Drought hormones measured

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Floods and droughts are increasingly in the news, and climate experts say their frequency will only go up in the future. As such, it is crucial for scientists to learn more about how these extreme events affect plants in order to prepare for and combat the risks to food security that could result.

Like animals, plants have hormones that send chemical signals between its cells relaying information about the plant's development or interactions with the outside world. One particular way in which plants use hormone signals is in reaction to drought or soil saltiness. The hormone responsible for this type of response is called abscisic acid. It not only controls efficient water use, but plays a role in signaling when seeds should remain dormant and when they should germinate, depending on soil conditions.

New work from a team including Carnegie's Wolf Frommer will allow researchers, for the first time, to measure the levels of abscisic acid in individual plant cells in real time. It is published in *eLife*.

"This will vastly improve our understanding of how abscisic acid works in a plant that is stressed by salt or lack of water," Frommer explained. "This new tool can help engineers and farmers work to increase crop yields, which is especially important as climate change puts plants under increased stress."

The team's tool uses multiple fluorescently tagged proteins to measure the concentration of abscisic acid found in a plant cell. Their findings

indicate that there are likely more proteins responsible for transporting abscisic acid into a cell than are currently known and also that abscisic acid is eliminated by root cells very quickly after uptake.

"More work should reveal the fine-tuning by which plant cells respond and react to hormone signals. These tools should also have applications for human and animal hormones, as well," Frommer said.

Provided by Carnegie Institution for Science

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