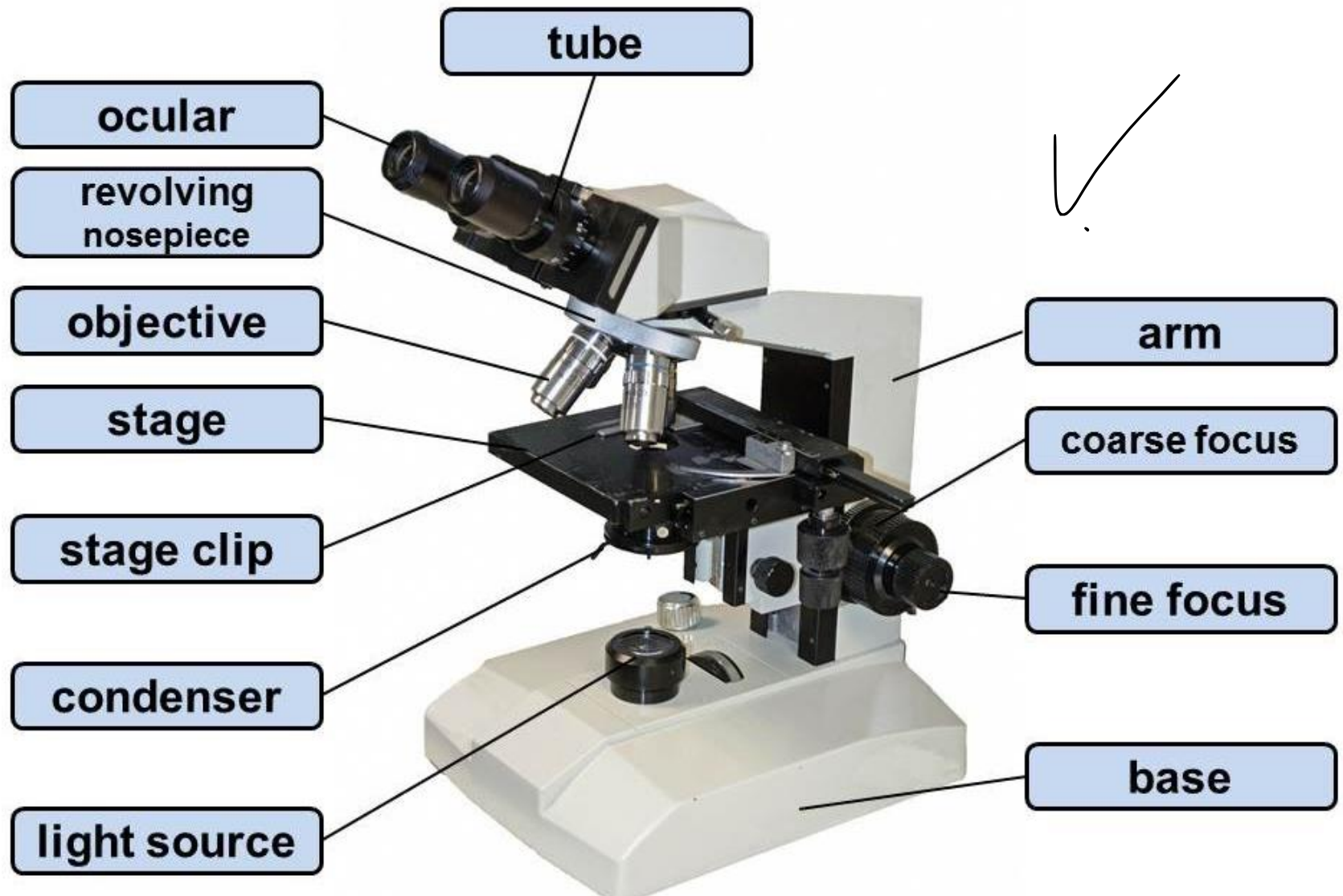


Microscope



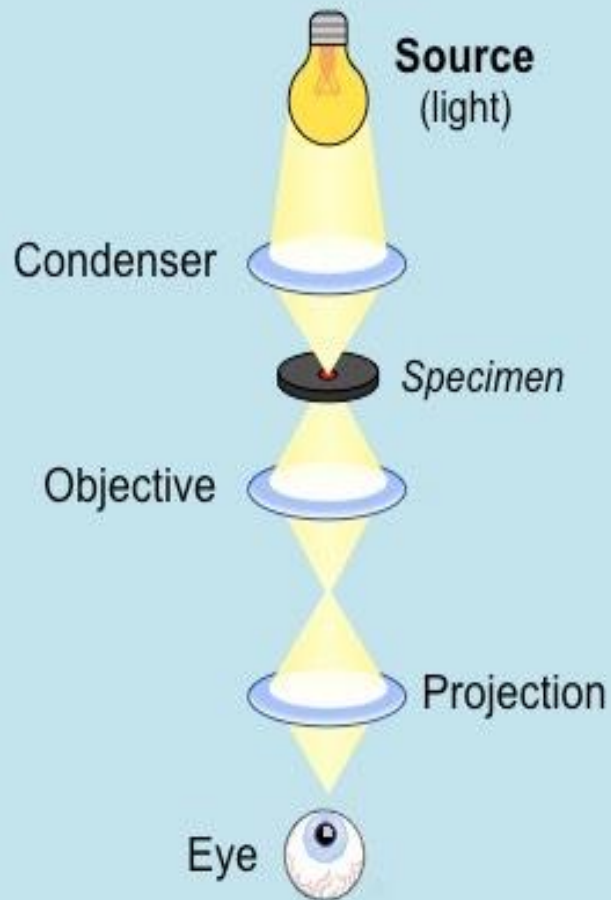




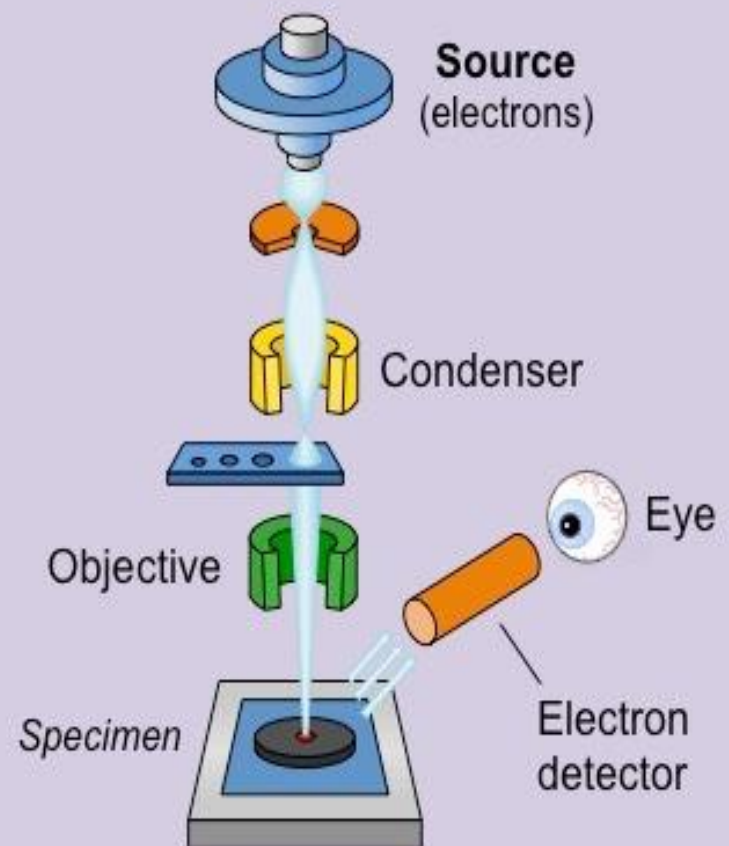
Comparing Microscopes

	Light microscopes	Electron microscopes
What is used to make an image?	Beams of visible light	Beams of electrons emitted in a vacuum
How does it magnify objects?	Light shines through an object and lenses magnify the image	Electrons are transmitted through or scan the outside of the object.
Magnification Power	Up to 1000 x	Usually 35,000 x but can be 1 million x
What can it magnify?	Specimens must be thin and transparent. Can be living or dead.	Fixed specimens must be dead, dry, and stained with heavy metals.
What can it record?	Full color images. Can be captured using digital camera or computer	Computer captures digital black & white images that can be colorized.

