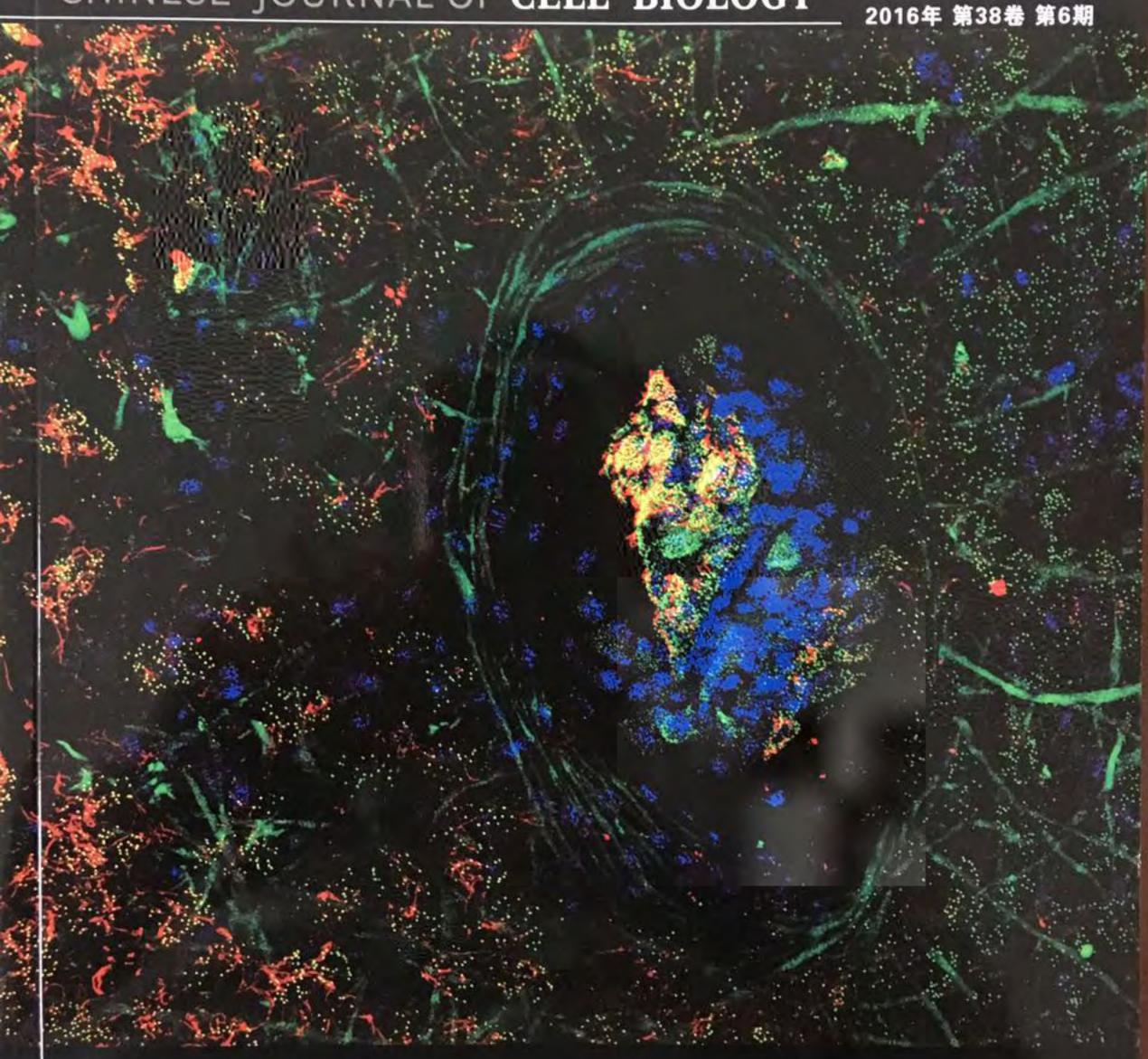
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(继续《细胞生物学杂志》,1979年创刊)

38卷第6期 2016年6月

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封面照片 在生命之花簇拥的暖巢里,安静地睡着一只小小的雏鸟。样品取材自涡虫咽部,是人工去除咽部以后再生长到56小时的咽部,从咽孔里伸出来。"巢"周围的花朵和蜷缩的雏鸟,红色的是纤毛,绿色的是中心粒,蓝色的是核,"巢"是咽孔的肌肉组织(作者:李亚萍)。

Cytochemical Study on the Anther Development of Hypericum monogynum L.

