Published in final edited form as:

Mol Reprod Dev. 2013 June ; 80(6): 427. doi:10.1002/mrd.22200.

Preparing for explosion: Pollen tubes are capacitated by the pistil

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Pollen tubes transport two immotile sperm cells in their cytoplasm during growth through the pistil, delivering one to the egg cell to form the zygote and one to the central cell to create the endosperm. Pollen tubes grow through the pistil's complex extracellular environment and target ovules by following a gradient of small protein attractants, which are secreted by two specialized synergid cells within the ovule. This image shows *Arabidopsis thaliana* pollen tubes growing in vitro, and illustrates how pollen tubes gain the capacity to locate and enter ovules only after interaction with the pistil tissue. When pollen grains expressing red fluorescent protein (bottom) are placed directly on media in vitro, they exhibit random growth and are unable to target ovules (shown in white; middle). In contrast, when pollen expressing green fluorescent protein (top) is grown through an explant of stigma and style, pollen tubes grow more rapidly and efficiently target and enter ovules. Pollen transcriptional programs are rapidly induced during growth through the pistil, which prepares the pollen tube for interaction with the synergid cells. The molecular components that allow perception of the chemoattractants, which are similarly transcriptionally regulated, are beginning to be identified. Pollen growth in the pistil initiates pollen tube differentiation, maximizing the capacity of pollen to deliver sperm.