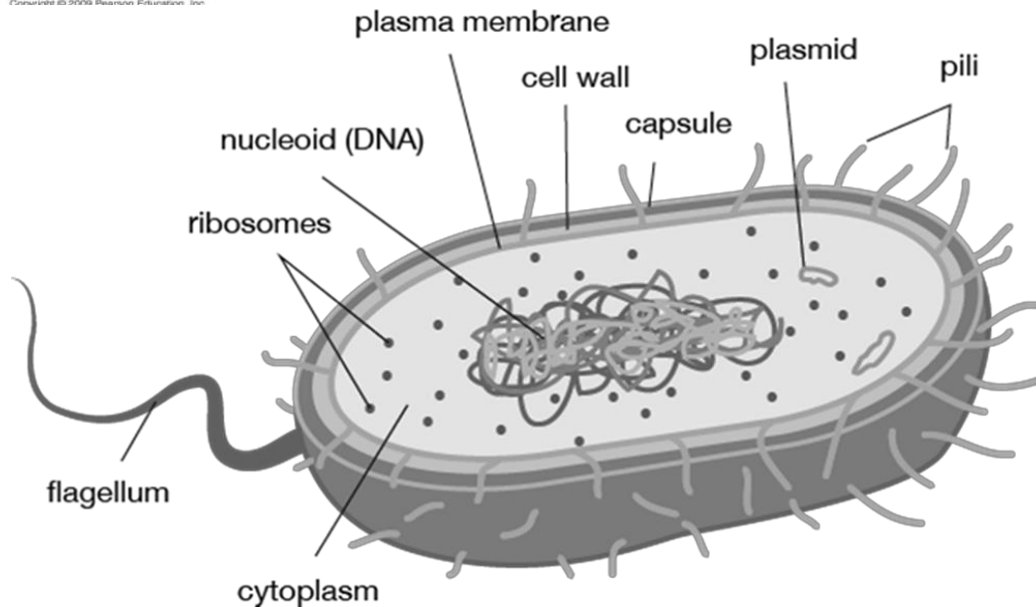
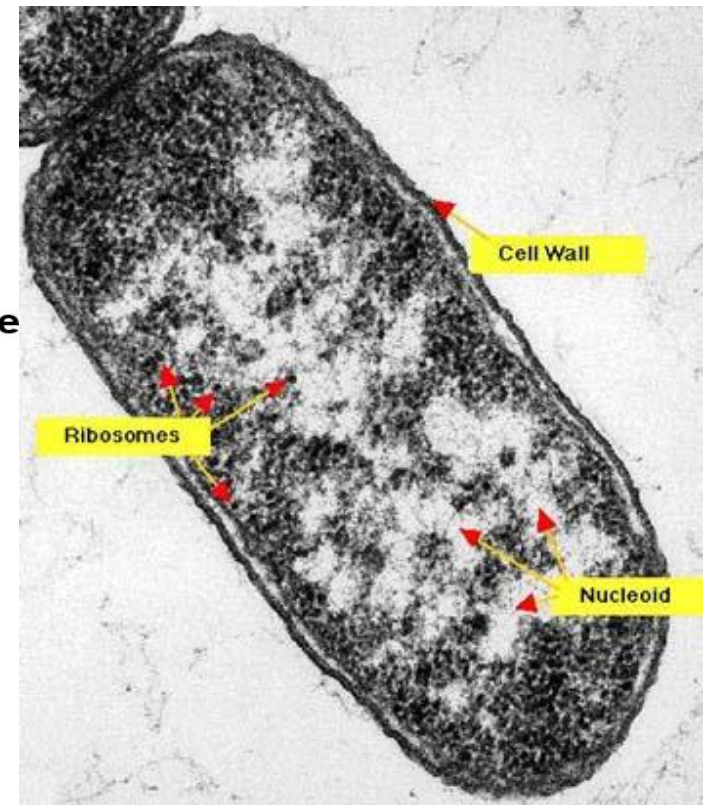
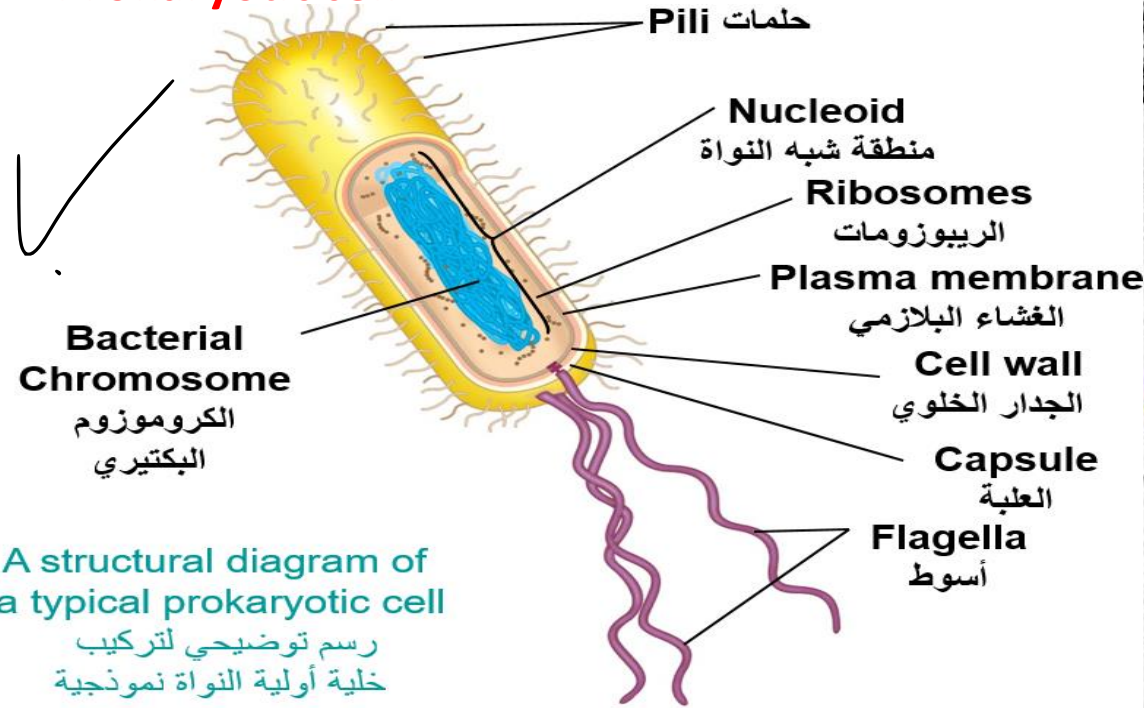
Light Microscope



