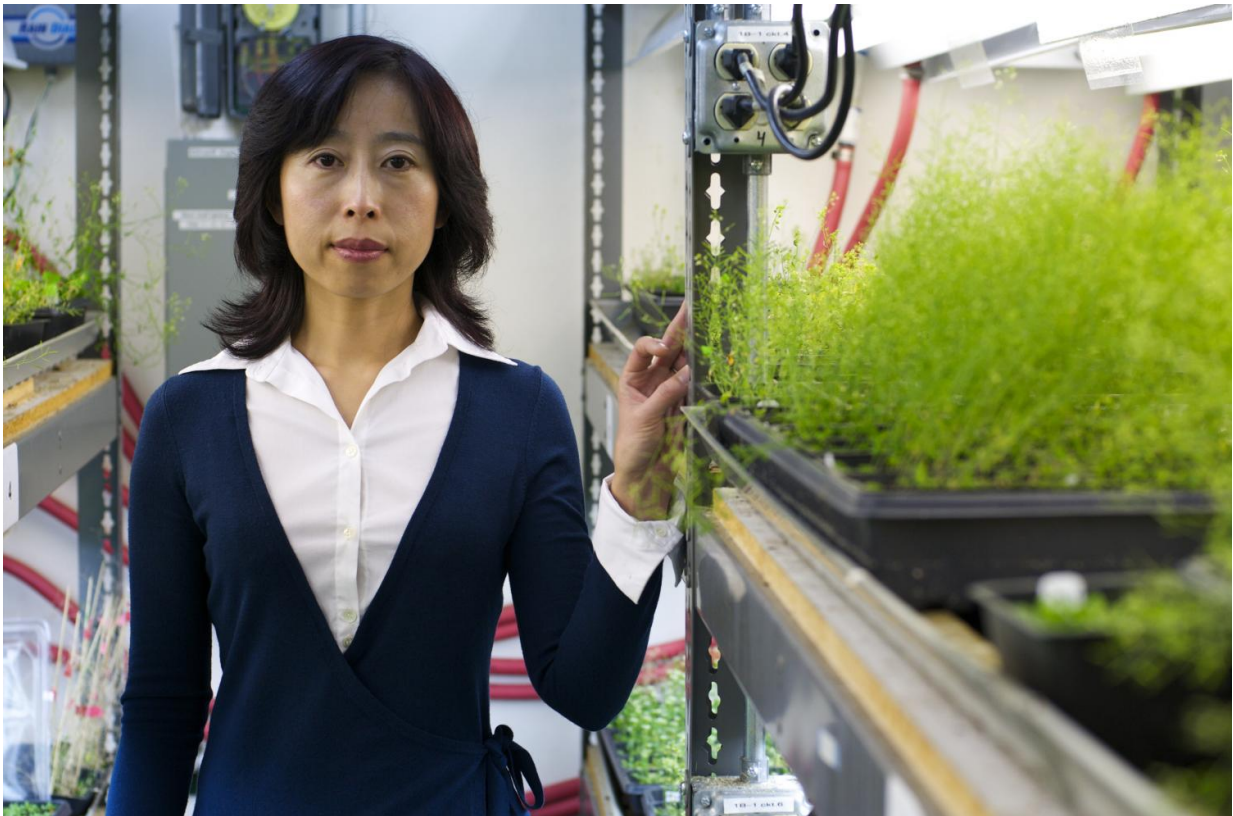


Researchers find crucial clue to manipulating reproduction in plants

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Xuemei Chen is a distinguished professor in the Department of Botany and Plant Sciences at UC Riverside. Credit: L. Duka.

A team of researchers, led by a plant cell biologist at the University of California, Riverside, has for the first time identified a small RNA

species and its target gene that together regulate female germline formation in plants.

"Understanding the mechanisms governing germline formation is crucial to our ability to manipulate plant reproduction for the improvement of agriculture," said Xuemei Chen, a distinguished professor of plant cell and molecular biology, who led the research project.

In both [plants](#) and animals, the germline is the lineage of cells that eventually makes the gametes (eggs and sperms). In animals, the germline is set aside (or "specified") early on, during embryogenesis, and does not go on to give rise to "[somatic cells](#)" - cells in the body that are not reproductive cells. In plants, on the other hand, the germline is not specified early on. It is produced from somatic cells late in plant development - specifically, in flowers - and is the first step towards sexual reproduction.

The new work not only identifies a regulatory module for an important developmental process, it also implies that there is likely cell-to-cell communications via RNA or protein in this process.

Study results appear June 5 in *Current Biology*.

Chen explained that small RNAs have been implicated in the process of germline formation in plants, but until now the small RNA species involved, called "tasiR-ARFs," was unknown. Chen and her team found that the tasiR-ARFs regulate germline formation by repressing its target gene Auxin Response Factor 3 (ARF3).

Chen explained that in mutants that fail to produce certain types of small RNAs, more somatic cells become germ [cells](#), suggesting that small RNAs prevent the overproduction of [germ cells](#). By isolating more mutants with germline specification defects, the team found that the

mutants provided more clues that, eventually, helped the team identify tasiR-ARFs.

The research was done on *Arabidopsis*, a model plant used widely in plant biology labs. The findings, however, are most likely to be applicable to other plants because tasiR-ARF is highly conserved.

Chen and her team did not see a defect in male germline in the mutants they studied, but, based on the literature in the field, acknowledge that small RNAs do act in the male germline.

"Quite possibly, in the case of the male [germline](#), a different small RNA species is involved," Chen said.

More information: *Current Biology* (2017).

[www.cell.com/current-biology/fulltext/S0960-9822\(17\)30557-2](http://www.cell.com/current-biology/fulltext/S0960-9822(17)30557-2)

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