

## Germline specification in plant reproduction

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Three years ago, the journal *Sexual Plant Reproduction* featured a special issue on “Deciphering molecular mechanisms of fertilization in seed plants,” which captured our state of understanding of gamete function and double fertilization in flowering plants at that time. This issue received considerable attention, making it one of the journal’s most successful. Since then, the pace of research has accelerated further, and recently we have seen numerous scientific breakthroughs. We anticipate that in the near future we will have sufficient tools and knowledge of molecular reproductive mechanisms to allow unparalleled manipulation and genetic improvement of crop plants. Basic data on the molecular regulation of cell lineages that govern plant reproduction will need to be among the resources employed to meet the challenges posed by increasing population in a context of dwindling arable land, demands on fresh water supplies and the need to provide the genetic diversity to resist increasing global challenges in climate, energy resources and disease.

With the current special issue, we address several enduring themes that relate to the fundamental **biology of gametes and germ lineages**, taking into account the most recent developments in the field of plant reproduction. In particular we examine the **specification of the plant germline in reproduction** and explore the general themes and molecular mechanisms that govern germ lineage and

cell fate establishment, which expands upon the coverage in our previous special issue.

In particular we address the designation and nature of germline identity in plants, from the simplest version of a germ cell-producing somatic cell, to the strongly reduced angiosperm germline, which derives two distinct germ lineages from spore mother cells that ultimately are the founding cells of the embryo and endosperm in flowering plants. In this issue, we include such aspects as crosstalk between the gametophyte, germ cells and the sporophyte, specification of gametes, the role of epigenesis in this process, and the establishment of polarity during gametogenesis and early embryogenesis. The selected papers address unifying concepts of critical importance to biology in general, focusing on flowering plants, which constitute the majority of crop plants upon which man relies. As before, we have asked leading scientists in the field to contribute to the special issue.

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