Electron Microscope



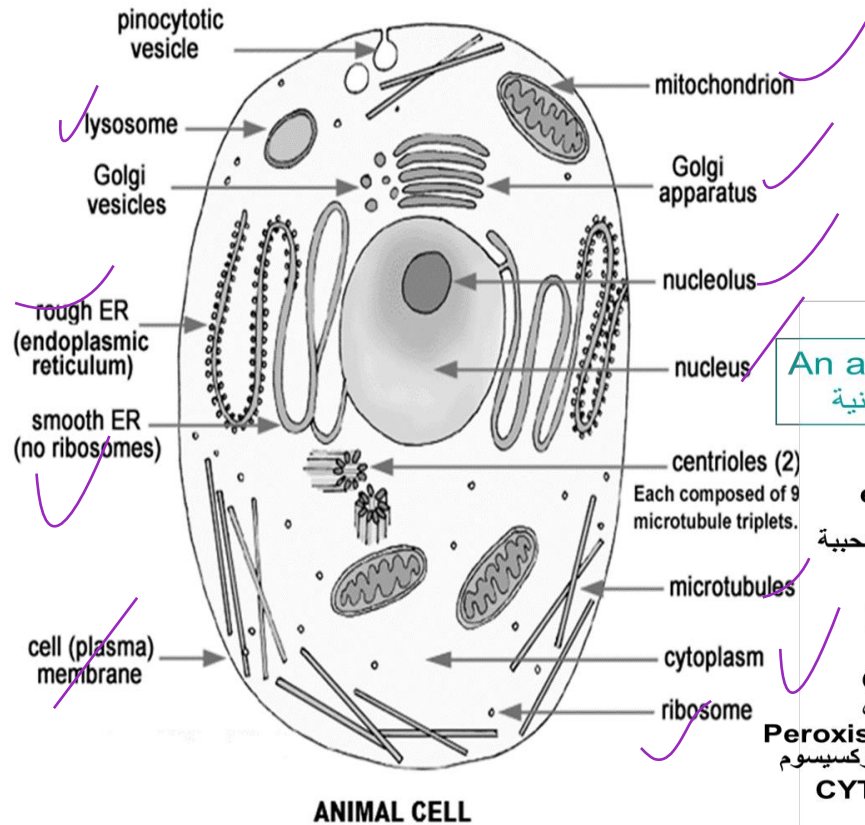
1-Prokaryotic cell



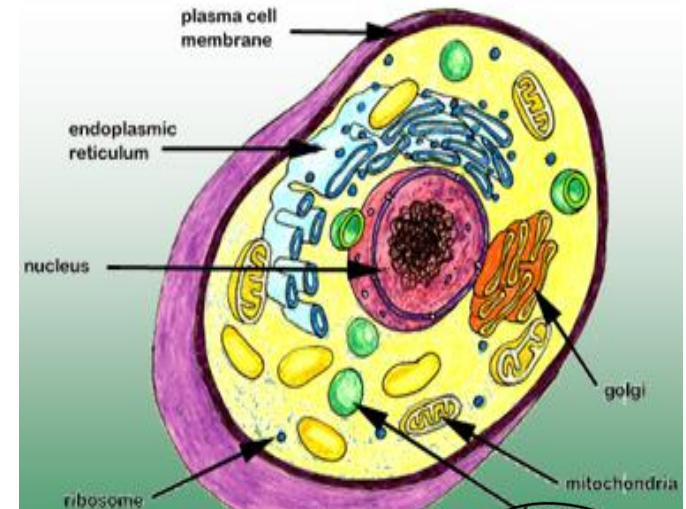
Bacterial cell

2- Eukaryotic cell

“Typical” Animal Cell



ANIMAL CELL



An animal cell
خلية حيوانية

Rough endoplasmic Reticulum
الشبكة الإندوبلازمية المحيطة

Lysosome
جسيم هاضم

Centriole
جسيم مركزي

Peroxisome
البيروكسيسوم

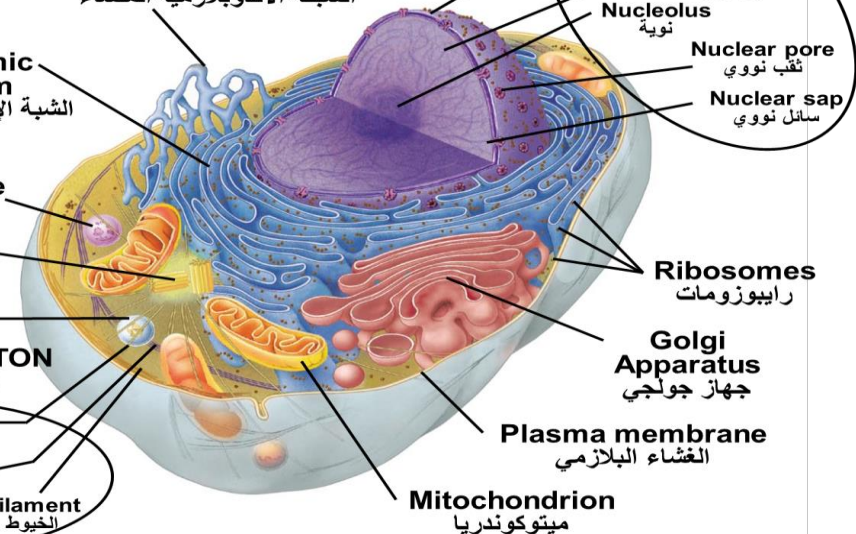
CYTOSKELETON
الهيكل الخلوي

Microtubule
الأنابيب الدقيقة

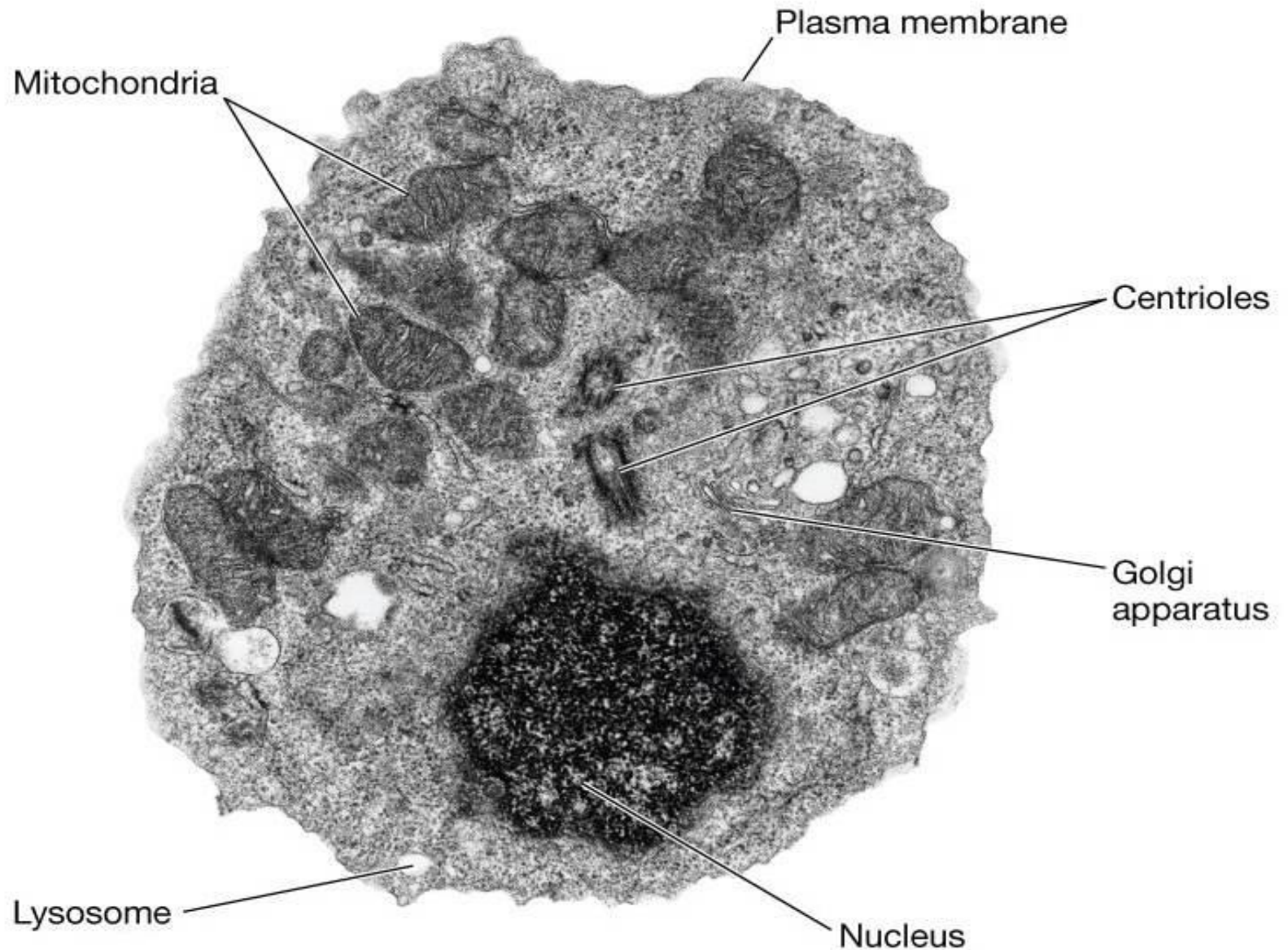
Intermediate filament
الخيوط المتوسطة

Microfilament
الخيوط الدقيقة

Smooth endoplasmic Reticulum
الشبكة الإندوبلازمية الملساء

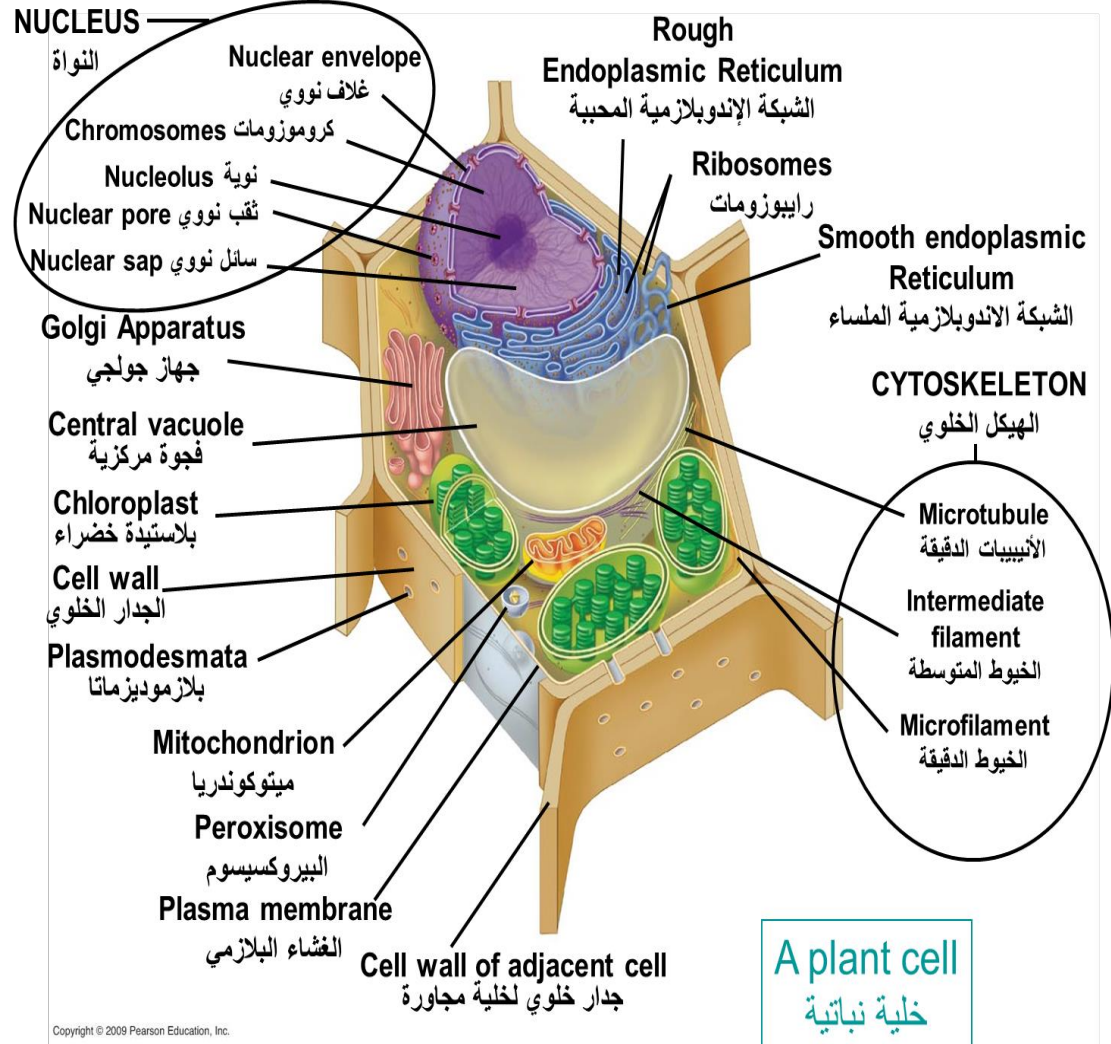
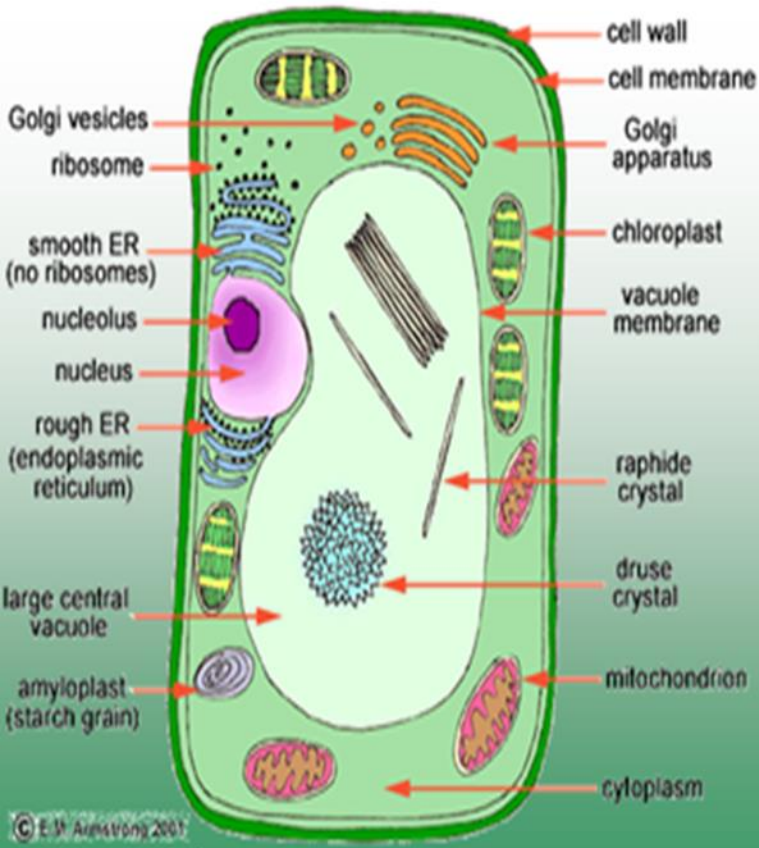


