

ROLE OF CYTOSKELETON IN PLANTS REPRODUCTION

S u m m a r y

This review concerns the role of cytoskeletal elements: microtubules and microfilaments in plants reproduction brought to light by recent electron microscopic and immunofluorescence investigations on mitotic and meiotic cells, as well as on the development of male and female gametophytes. Configurations of the cytoskeleton depend on the cell cycle phase and on morphogenetic processes. The mitotic cell cycle contains five configurations of cytoskeletal fibers: cortical network, preprophase band, mitotic spindle and perinuclear radial arrangement. The cortical network exists at the stages G1, S and G2 but at the end of the G2 the preprophase band exists as a peculiar form of cortical microtubules, predicting the future division plane. The cytoskeleton of meiotic cells doesn't contain the preprophase band configuration. In anthers, the microsporocytes (the male line of generative cells) are divided into tetrads after successive or simultaneous cytokinesis. There are quite dense arrangements of microtubules and microfilaments in cytoplasm of prophase microsporocyte and two other configurations of the cytoskeleton; meiotic spindle and phragmoplast in the metaphase I and telophase I cytoskeleton. Such configurations are doubled in

metaphase II and telophase II. The phragmoplast is arranged between sister and non sister nuclei in case of simultaneous cytokinesis, while in two separate bipolar phragmoplasts in case of successive cytokinesis. Before the first mitosis in the microspores an asymmetric microtubular cytoskeleton is developed, resulting in displacement of the nucleus to the cell periphery. Later the first, asymmetric, haploid mitosis forms a much bigger vegetative cell and a smaller generative one. The generative cell changes in the shape from a lens to spherical and to a spindle shape. This cell divides (in pollen grain or in pollen tube) forming two male gametes. The development of female line of generative cells starts in hypodermal cell at the micropylar end of the ovule. The megasporocyte performs random or perinuclear disposition of cytoskeletal elements in mitotic prophase with a temporary concentration during nucleus migration. During the meiosis the tetrad of megaspores is formed with the linear or T shape arrangement. Finally the haploid embryo sac develops with a peculiar cytoskeletal organisation. The pollen tube and gametes entrance is an effect of interaction of the actin cytoskeleton and myosin (or a myosin like protein) on the surface of male gametes.