

Pushy neighbour sends several messages

March 30 2010

How does a plant ensure that one cell remains responsible for making root cells for the rest of its life? The plant embryo contains the transcription factor MONOPTEROS. This tells its neighbouring cell to become a centre that controls stem cells for new growth. Dutch researcher Dolf Weijers has revealed for the first time how MONOPTEROS does that. Besides a hormone, the regulator also sends a protein to the chosen cell. The research results were published in the journal *Nature* on 10 March 2010.

How do you tell your neighbours that you would appreciate their party being quieter? Phoning often fails to help. Do you call out the police? That is exactly what plant genes do: they transmit two messages. MONOPTEROS, a transcription factor, has an important goal: commissioning a neighbouring cell to become the precursor of the root meristem. Thanks to meristems, growth tips containing [stem cells](#), [plants](#) can continually renew their organs. Yet how does MONOPTEROS convey this message to the lucky cell? Dutch researcher Dolf Weijers has solved this puzzle.

Weijers and his German colleagues discovered that MONOPTEROS sends out several messengers. It was already known that MONOPTEROS used the hormone auxin, yet that is not enough to get through to its neighbour. The transcription factor therefore activates the gene TMO7 and subsequently the TMO7 protein is sent to the neighbouring cell. This is the first time that researchers have found this form of communication a plant embryo.

Up until now, MONOPTEROS only seemed to deploy signalling molecules to communicate with neighbouring cells. The combination of the two signals possibly ensures that the cell knows it is a precursor of the root meristem and not, for example, leaves.

In the model plant [Arabidopsis thaliana](#), the team of scientists investigated which of the 25,000 plus genes are activated by the transcription factor MONOPTEROS. By marking the TMO7 protein in the plant embryos and studying the consequences of its presence or absence, the researchers could identify the role of the TMO7 gene.

More information: MONOPTEROS controls embryonic root initiation by regulating a mobile transcription factor, Schlereth, A.S., Möller, B., Liu, W., Flipse, J., Kientz, M., Rademacher, E.H., Schmid, M., Jürgens, G. and Weijers, D. (2010) . Nature, [doi:10.1038/nature08836](https://doi.org/10.1038/nature08836)

Provided by Netherlands Organisation for Scientific Research (NWO)

Citation: Pushy neighbour sends several messages (2010, March 30) retrieved 26 April 2024 from <https://phys.org/news/2010-03-pushy-neighbour-messages.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--