

Scientists find stem cell switch

Scientists have discovered how plant stem cells in roots detect soil structure and whether it is favourable for growth.

Poor soil structure is a problem in tropical agriculture, where soil becomes compact as it dries out.

“We believe this is a first step towards understanding how plants respond to soil compaction. Armed with this understanding we can start to devise ways to tackle it”, said research leader Professor Liam Dolan, of the John Innes Centre in Norwich, UK.

The research team determined that the hormone ethylene regulates cell division in root stem cells. Ethylene is known to play a role in perceiving and communicating environmental cues.

“We predict that this is the mechanism plants use to detect how tough or soft the soil is around them”, said Professor Dolan.

As in humans, plant stem cells are the source of all growth. The defining characteristics of stem cells are that they are able to either regenerate themselves or produce other types of cells. The ultimate source of cells in the root is the ‘quiescent center’, a group of four stem cells that divides infrequently and can produce any type of cell in the root. This study proved that ethylene is the cue needed to promote cell division.

“Every spring, the growth in your garden is the result of the function of stem cells”, said Professor Dolan.

“Stem cells in buds are activated to divide and give rise to the growth for that season. In roots, we found that the division of stem cells is regulated by ethylene. We suggest that ethylene provides signals from the environment to activate cell division when the conditions are right”.

The research was carried out in the mustard-like plant *Arabidopsis*, but it is thought to apply to other plant species.

Source: Norwich BioScience Institutes

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