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Perspective

Pollen structure and its formation

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ABOUT THE STUDY

Pollen grains are infinitesimal structures that convey the male gametes or their progenitor cells in higher plants. Each pollen grain contains all the hereditary data needed for whole haploid plant and to fertilize with the female gamete to produce a diploid zygote. Pollen grains differ in size, shape, and surface structures. These unique features help pollen grains to secure the male hereditary material from the environment during transportation from the anther to the stigma. The outer layer of the pollen grain additionally contains different waxes and proteins which help in holding dampness and associate with the stigma during fertilization. The surface proteins are frequently perceived by immune cells and are the source of the hypersensitive responses in humans.

Pollen grains of land plants are bordered by a complex multilayered cell wall, called pollen wall, which provides protection from biotic and abiotic stresses and assumes a significant part during the association between male and female organs. Pollen wall in blossoming plants is made out of two distinct layers: the external layer is called exine and internal layer is called intine, with the pollen coat deposited on the outer layer of the exine. The exine can be divided into the sexine (external) and nexine (internal), and the sexine itself likewise contains two layers: an external tectum layer and an inner layer of vertical regular bacula between the tectum and the nexine. Mutants with inadequate pollen wall structures frequently show decreased levels or complete loss of fertility.

Exine is mostly made out of sporopollenin which is a complex biopolymer and hence is resistant to harsh chemical, physical, microbial, and enzymatic treatments. Sporopollenin is secreted from the tapetal cells to the outer layer of pollen grains. Pollen grains themselves add to sporopollenin biosynthesis and exine development. Biosynthesis of sporopollenin precursors occurs in plastids, and the deposition of sporopollenin precursors starts before long the completion of meiosis when the temporary callose wall is broken down and the primexine is formed. The accumulation of sporopollenin precursors proceeds until microspore vacuolation, and is generally finished when of pollen mitosis. Sporopollenin biosynthesis and accumulation coincides with tapetum Programmed Cell Death (PCD). Immature or delayed tapetum PCD ordinarily disturbs pollen wall formation and causes defects in male fertility.

Pollen crevices are areas of the pollen wall that might include exine diminishing or a critical decrease in exine thickness. They permit contracting and expanding of the grain brought about by changes in dampness. The most common way of contracting the grain is called harmomegathy.

The transfer of pollen grains to the female reproductive structure is called pollination. Pollen Mother Cells (PMCs) are organized inside the anthers as long as the flower buds are present underground. The pollen wall of mature pollen grains is made out of an uninterrupted intine and a constant endexine overspread with spines. The endexine is roughly pretty much as thick as the intine and has a light appearance. Pollen development finishes in a three-celled pollen grain.

Pollens that cause allergic reactions are those of anemophilous plants. Such plants produce huge amounts of lightweight pollen which can be carried for long distance and are inhaled easily, carrying it into contact with the sensitive nasal passages. Dust sensitivities are normal in polar and calm environment zones, where creation of dust is occasional.

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