Cell Structure III

Cytoskeleton and Inclusions

VIBS 443/602
CYTOSKELETON

MICROTUBULES (25 nM)
MICROFILAMENT (6 nM)
INTERMEDIATE FILAMENT (10 nM)
EM 4: liquid droplets are sometimes clustered together in irregularly shaped groups visible in intestinal epithelial cells. Note: the large droplets visible in the goblet cell contain mucin, not lipid.

1. Lipid
2. Chylomicrons
3. Mucus
EM 4 (Enlargement of section from class print): Microvilli at apical ends of intestinal absorptive cells with parallel arrays of microfilaments in their cores. The microvilli are covered with a wispy glycocalyx. The terminal web region immediately below the microvilli contains a very high concentration of microfilaments and (keratin) intermediate filaments, and thereby excludes most other cell organelles.

1. Microvilli
2. Glycocalyx
3. Terminal web
EM 4b: intestinal absorptive cell (apex); 60,000x

1. Microfilaments
2. Microvilli
3. Mitochondria
4. Plasma membranes of adjacent cells
5. Terminal web
6. Zonula occludens
EM 2b: Liver; cytoskeleton elements.

Microtubules, microfilaments, and intermediate filaments can be compared in this cell, which has a high concentration of cortical microfilaments.

1. Microtubule
2. Microfilaments
3. Intermediate filaments
EM 6a: Insect spermatocyte. Centriolar region of a cell showing both the stable, triplet microtubule arrays within the centriole, and the labile, individual microtubules originating from pericentriolar material.

1. Centriole
2. Stable microtubule
3. Labile microtubule
EM 6b: monkey oviduct; cross-sectional view of cilia and basal bodies.

1. Basal bodies
2. Cilia
3. Axoneme
EM 6c: monkey oviduct; longitudinal section through basal bodies and cilia. Basal body microtubules serve as assembly sites for outer doublet microtubules that are continuous with them. This is not true for the central pair of microtubules.

1. Basal body
2. Axoneme
3. Cilia
EM 10d: peripheral nerve; Schwann cells and axons. Neurofilaments (intermediate filaments) and microtubules can be seen in both myelinated and unmyelinated axons.

1 Neurofilaments
2 Microtubule
CELL COMPOSITION

THREE MAJOR CLASSES OF CYTOPLASMIC STRUCTURE

1. MEMBRANOUS ORGANELLES

2. NON-MEMBRANOUS ORGANELLES
   – CYTOSKELETAL COMPONENTS etc

3. INCLUSIONS - EXPENDABLES
INCLUSIONS - EXPENDABLES

a. NUTRIENT e.g., GLYCOGEN, LIPID
b. PIGMENT e.g., MELANIN GRANULES
c. SECRETORY GRANULE e.g., ZYMOMGEN GRANULE OF PANCREAS
EM 2: liver. Glycogen appears as darkly staining, granular structures that are slightly larger than a ribosome.

1. Glycogen
2. Ribosome
3. Golgi vesicle
4. Lipid
EM 25: ovary. Yolk protein has formed a crystalloid inclusion within the cytoplasm of this oocyte.

1. Crystalloid inclusion
EM 24: corpus luteum. Several clear, non-membrane bounded lipid droplets are visible in the cytoplasm of the large cell.

1. Lipid droplets
2. Mitochondria
3. Smooth endoplasmic reticulum
4. Rough endoplasmic reticulum
Fig. 13-10  Pancreas (sectional view). Stain: hematoxylin-eosin. Low magnification.
Slide 156: Monkey Pancreas; toulidine blue
1. Islet
2. Pancreatic acinar cells
Pancreas, monkey (toluidine blue)
EM 1: pancreas. Secretory droplets containing digestive enzymes are major constituents of pancreatic acinar cells.

1. Zymogen granules
2. Rough endoplasmic reticulum
3. lumen
Secretory droplets
EM 14: stomach. Secretory droplets with a variety of sizes and staining intensities are visible.

1. Secretory granules
2. Secretory vacuoles
3. Rough endoplasmic reticulum
EM 4c: Intestinal absorptive cell (super nuclear region); 60,000x.

1. Budding RER
2. Coated vesicle
3. Golgi
4. Mitochondria
5. Nucleus
6. Plasma membrane
7. Primary lysosome
EM 20: testis. Several darkly staining lipofuscin granules representing indigestible material are visible in this steroid-secreting cell.

1. Lipofuscin granule
2. Nucleus
3. Mitochondrion
Lung
lung with bronchi
lung with bronchi
EM 8h: Macrophage in testis; 30,000x.

- Enlarged basal lamina
- Heterophagic vacuole
- Leydig cell cytoplasm
- Nucleolus
- Myoid cell
Lipid droplets
EM 21: Ductus deferens; 11,000x.

1. Golgi
2. Stereocilia
3. Mitochondria
4. Swirl of SER
Fig. 5-10  Cardiac Muscle (longitudinal section). Stain: Iron hematoxylin-eosin. Oil immersion.
Opened Interclated disc in cardiac cells of Heart, endocardium
Lipofuscin in cardiac cells of Heart
Fig. 6-14  Dorsal Root Ganglion (panoramic view, longitudinal section). Stain: hematoxylin-eosin. Low magnification.

Fig. 6-15  Section of a Dorsal Root Ganglion. Stain: hematoxylin-eosin. High magnification.

Fig. 6-16  Section of a Sympathetic Trunk Ganglion. Stain: hematoxylin-eosin. High magnification.
Peripheral ganglion, monkey