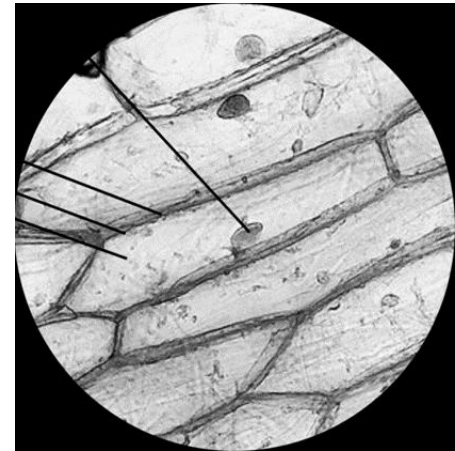
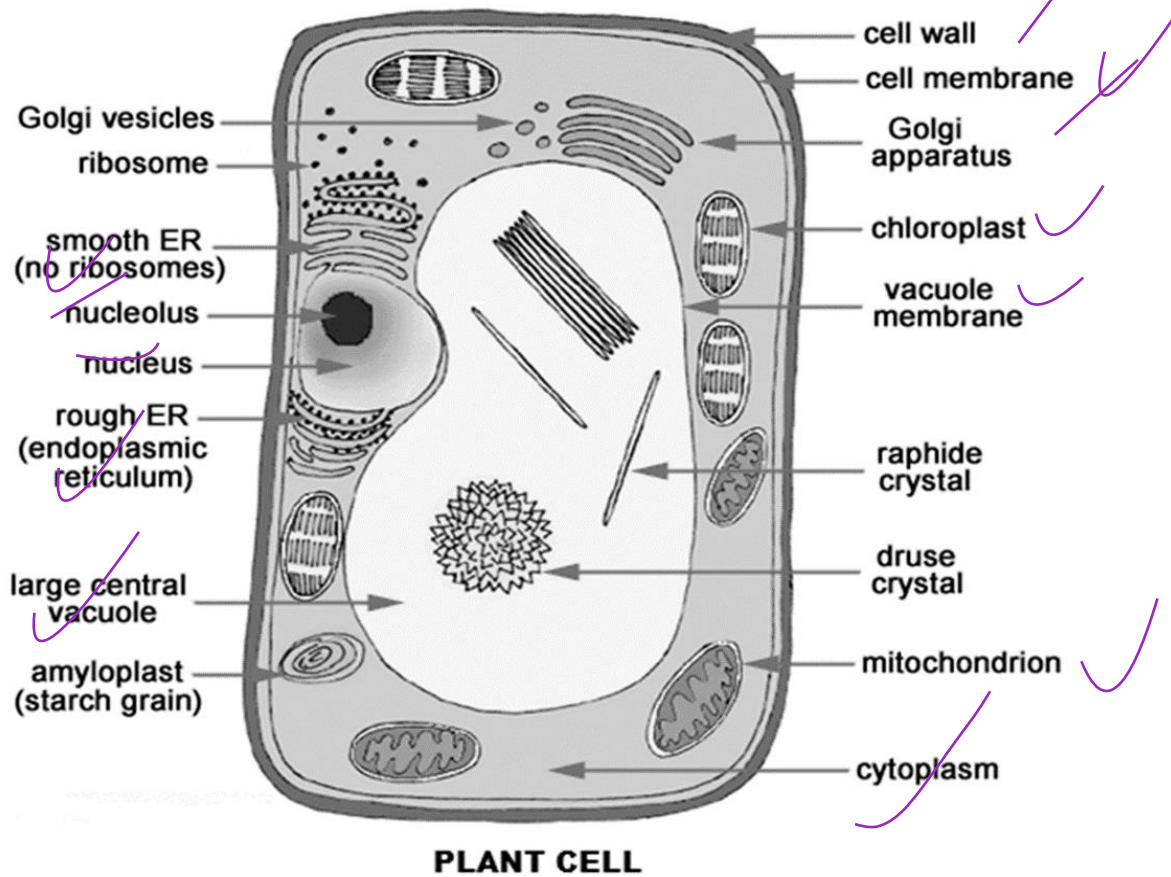
تعريف مع البايئات



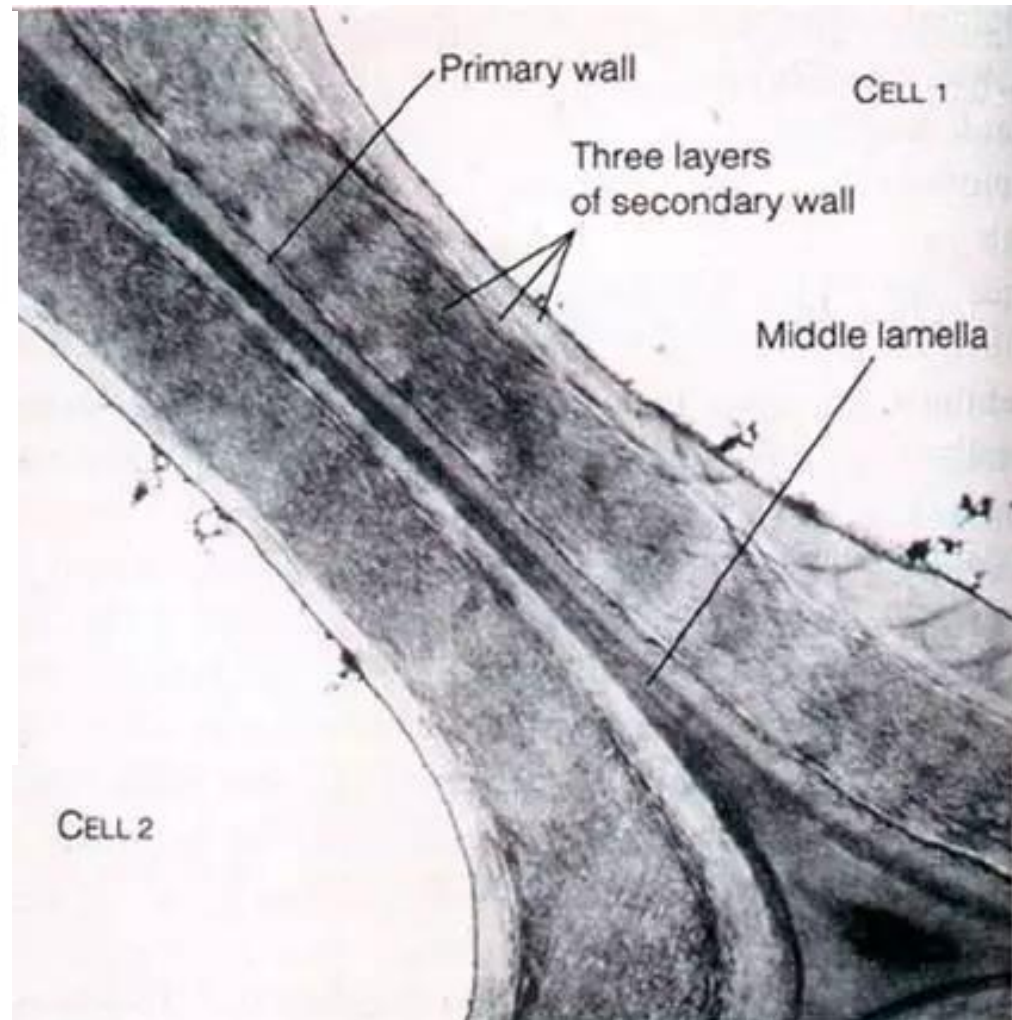
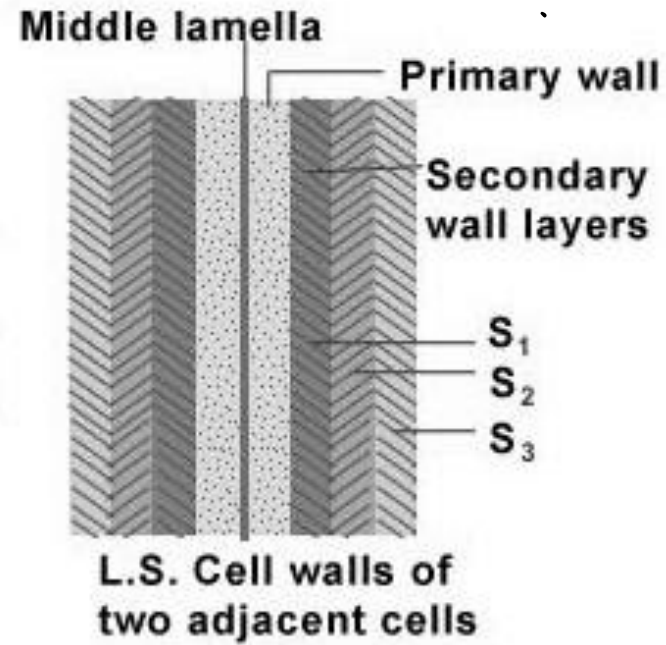
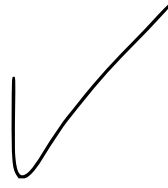
Animal Cell

2- Eukaryotic cell

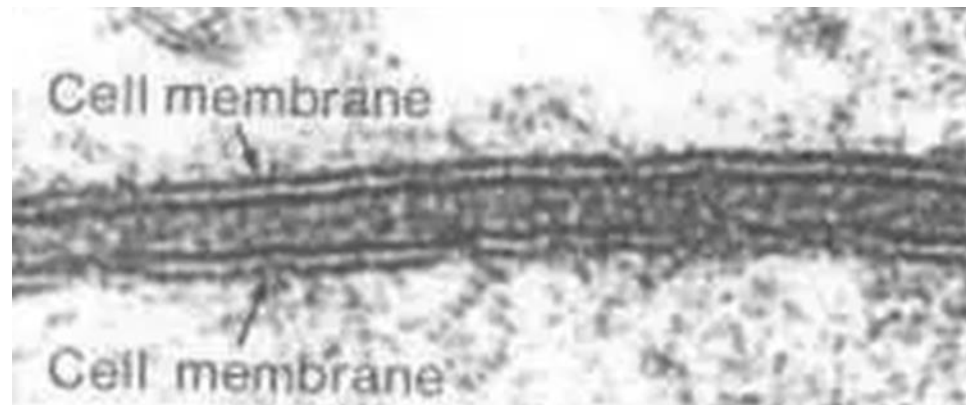
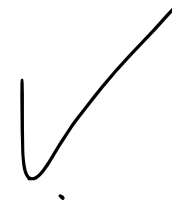
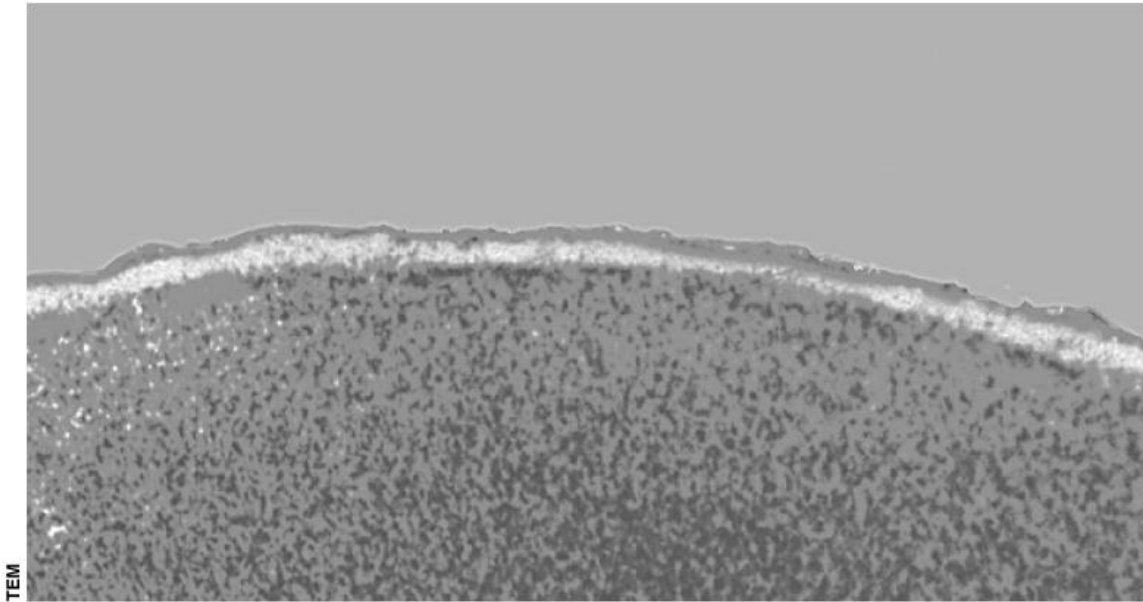




