

ANTHER TAPETUM IN PROGRAMMED CELL DEATH

S u m m a r y

The death of the tapetum in normal anther development is an example of physiological programmed cell death (PCD) in floral organ of higher plants. This sporophytic secretory tissue which surrounds meiocytes/pollen grains, provides them with many substances necessary for development, e.g. nutrients, certain enzymes, precursors of the pollen exine and materials of pollen coat including the signalling molecules. Species specific program of tapetal cells differentiation and disintegration coincides precisely with developmental program of the male postmeiotic cell line. Premature or delayed degradation of the tapetum results in male sterility. The death of tapetum, coordinated with death of several different tissues, is indispensable in realization of anther dehiscence programme and in release of mature pollen grains.

PCD of tapetum is genetically controlled, but its molecular mechanisms are poorly known with the ex-

ception of internucleosomal cleavage of nuclear DNA.

At the structural level, programmed death of tapetum is realized by sequential elimination of all the cellular structures (extracellular matrix = cell wall and protoplast). The cell wall hydrolysis takes place long before disintegration of tapetal protoplast.

The morphotype of the anther in tapetum PCD is different from apoptosis and autolysis. Cytomorphological changes in tapetum include: general shrinkage of the whole cells and nuclei, chromatin condensation (specially at the nucleus periphery), transformation of tapetal plastids into elaioplasts, accumulation of lipids in cytoplasm, disruption of endoplasmic reticulum and other organelles, and eventually the breakdown of the plasma membrane accompanied by the the release of changed tapetal remnants, transformed, in turn, into pollen coat materials.