Plates

1 Nuclei and Chromosomes 1

1.1 Ultrastructural appearance of nuclei at different cell stages in high pressure frozen onion epidermal cells 2
Ichirou Karahara, Lucas Andrew Staehelin, and Yoshinobu Mineyuki

1.2 Morphology of nucleoli in tobacco BY-2 cultured cells 4
Junko Hasegawa and Sachihiro Matsunaga

1.3 Nuclear lamina localized at the nuclear periphery in interphase and at chromosomes in mitotic phase 6
Yuki Sakamoto and Shingo Takagi

1.4 Nuclei of multinucleate cells in *Hydrodictyon reticulatum* 8
Manabu Tanaka and Kyoko Hatano

1.5 Meiotic chromosomes of *Arabidopsis thaliana* pollen mother cells 10
Yoshitaka Azumi

1.6 Multicolor FISH of *Pinus* chromosomes 12
Masahiro Hizume and Fukashi Shibata

1.7 Chromosome painting and FISH of distal end satellite DNAs in dioecious plants with sex chromosomes 14
Fukashi Shibata, Yusuke Kazama, Shigeyuki Kawano and Masahiro Hizume

1.8 Kinetochore and microtubule dynamics during cell division of tobacco BY-2 cells visualized by live-cell imaging 16
Daisuke Kurihara and Sachihiro Matsunaga

1.9 Visualization of chromatin dynamics in the root of *Arabidopsis thaliana* 18
Takeshi Hirakawa and Sachihiro Matsunaga

1.10 Specific contribution of condensin II to sister centromere resolution in *Cyanidioschyzon merolae* 20
Takayuki Fujiwara and Tatsuya Hirano

1.11 Endomitosis induces a giant polyploid cell on the leaf epidermis 22
Sachihiro Matsunaga and Masaki Ito

2 Mitochondria 25

2.1 Mechanisms of division and inheritance of mitochondria and chloroplasts 26
Tsuneyoshi Kuroiwa and Isamu Miyakawa

2.2 Mitochondrial nucleoid of *Physarum polycephalum* 28
Narie Sasaki

2.3 Uniparental inheritance of mitochondria during mating of *Didymium iridis* 30
Yohsuke Moriyama and Shigeyuki Kawano

Atlas of plant cell structure
2014

digitalisiert durch:
IDS Basel Bern

2.4 Giant mitochondrion in synchronized *Chlamydomonas* cells 32
Tomoko Ehara and Tetsuaki Osafune
2.5 Dynamic transition of mitochondrial morphologies during germination in living zygospore 34
Hiroaki Aoyama and Soichi Nakamura
2.6 Mitochondrial nucleoids in the *Euglena gracilis* mitochondrial network 36
Yasuko Hayashi and Katsumi Ueda
2.7 Mitochondrial fission and fusion in an onion epidermal cell 38
Shin-ichi Arimura
2.8 Mitochondria in *Arabidopsis* guard cells 40
Chieko Saito
2.9 Mitochondria of thermogenic skunk cabbage 42
Mayuko Sato and Yasuko Ito-Inaba

3 Chloroplasts 45
3.1 Chloroplast division by the plastid-dividing ring 46
Shin-ya Miyagishima and Tsuneyoshi Kuroiwa
3.2 Chloroplasts divide by contraction of a bundle of polyglucan nanofilaments 48
Yamato Yoshida, Haruko Kuroiwa, and Tsuneyoshi Kuroiwa
3.3 Cyanelle division of the glaucocystophyte alga *Cyanophora paradoxa* 50
Haruki Hashimoto, Mayuko Sato, and Shigeyuki Kawano
3.4 3D distribution of RuBisCO in synchronized *Euglena* cells 52
Tetsuaki Osafune, Tomoko Ehara, and Shuji Sumida
3.5 Developing and degenerating chloroplasts in *Haematococcus pluvialis* 54
Shuhei Ota and Shigeyuki Kawano
3.6 Monoplastidic cells in lower land plants 56
Masaki Shimamura
3.7 Dimorphic chloroplasts in the epidermis of the aquatic angiosperm *Podostemaceae* family 58
Rieko Fujinami
3.8 Distribution of chloroplasts and mitochondria in *Kalanchoë blossfeldiana* mesophyll cells 60
Ayumu Kondo
3.9 Etioplast prolamellar bodies in *Arabidopsis thaliana* etiolated cotyledon 62
Yasuko Hayashi
3.10 Chloroplasts and mitochondria in *Sorghum* bundle sheath cells 64
Chieko Saito, Yoshihiro Kobae, and Takashi Sazuka
3.11 Chloroplast division machinery in *Pelargonium zonale* 66
Haruko Kuroiwa and Tsuneyoshi Kuroiwa
3.12 Active digestion of paternal chloroplast DNA in a young *Chlamydomonas reinhardtii* zygote 68
Yoshiki Nishimura