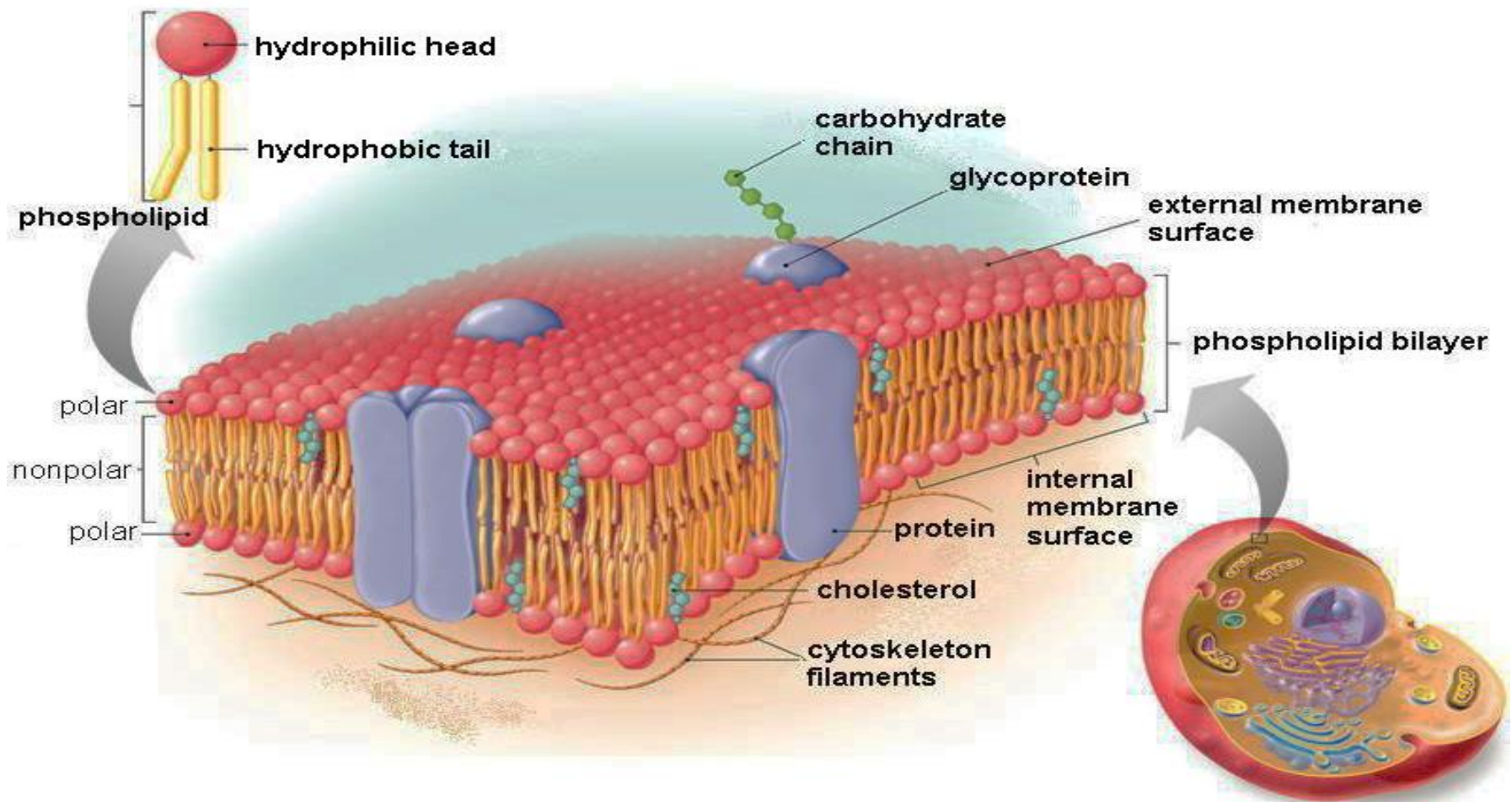
Cell wall

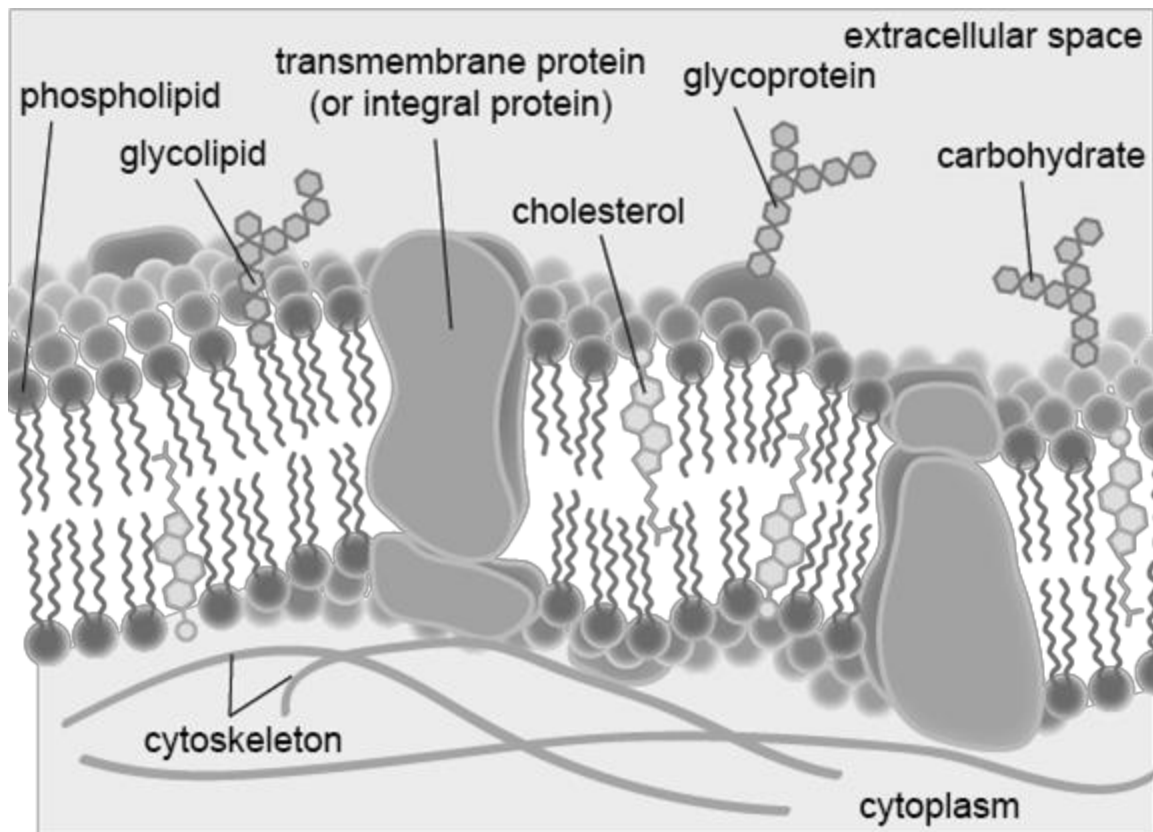


Plasma membrane



Plasma membrane

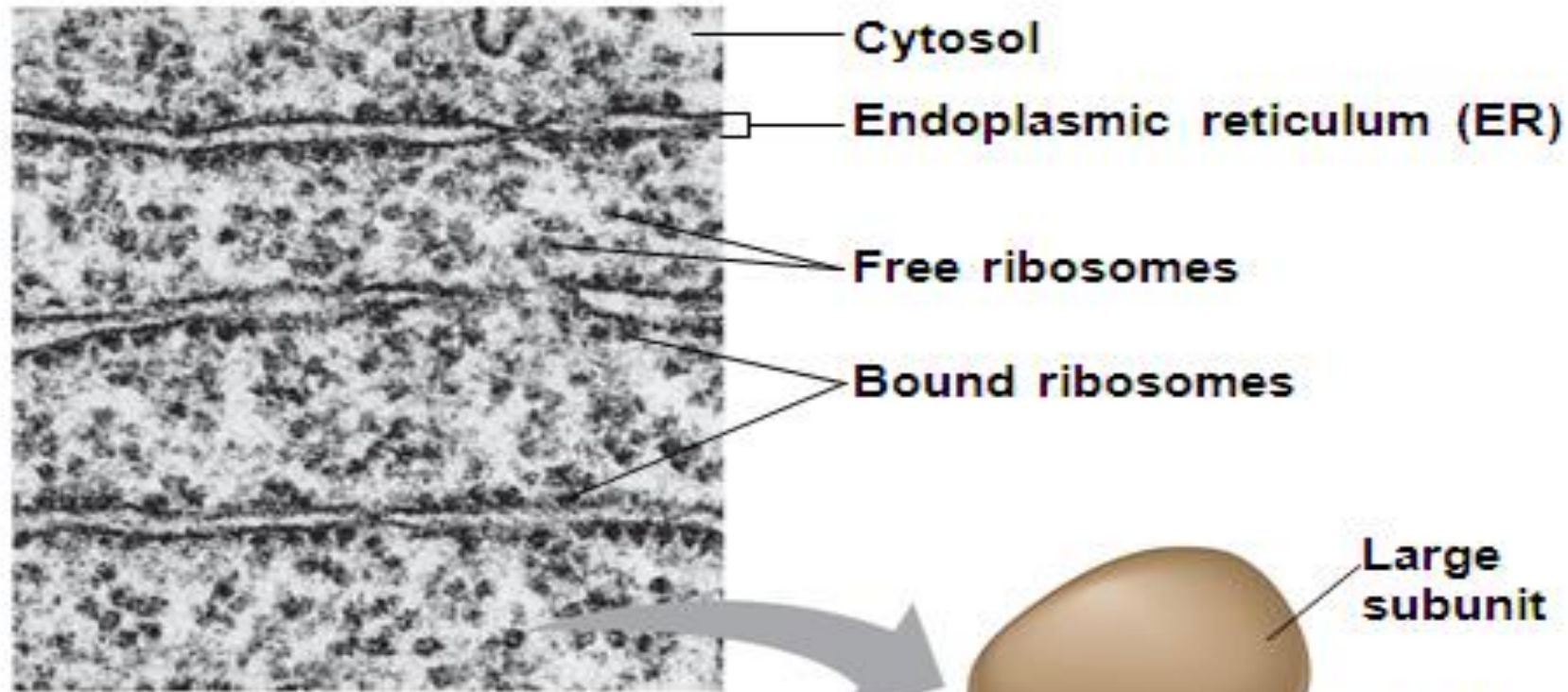




Ribosomes: Protein Factories

تعريف مع الرسم والبيانات

Fig. 6-11



0.5 μm

TEM showing ER and ribosomes

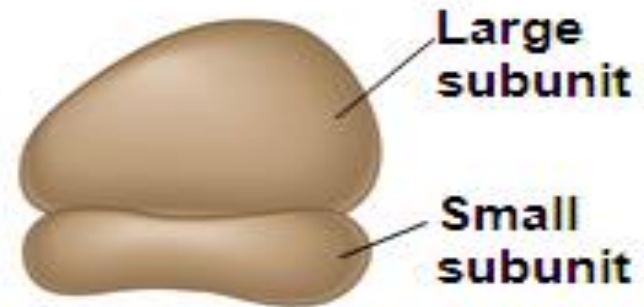
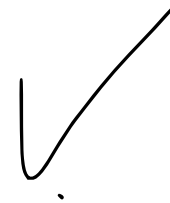
