New tool puts plant hormone under surveillance

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(PhysOrg.com) -- Charles Darwin was the first to speculate that plants contain hormones. His pioneering research led to the identification of the very first and key plant growth hormone — auxin — in 1937.

Seventy five years on an international team of researchers have made another break-through in our understanding of this important plant hormone. The team from the University of Lyon, The University of Nottingham, Ghent University and the University of Leeds, have developed a sensor that allows auxin to be visualised in plant tissues for the very first time.

Their research published today, Sunday 15 January 2012, in the prestigious academic journal *Nature* describes how the scientists engineered the sensor in the model plant Arabidopsis thaliana.

Plants, like animals, have hormones that regulate how they grow and develop. Plant hormones give their shape to plants, cause tomatoes to

ripen, leaves to drop and roots to grow downwards. Auxin is essential for plant body development. It has a key role in the coordination of many growth and behavioural processes in the plant's life cycle.

Called DII-VENUS, the new sensor can monitor rapid changes in auxin and allowed researchers to visualise almost in real-time the redistribution of auxin during developmental responses. This has revealed much more complex patterns of auxin in tissues than previously thought, indicating that sensitivity to the hormone within tissues precisely control their capacity to respond.

Malcolm Bennett, Professor of Plant Sciences in the School of Biosciences and Biology Director at the Centre for Plant Integrative Biology (CPIB), said: "This sensor represents a very important advance because almost every plant developmental process is controlled by auxin, starting from embryo patterning, to regulation of leaf and root growth and even the shape of flowers. Using the sensor to determine exactly where and when auxin accumulates in plant tissues will help us to design plants with new shapes, sizes and properties."

With funding from the Biotechnology and Biological Sciences Research Council (BBSRC) and the Engineering and Physical Sciences Research Council (EPSRC) the auxin sensor was developed and characterised by scientists led by CNRS Researcher Dr Teva Vernoux from the Laboratoire de Reproduction et Developpement des Plantes (RDP) at the Universite de Lyon in collaboration with the CPIB at The University of Nottingham, the Department of Plant systems Biology,VIB, at Ghent University and Centre for Plant Science at the University of Leeds.

Dr. Vernoux said: "We can now visualize auxin in living tissues. This is a fantastic progress for the understanding of the role of hormones in plant development."

More information: The full paper can be found at: dx.doi.org/10.1038/nature10791

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