Gene discovery to increase biomass needed for green fuel

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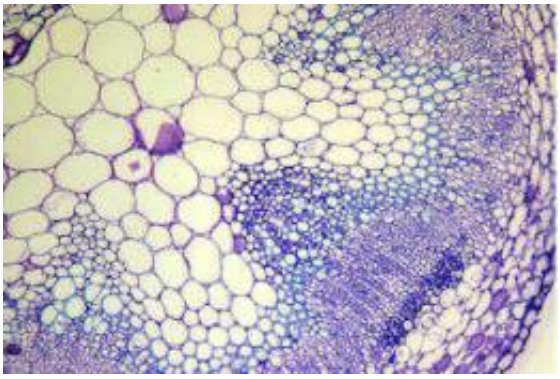

(PhysOrg.com) -- Manchester scientists have identified the genes that make plants grow fatter and plan to use their research to increase plant biomass in trees and other species - thus helping meet the need for renewable resources.

“The US has set the ambitious goal of generating a third of all liquid fuel from renewable source by the year 2025. Estimates suggest to reach their goal they would need 1 billion tonnes of biomass, which is a lot,” says Professor Simon Turner, one of the University of Manchester researchers whose BBSRC-funded study is published in *Development* today.

“Our work has identified the two genes that make plants grow outwards.

The long, thin cells growing down the length of a plant divide outwards, giving that nice radial pattern of characteristic growth rings in trees. So you get a solid ring of wood in the centre surrounded by growing cells. Now we have identified the process by which the cells know how to grow outwards, we hope to find a way of making that plants grow thicker quicker, giving us the increased wood production that could be used for biofuels or other uses.

“And there is an added benefit. There are concerns that the growing of biofuel products competes with essential food production. However, the part of the plant we have studied is the stalk - not the grain - so there will be no competition with food production.”

Professor Turner and Dr Peter Etchells, at the Faculty of Life Sciences, studied the plant Arabidopsis which does not look like a tree but has a similar vascular system, (which carries water and sugar around the plant). They investigated growth in the vascular bundles and found that the genes PXY and CLE41 directed the amount and direction of cell division. Furthermore, they found over-expression of CLE41 caused a greater amount of growth in a well-ordered fashion, thus increasing wood production.

Professor Turner explained: “We wanted to know how the cells divided to produce this pattern, how they ‘knew’ which side to divide along, and we found that it was down to the interaction of these two genes.

“Trees are responsive to a lot of things. They stop growing in winter and start again in spring and this changes according to the amount of light and the day length. It might take a tree 150 years to grow in Finland and only ten years in Portugal.

“Now we know what genes are dictating the growth process, we can develop a system of increasing growth so that it is orientated to produce

more wood - increasing the essential biomass needed for our future."

The team are now growing poplar trees in the lab - to see if they fit the Arabidopsis model. They will use these results to develop a system of increasing wood production.

Provided by University of Manchester