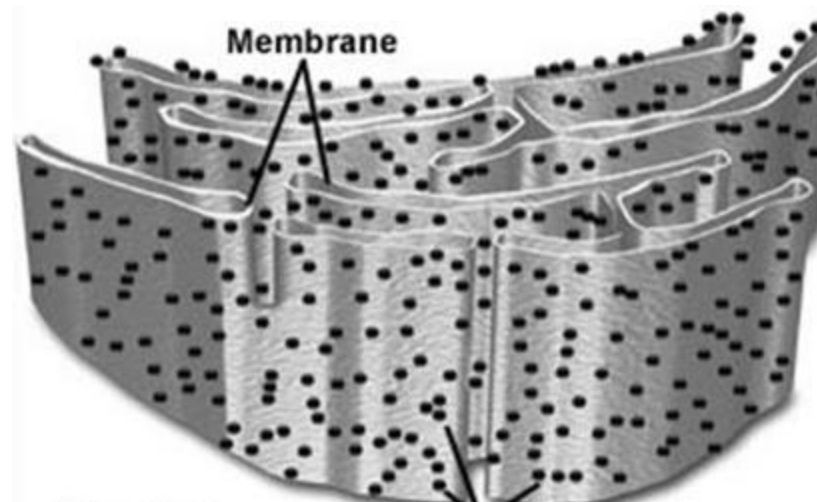
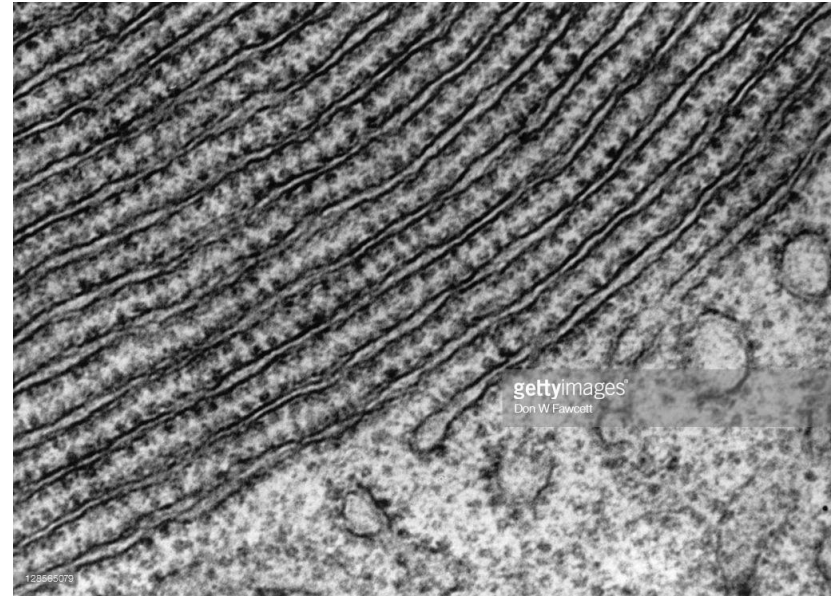
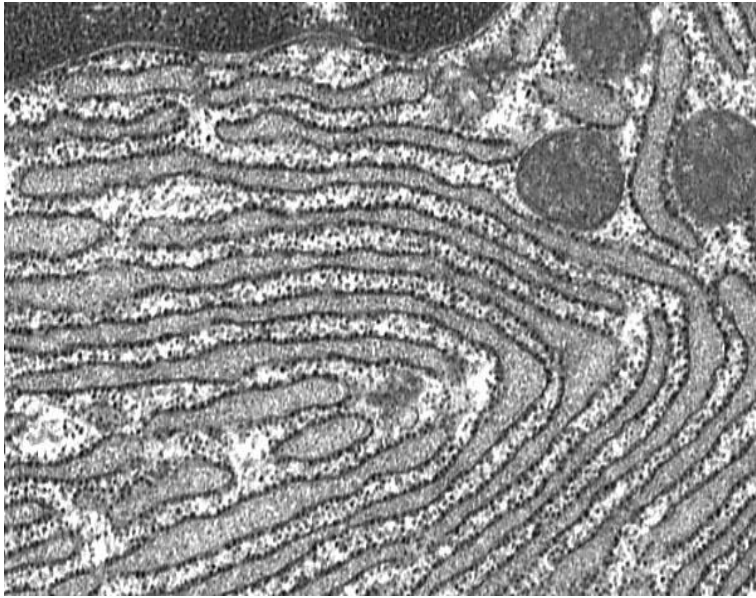

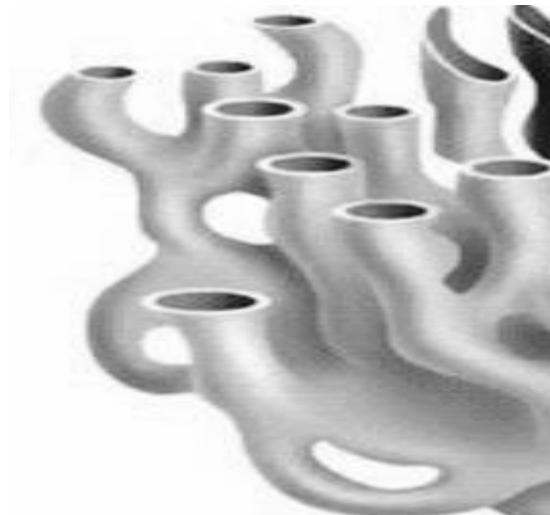
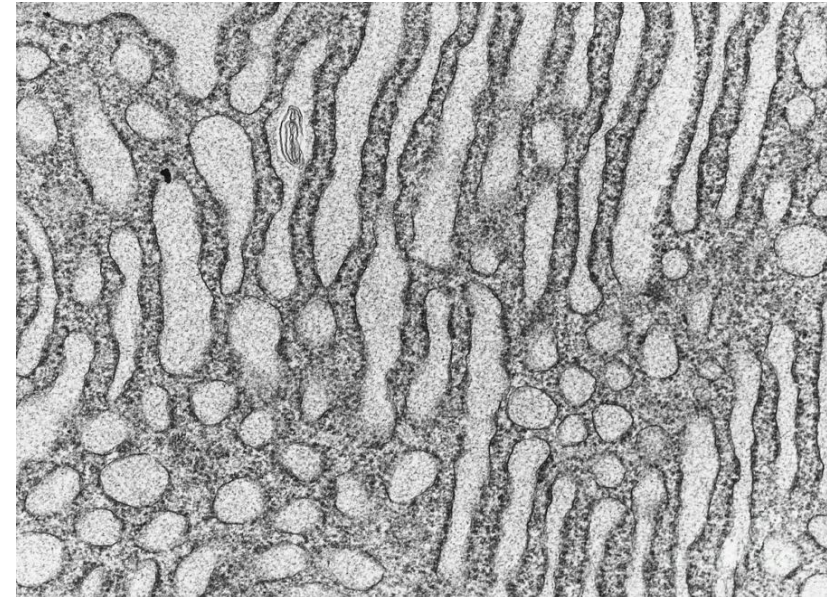


Diagram of a ribosome

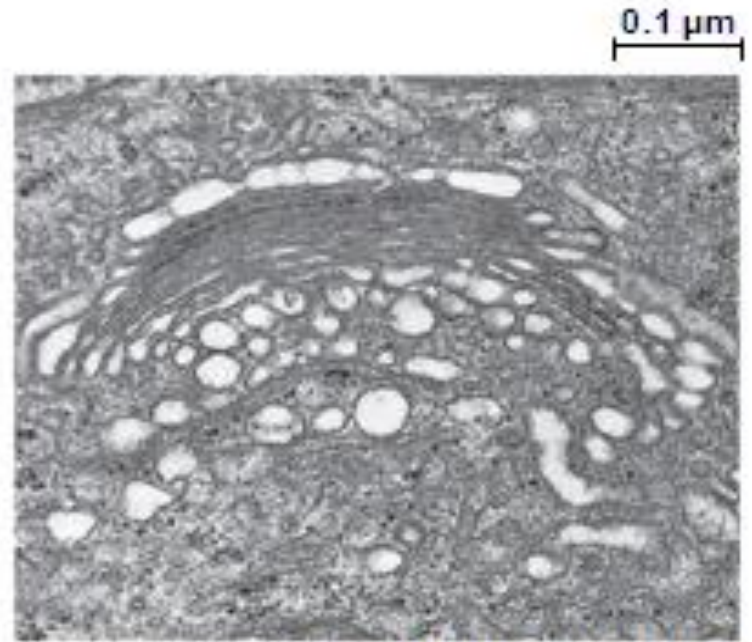
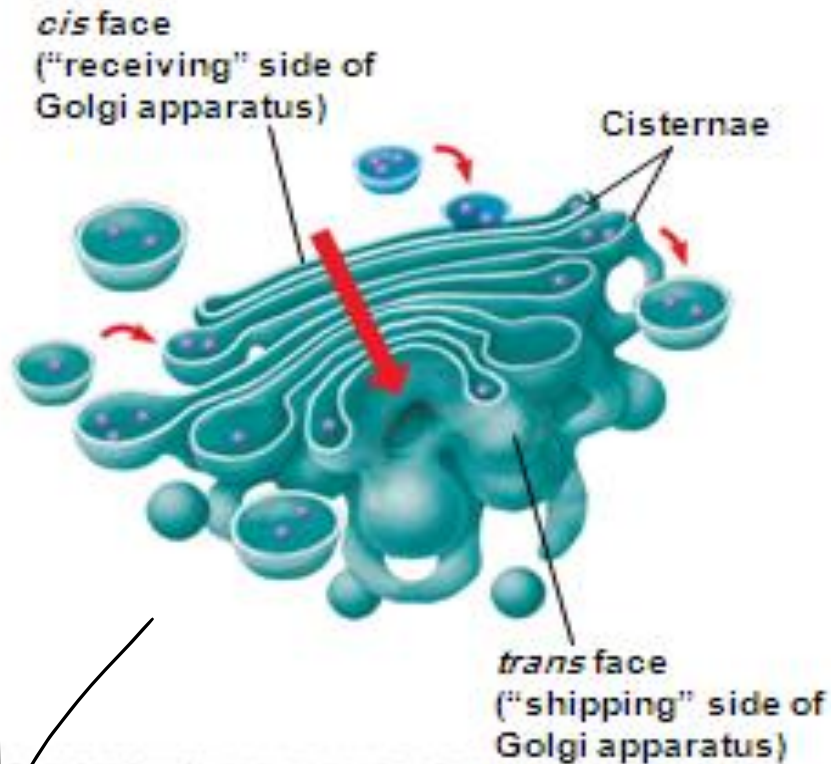
Rough Endoplasmic Reticulum