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Wei Dongmei<sup>1,2*</sup>, Yang Shujuan<sup>3</sup>, Yang Risheng<sup>2</sup>

(1 ; 3 )
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Abstract The metabolisms of polysaccharides and lipids have temporal and spatial characteristic during the anther development. The metabolic characteristics of polysaccharides and lipids differ with plant species. The dynamic distribution of polysaccharides and lipids was observed in the anther developmental processes of

L. by histochemical methods. The results showed the distribution of polysaccharides and lipids displayed some characters. At the stage of sporogenous cell, a lot of starch polysaccharides were accumulated in parenchyma cells around vascular bundle, epidermis, endothecium and middle layer cells but no starch in tapetal cells. At the stage of early microspore, tapetal cells began to accumulate starch polysaccharides and gradually increased, and starch polysaccharides appeared in microspores. At stage of late microspore, starch polysaccharides disappeared, and lipids began to accumulate in tapetal cells and microspores. At the stage of bicellular pollen, tapetal cells degenerated —, and the lipid content of bicellular pollen significantly increased. Few of normal pollens were flled with starch polysaccharides and lipids as nutritional substances. Most of pollens happened to be abnormal at the stage of microspore. At anthesis, these pollens were empty without starch polysaccharides and lipids resulting in abortion of pollen grains fnally. Fertile pollens were flled with starch polysaccharides and lipids.

Keywords L.; anther development; cytochemistry; starch polysaccharides; lipid

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(1C)**PAS** 1E) 1D) 1F) 2.1.3 1G) MMC VB A: (VB) (Pa) (Sc) (Sp) B:

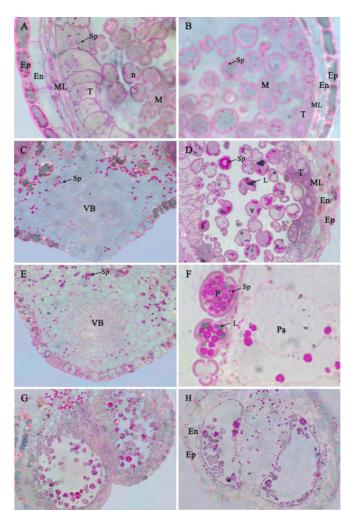
(Ep) (En) (ML) (T), C: (MMC) D: E: PAS F: G: (M) ; MMC: En: ; Ep: ; L: ; M: ; ML: ; Sc: ; VB: A: 200×; B D G: 1 000×; C E F: 400× Sp: ; T:

A: transverse section of an anther at the sporogenous cell stage of L., with tetrasporangiate anthers. Lots of starch grains (stained red) are evident in parenchymal cells around vascular bundle. B: the anther wall is composed of epidemis, endothecium, middle layer, and tapetum cells. Some starch is visible in epidemis, endothecium, and middle layer cells. No starch and lipid droplet is in tapetal cells. Small starch grains and lipid droplets are visible in sporogenous cells. C: at MMC stage, vascular bundle cells are stained red. Abundant starch grains are accumulated in parenchymal cells. D: MMCs are wrapped in red callose walls. Little starch and lipid droplets are visible in MMCs. Large size starch grains are visible in epidermic cells. No starch and lipid droplet is in endothecium, middle layer, and tapetum cells. The morphology changes occur in tapetum cells. E: the tetrad stage is characterized by four microspores wrapped in red callose walls. The PAS-positive material is flled with pollen sac. F: starch grains are visible in parenchymal cells. G: no starch and lipid droplet is in microspores and epidemis. Little starch and lipid droplets are visible in endothecium and middle layer. The cytoplasm of tapetum cells is stained red. En: endothecium; Ep: epidemis; L: lipid droplet; M: microspore; MMC: microspore mother cell; ML: middle layer; Pa: parenchymal cell; Sc: sporogenous cell; T: tapetum; VB: vascular bundle. A: 200×; B,D,G: 1 000×; C,E,F: 400×.

