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Arabidopsis

In Brassicaceae species (*Arabidopsis*, canola), the first step towards sexual reproduction is initiated when the male pollen grains are deposited on the stigmatic papillae at the top of the female pistil. The characteristic Brassicaceae dry stigmas enable a rapid control over the fate of pollen grains following pollination. As the pollen grains are in an inactive desiccated state for dispersal, the first post-pollination steps of pollen hydration and germination are tightly regulated by the stigma. Following this, cell-cell communication continues to play a critical role as the pollen tube emerges and grows through the female reproductive tract to an ovule for fertilization. In *Arabidopsis*, many signalling players have been identified that regulate the later stages of these pollen-pistil interactions (e.g. ovular pollen tube guidance and reception), but little is known about the regulators of these interactions in the preceding stages. We have identified two groups of *Arabidopsis* receptor-like kinases that play an essential role in the upper pistil for compatible pollen hydration and pollen tube growth. Furthermore, using pollen from related Brassicaceae species, we also discovered that these genes play a role in forming a reproductive barrier in the pistil to prevent interspecies pollen tube growth. Thus, these novel *Arabidopsis* receptor-like kinases play a dual role in the female pistil to promote compatible pollen and block more distantly related pollen.

