mysterious substance 'Florigen'. During the following 70 years scientists have been involved in an intense hunt trying to find out the true nature of Florigen

which has been described as something of a Holy Grail for plant physiology.

The reason is that the nature of Florigen is central for our understanding of how plant flowering is controlled. All attempts to identify a single substance carrying the properties of Florigen have failed, until now.

Messenger molecule

A research group led by Professor Ove Nilsson at the Umeå Plant Science Centre at the Swedish University of Agricultural Sciences has now identified a messenger molecule that fulfills all the classical properties of Florigen. A gene called FT produces the messenger molecule. This gene is active in leaves and its activity is controlled by the length of the day. When the gene is activated, a messenger molecule is produced that is transported to the shoot tips where it very efficiently induces the gene programs that control the formation of flowers. These groundbreaking results are published online on Aug 12 in the international journal Science. Together with other data published at the same time, it shows convincingly that the messenger molecule produced by FT either is florigen, or an important component of florigen.

The researchers have used the small plant model species Arabidopsis in their research. But the group of Ove Nilsson has also other data showing that these results can be directly applied to other species, such as poplar trees. Ove Nilsson says: "With the help of this knowledge plant breeders will get a new tool to control and adopt the flowering of plants, something that has been of great importance for agriculture but that can also lead to the development of efficient tree breeding for forestry."

The persons that have been active in this study are: Tao Huang, Henrik Böhlenius, Sven Eriksson and François Parcy. The Swedish Foundation has funded the research for Strategic Research.

Source: The Swedish Research Council

Citation: Long-sought flower-inducing molecule found (2005, August 13) retrieved 15 May 2024 from <https://phys.org/news/2005-08-long-sought-flower-inducing-molecule.html>

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