

Researchers discover a regulatory pathway that changes the way cells divide in plants

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Credit: Albert-Ludwigs-Universität Freiburg

An international scientific consortium including the Freiburg plant biologist Prof. Dr. Thomas Laux has discovered a regulatory pathway that turns plants' ordinary somatic cells into germ cells for sexual reproduction. The researchers recently published their findings in the scientific journal *Science*.

In contrast to humans and animals, [plants](#) do not set aside a specialized cell lineage (germline) for the future production of gametes during early embryogenesis. Instead, the [germ cells](#) of plants are established de novo from [somatic cells](#) in the floral reproductive organs, the stamens and carpels. To this end, the selected cells switch their cell division mode from mitosis, cell proliferation maintaining the chromosome number, to meiosis, the division that reduces the number of chromosomes and where genetic recombination occurs. Plants have therefore evolved strategies to enable somatic cells to switch to germline fate and to do so in the right place and at the right time.

Laux and colleagues have identified multiple genes in the model organism *Arabidopsis thaliana* that give the start signal for switching from mitose to meiose. The starting point for the findings presented in *Science* are mutants that create multiple [germ](#) cells instead of a singular one in each ovule.

Key of the newly discovered pathway is the limitation of activity of the transcription factor WUSCHEL, which Laux's team had identified several years ago as an important regulator of [pluripotent stem cells](#) that are able to develop into every cell type in the organism. The involvement

of WUSCHEL in creating germ cells is a discovery that provides molecular evidence for the longstanding hypothesis derived from paleobotanical studies that the reproductive ovules and the shoot meristem have evolved from the same precursor organ in ancient plants. The newly discovered regulatory mechanism shows how plants are able to limit switching to the germ cell program so that only a single germ cell emerges, while the surrounding [cells](#) take on other tasks.

More information: Xin' Ai Zhao et al. RETINOBLASTOMA RELATED1 mediates germline entry in, *Science* (2017). [DOI: 10.1126/science.aaf6532](#)

Provided by Albert Ludwigs University of Freiburg

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