Fig.1 Starch and lipid droplets distribution in young anthers of Hypericum monogynum L.

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                                                      ( 2G)
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                                                                   2H)
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A: (M) (Ep) (En) (Sp); (ML) 4~5 (T) B: C: D (v), E: F: (Pa) G: 2 En: ; Ep: ; ML: ; P: ; Pa: ; Sp: ; T: ; VB: A~E: 400×; F: 1 000×; G H: 200×

A: the free microspores are released from callose walls. No starch and lipid droplet is in early microspores. Epidemis and endothecium cells remain high vacuolization, and little starch is present in cytoplasm. The middle layer is comprised of 4-5 layers cells. Some starch is visible in tapetum cells. B: starch grains begin to accumulate in cytoplasm during microspores development. No changes occur in epidemis and endothecium cells. The middle layer is compressed into narrow cell zone. Starch grains increase significantly in tapetum cells. C: a lot of starch grains are accumulated in the cytoplasm of parenchymatous cells. Some cells are dyed black. D: in late microspore stage anthers, a large vacuole occupies almost the entire cellular volume. Large size starch and lipid droplets appear in the vacuolated microspore cytoplasm. The microspores begin to degenerate. The large size starch grains are visible in epidemis, endothecium and middle layer cells. Tapetum cells begin to degenerate, and lipid droplets are flled with cytoplasm. E: plenty of starch grains are accumulated in the parenchyma cells at this stage. F: mature pollens are flled with starch grains. Compound starch grains are present in parenchymal cells. G: during the early bicellular stage, most pollens abortion occurs at this stage. A few of pollens are flled with starch grains and lipid droplets. No noticeable changes occur in anther wall cells. Amount of starch grains accumulate in parenchymal cells. H: at anthesis, a few of pollens develop into mature pollens and are flled with nutritional substances. The anther wall consists of epidemis and endothecium cells. Tapetum and middle layer cells completely degenerate, and endothecium cells undergo radial and inner tangential wall thickening. En: endothecium; Ep: epidemis; L: lipid droplet; M: microspore; ML: middle layer; n: nucleus; P: pollen; Pa: parenchymal cell; T: tapetum; VB: vacuole. A-E: 400×; F: 1 000×; G,H: 200×.

674

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参考文献 (References)

- 1 Cheung AY, Wu HM. Structural and functional compartmentalization in pollen tubes. J Exp Bot 2007; 58(1): 75-82.
- Datta R, Chamusco KC, Chourey PS. Starch biosynthesis during pollen maturation is associated with altered patterns of gene expression in maize. Plant Physiol 2002; 130(4): 1645-56.
- 3 Ku S, Yoon H, Su HS, Chung YY. Male-sterility of thermosensitive genic male-sterile rice is associated with premature programmed cell death of the tapetum. Planta 2003; 217(4): 559-65.
- 4 Xie CT, Yang YH, Zhu XY, Tian HQ. Cytochemical investigation of genic male-sterility in Chinese cabbage. Sex Plant Reprod 2005; 18(2): 75-80.
- 5 Castro AJ, Clement C. Sucrose and starch catabolism in the anther of during its development: A comparative study among the anther wall, locular fluid and microspore/pollen fractions. Planta 2007; 225(6): 1573-82.
- 6 Kurusu T, Koyano T, Hanamata S, Kubo T, Noguchi Y, Yagi C, OsATG7 is required for autophagy-dependent lipid metabolism in rice postmeiotic anther development. Autophagy 2014; 10(5): 878-88.
- 7 Park SK, Twell D. Novel patterns of ectopic cell plate gro)

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