تعريف

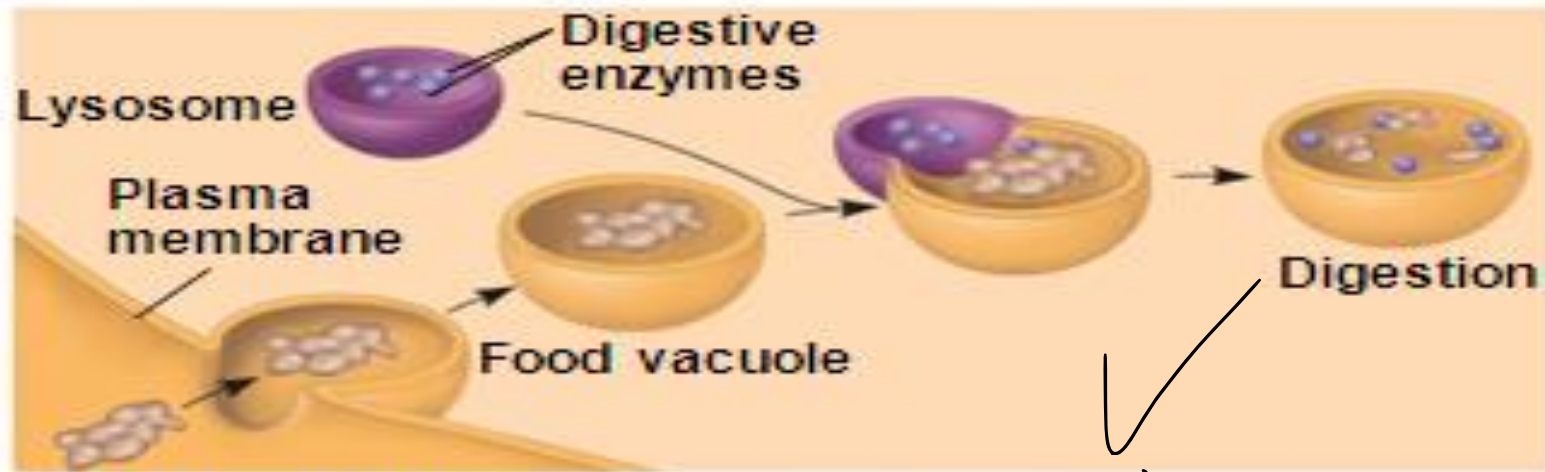
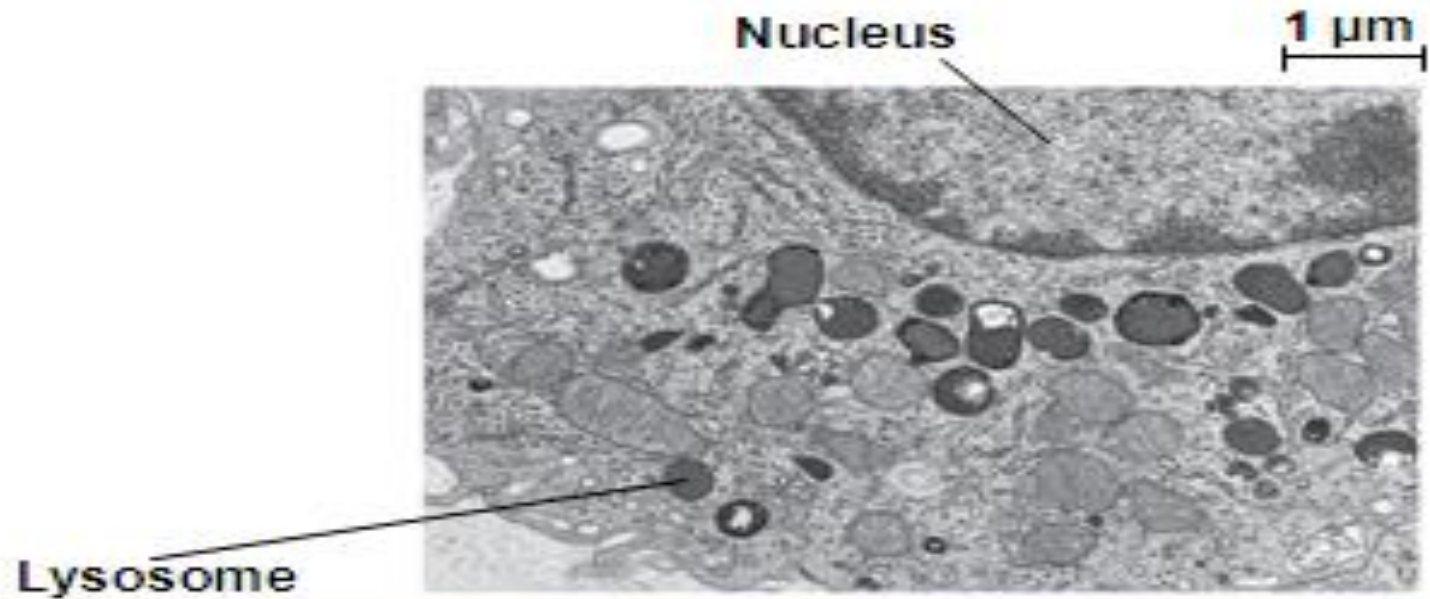


The Golgi apparatus



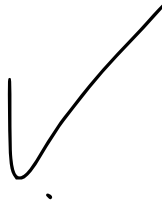
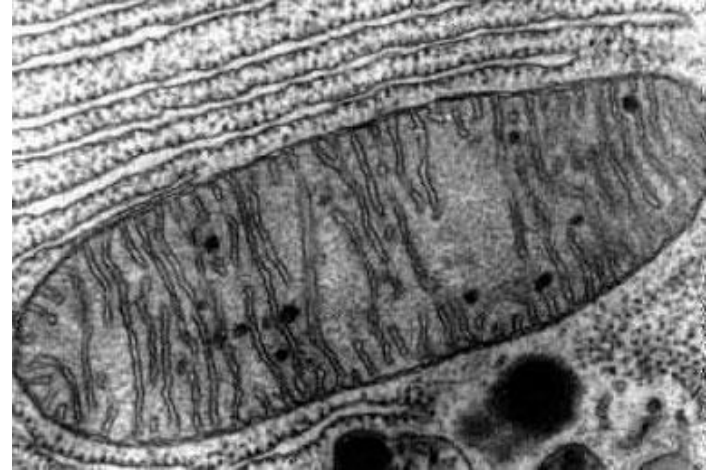
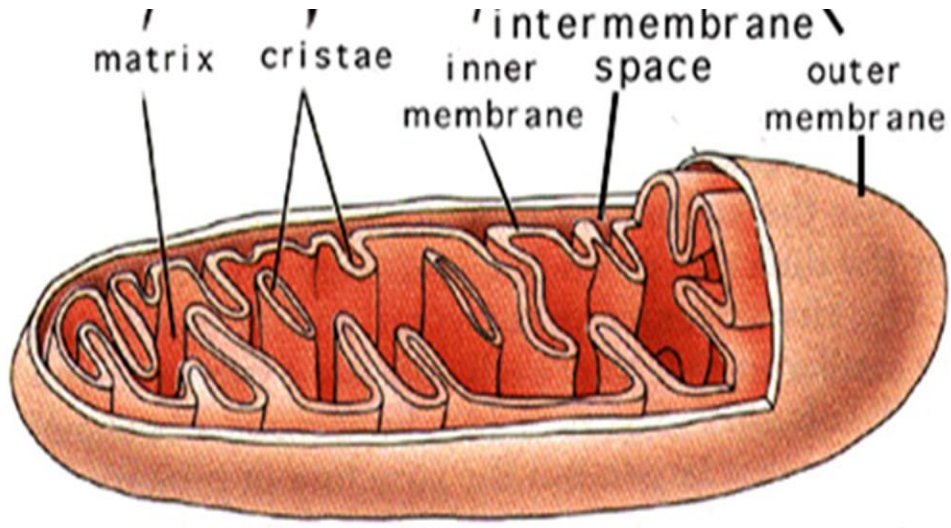
TEM of Golgi apparatus

