S013 Dissecting seed growth and development in *Arabidopsis*

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Seed formation in flowering plants is a paradigm for the coordination of different organisms and tissues during development. We have recently identified a mutant in the CYCLIN-DEPENDENT KINASE A;1 and the F-BOX-LIKE PROTEIN 17 that allow a genetic dissection of plant reproduction. In these mutants, pollen forms only one instead of two sperms and this single sperm fertilizes remarkably only the egg cell leaving the central cell unfertilized. Although recent data from other laboratories have shown that both sperms have a similar potential, this result suggests a clear hierarchy during double fertilization. Moreover, although the central cell remained unfertilized it started to proliferate and adopted endosperm-specific characteristics providing genetic evidence for a differentiation and growth triggering signal that emanates from the fertilization of the egg cell. Interestingly, there exists a large natural genetic variation with respect to the outcome of this signaling process and exploiting this natural variation, we could further dissect the interdependence of embryo and endosperm growth during early seed development. Our data show an unexpectedly large degree of independence in embryo growth, but also reveal the embryo's developmental restrictions with respect to endosperm size. This work provides a genetic framework for dissection of the interplay between embryo and endosperm during seed growth in plants and forms the base for several current molecular approaches in our laboratory that aim at unraveling communication pathways during plant reproduction.