4 The Endoplasmic Reticulum, Golgi Apparatuses, and Endocytic Organelles 71
4.1 Endoplasmic reticulum throughout the cytoplasm 72
Haruko Ueda, Etsuo Yokota, and Ikuko Hara-Nishimura
4.2 Endoplasmic reticulum in the green alga *Botryococcus braunii* 74
Tetsuko Noguchi

4.3 ER body in cotyledon epidermal cells 76
Yasuko Hayashi and Toshiyuki Sakurai
4.4 Golgi apparatuses in a *Brachypodium* root cap peripheral cell 78
Mayuko Sato
4.5 Golgi bodies in mature pollen of *Tradescantia reflexa* 80
Tetsuko Noguchi
4.6 Golgi bodies and the *trans*-Golgi networks in *Botryococcus braunii* 82
Tetsuko Noguchi
4.7 Clathrin-coated buds and vesicles in *Botryococcus braunii* 84
Tetsuko Noguchi
4.8 Spatio-temporal dynamics of endocytic vesicle formation in *Arabidopsis thaliana* 86
Masaru Fujimoto and Takashi Ueda

5 Vacuoles and Storage Organelles 89
5.1 Central vacuole in *Arabidopsis thaliana* pistil cells 90
Tetsuko Noguchi
5.2 Vacuoles under salt stress 92
Tetsuro Mimura and Kohei Hamaji
5.3 Autophagosomes and autolysosomes in plant cells 94
Yuko Inoue and Yuji Moriyasu
5.4 Transition of peroxisomes from glyoxysomes to leaf peroxisomes during greening in cotyledon 96
Yasuko Hayashi and Shoji Mano
5.5 Dynamics of embryonic pea leaf cells during early germination 98
Yasuko Kaneko
5.6 Lipids and astaxanthin are major contents of subcellular changes during encystment in *Haematococcus pluvialis* 100
Shuhei Ota and Shigeyuki Kawano
5.7 Lipid accumulation in the green alga *Botryococcus braunii* 102
Reiko Suzuki and Tetsuko Noguchi
5.8 Production of oil bodies in response to nitrogen starvation in *Chlamydomonas reinhardtii* 104
Haruko Kuroiwa and Tsuneyoshi Kuroiwa

6 Cytoskeletons 107
6.1 Microtubule systems in the cell cycle of onion root tips visualized in 3D 108
Yoshinobu Mineyuki
6.2 Microtubule-dependent microtubule nucleation in a tobacco BY-2 cell 110
Takashi Murata
6.3 Ultrastructural appearance of microtubules in high-pressure frozen onion epidermal cells 112
Ichirou Karahara, Takashi Murata, Lucas Andrew Staehelin, and Yoshinobu Mineyuki
6.4 Microtubules and their end structures in high-pressure frozen onion epidermal cells visualized by electron tomography 114
Ichirou Karahara and Yoshinobu Mineyuki
6.5 Microtubule organizing centers in bryophytes 116
Masaki Shimamura and Yoshinobu Mineyuki
6.6 Selective disappearance of female centrioles after fertilization in brown algae 118
Chikako Nagasato and Taizo Motomura

6.7 **Spindle formation in brown algae** 120
Chikako Nagasato
6.8 **Helical rows of microtubules in *Euglena* pellicles** 122
Tetsuko Noguchi
6.9 **Spindle pole body during meiosis I in the budding yeast *Saccharomyces cerevisiae*** 124
Aiko Hirata and Shigeyuki Kawano
6.10 **Actin filaments in *Lilium longiflorum* pollen protoplasts** 126
Ichiro Tanaka
6.11 **Dynamics of actin filaments in the liverwort, *Marchantia polymorpha*** 128
Atsuko Era and Takashi Ueda
6.12 **Two actin structures in dormant *Dictyostelium discoideum* spores** 130
Masazumi Sameshima
6.13 **Actin-microtubule interaction during preprophase band formation in onion root tips visualized by immuno-fluorescence microscopy** 132
Miyuki Takeuchi and Yoshinobu Mineyuki
6.14 **Microtubules direct the layered structure of angiosperm shoot apical meristems (SAMs)** 134
Shuichi Sakaguchi

