

S003 Signalling during pollen tube perception
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Recent years have shown that proper cross-talk among gametophytic cells represents a key to reproductive success in flowering plants. In addition to gametophytic interactions between pollen tube and embryo sac cells, cell-cell-communication occurs inside both gametophytes as well as between gametic cells during pollen tube burst. Here we will focus on communication during pollen tube perception and discuss two classes of small cysteine-rich proteins (CRPs) that are involved to induce pollen tube burst. Additionally, we will report on possible roles of calcium signaling during this process. The defensin-like (DEFL) small protein ZmES4 (*Zea mays* Embryo Sac4) was previously shown to induce pollen tube burst via opening of the potassium channel KZM1 (Amien et al. 2010, PLoS Biol.). Here we show that other members of the ZmES family are also capable to enhance the open probability of potassium channels at physiological membrane potentials. Mutated proteins and short peptides derived from various domains of ZmES4 were used to map active sites and channel interaction domains. A second class of small CRPs secreted from the embryo sac encode PME inhibitors (PMEI) that destabilize the pollen tube wall after external application suggestion that they work in concert with DEFL-like toxins to induce pollen tube burst (Woriedh et al. 2013, Plant Reprod.). Finally, we have studied the role of calcium during pollen tube perception by monitoring its dynamics in the synergids, egg and central cell by using a novel troponin-based biosensor.