7 **Cell Walls** 137
7.1 **Ribbon-like fibrillar network of glucan in reverting *Schizosaccharomyces pombe* protoplast** 138
Masako Osumi
7.2 **Mother and daughter cell walls during autosporulation in the green alga *Chlorella vulgaris*** 140
Maki Yamamoto and Shigeyuki Kawano
7.3 **Great-grandmother, grandmother, mother, and daughter cell walls during budding in the green alga *Marvania geminata*** 142
Maki Yamamoto, Satomi Owari, and Shigeyuki Kawano
7.4 **Formation of amphiesmal vesicles and thecal plates in the dinoflagellate *Scrippsiella hexapraecingula*** 144
Satoko Sekida and Kazuo Okuda
7.5 **The elaborate shape of *Micrasterias* is formed by a primary cell wall containing pectin** 146
Tetsuko Noguchi
7.6 **Cellulose-synthesizing rosettes in the green algae *Micrasterias* and *Closterium*** 148
Tetsuko Noguchi
7.7 **Localization of typical cell wall polysaccharides pectin and β-1,3/1,4 mixed linkage glucan in *Arabidopsis thaliana* and *Oryza sativa*** 150
Ryusuke Yokoyama, Hideki Narukawa, and Kazuhiko Nishitani
7.8 **Plasmodesmata directly connect the cytoplasm of neighboring plant cells** 152
Yasuko Hayashi
7.9 **Meshwork structure of the Casparian strip** 154
Yoshihiro Honma and Ichirou Karahara

8 **Generative Cells** 157
8.1 **A mating-pair of seaweed *Ulva compressa* gametes with asymmetrical mating structure positions** 158
Yuko Mogi and Shigeyuki Kawano
8.2 **Spermatogenesis in *Marchantia polymorpha*** 160
Katsumi Ueda and Tetsuko Noguchi
8.3 **Motile sperms released in the ovule of an extinct Permian gymnosperm *Glossopteris*** 162
Harufumi Nishida
8.4 **Multiflagellated sperm of *Ginkgo biloba* L** 164
Shinichi Miyamura
8.5 **Pollen exine and male gametic nucleus of *Lilium longiflorum*** 166
Norifumi Mogami and Ichiro Tanaka
8.6 **Developing *Arabidopsis* pollen grain containing a young generative cell with some mitochondria and no plastids** 168
Chieko Saito and Keiko Shoda
8.7 **The selective increase or decrease of organelle DNAs in young generative cells controls cytoplasmic inheritance in higher plants** 170
Noriko Nagata
8.8 **Dimorphic *Plumbago auriculata* sperm cells** 172
Chieko Saito
8.9 **Pollen tube guidance toward the ovule** 174
Masahiro M. Kanaoka
8.10 **Semi-in vitro *Torenia* system for live-cell analysis of plant fertilization** 176
Tetsuya Higashiyama
8.11 **Protoplasts from plant female gametophytes** 178
Masahiro M. Kanaoka
8.12 **Egg cells with giant mitochondria in a higher plant, *Pelargonium zonale* Ait** 180
Haruko Kuroiwa and Tsuneyoshi Kuroiwa
8.13 **Zygote and sperm cells during early embryogenesis in a higher plant, *Pelargonium zonale* Ait** 182
Haruko Kuroiwa and Tsuneyoshi Kuroiwa
8.14 **Cell geometry in a whole *Arabidopsis* seed visualized by X-ray micro-CT** 184
Yoshinobu Mineyuki, Aki Fukuda, Daisuke Yamauchi, and Ichirou Karahara

9 **Meristems** 187
9.1 **Two types of meristem involved in development of the fern gametophyte** 188
Ryoko Imaichi
9.2 **Structures of fern and lycophyte shoot apical meristems (SAMs)** 190
Ryoko Imaichi
9.3 **Structures of angiosperm SAMs** 192
Ryoko Imaichi
9.4 ***Arabidopsis thaliana* leaf blade and leaf petiole** 194
Yasunori Ichihashi, Kensuke Kawade, and Hirokazu Tsukaya
9.5 **Structures of fern and lycophyte root apical meristems (RAMs)** 196
Ryoko Imaichi

9.6 Structures of angiosperm RAMs 198
Ryoko Imaichi
9.7 Asymmetric cell division forms endodermis and cortex in *Arabidopsis thaliana* root 200
Mai Takagi and Sachihiro Matsunaga