Lysosomes

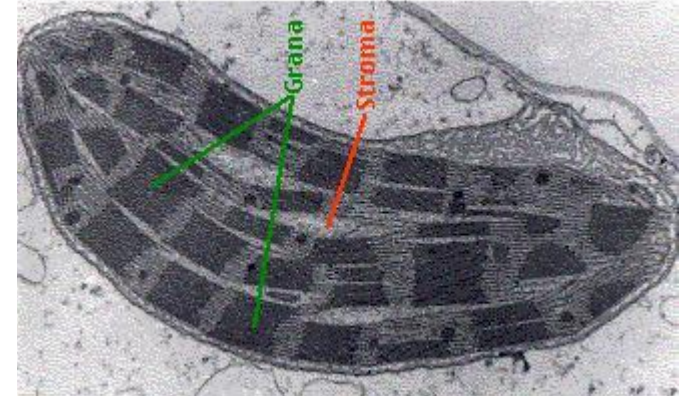
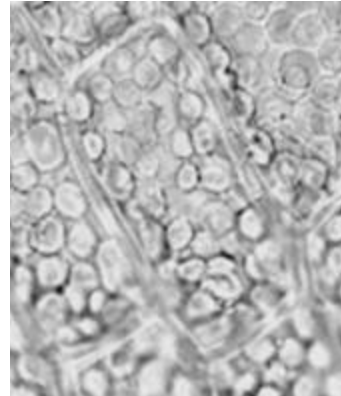
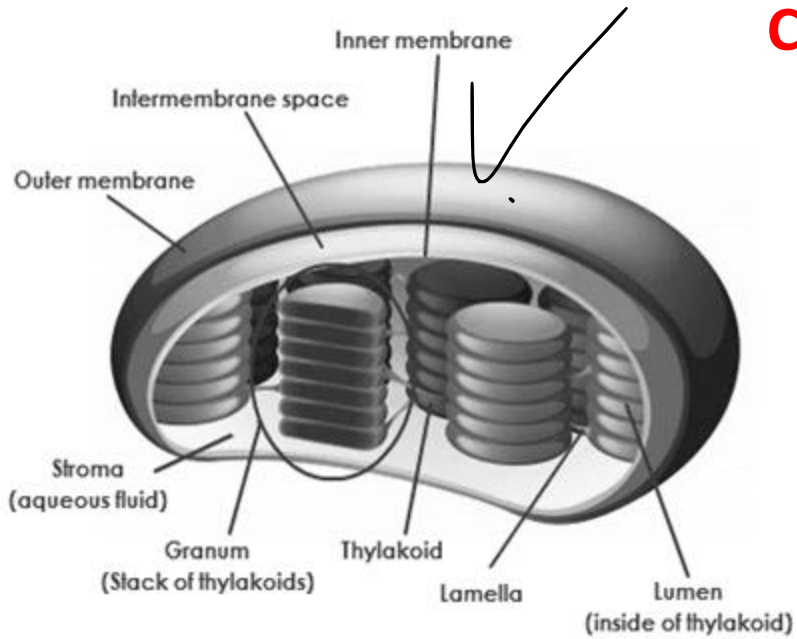


(a) Phagocytosis

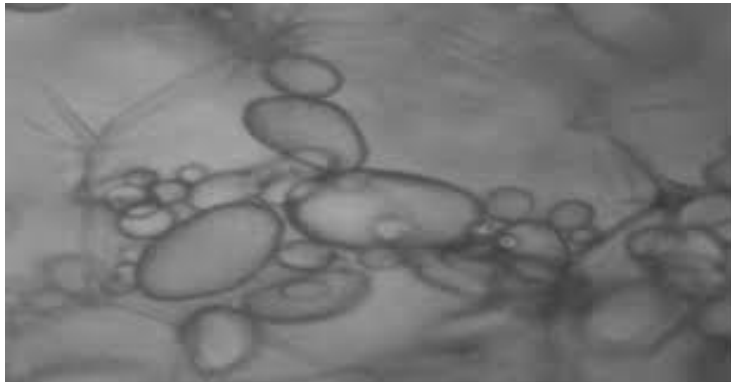
Mitochondria



Chloroplasts



Leucoplasts

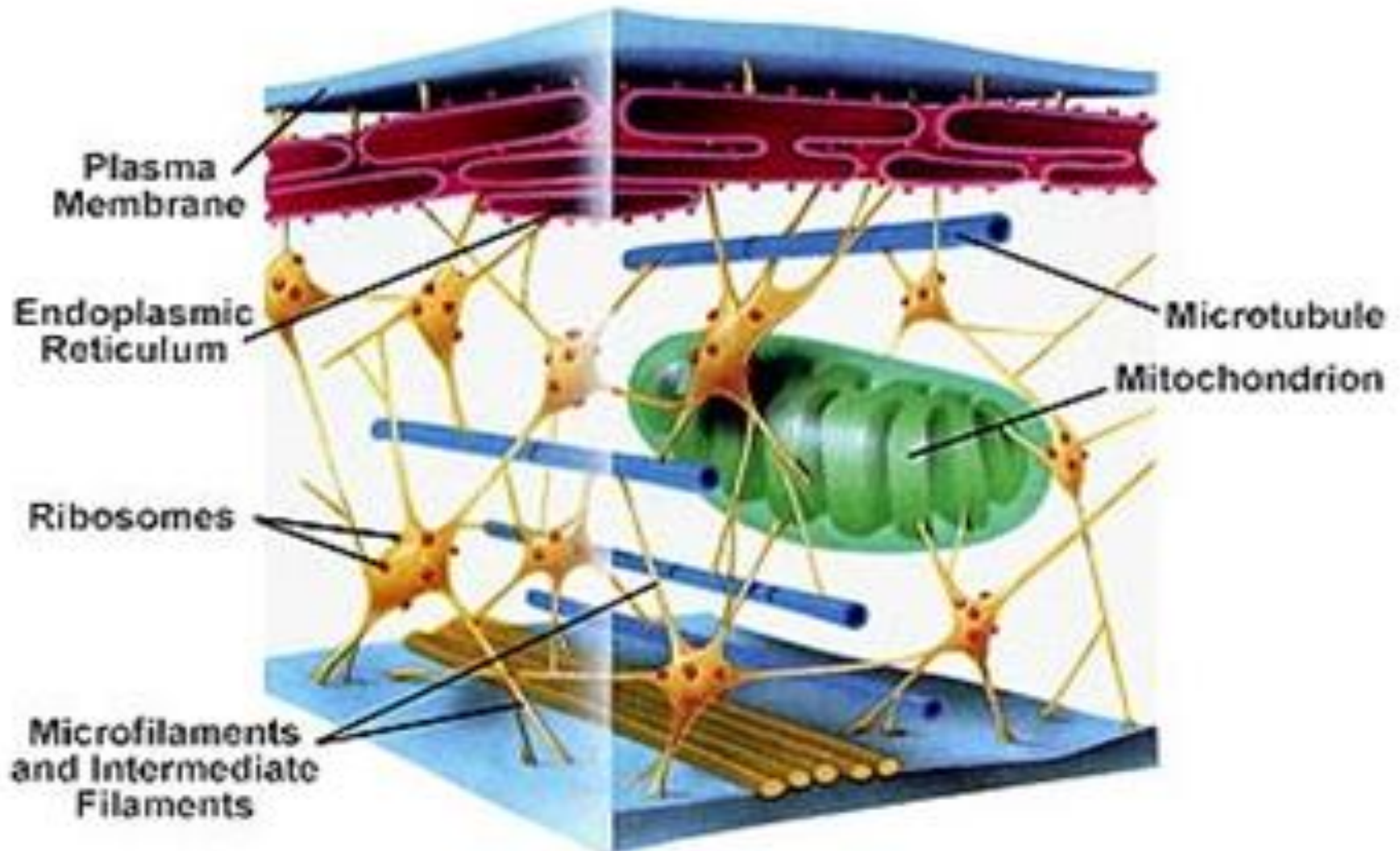
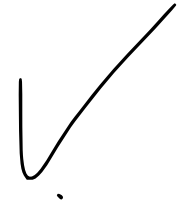


Cytoskeleton

Components of the Cytoskeleton

- Microtubules are the thickest of the three components of the cytoskeleton
- Microfilaments, also called actin filaments, are the thinnest components
- Intermediate filaments are fibers with diameters in a middle range

Components of the Cytoskeleton



Microtubules

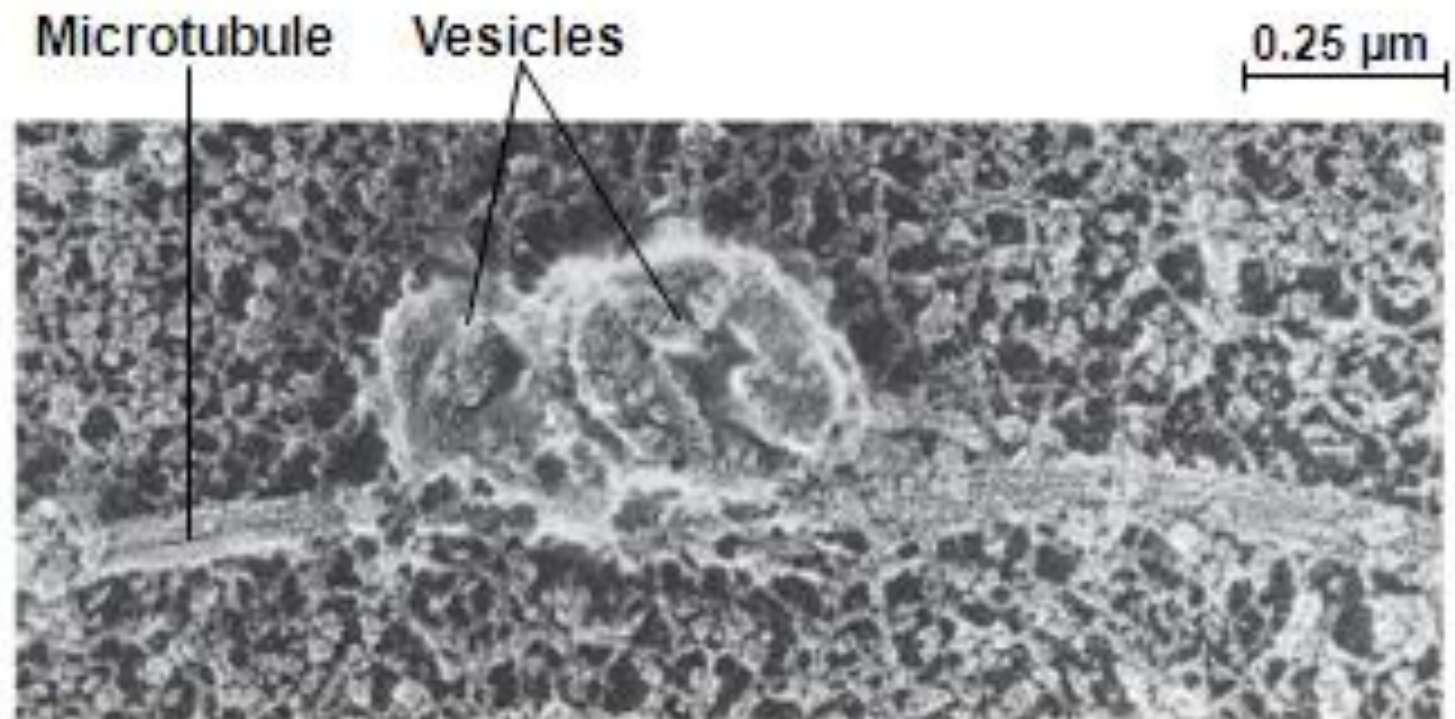
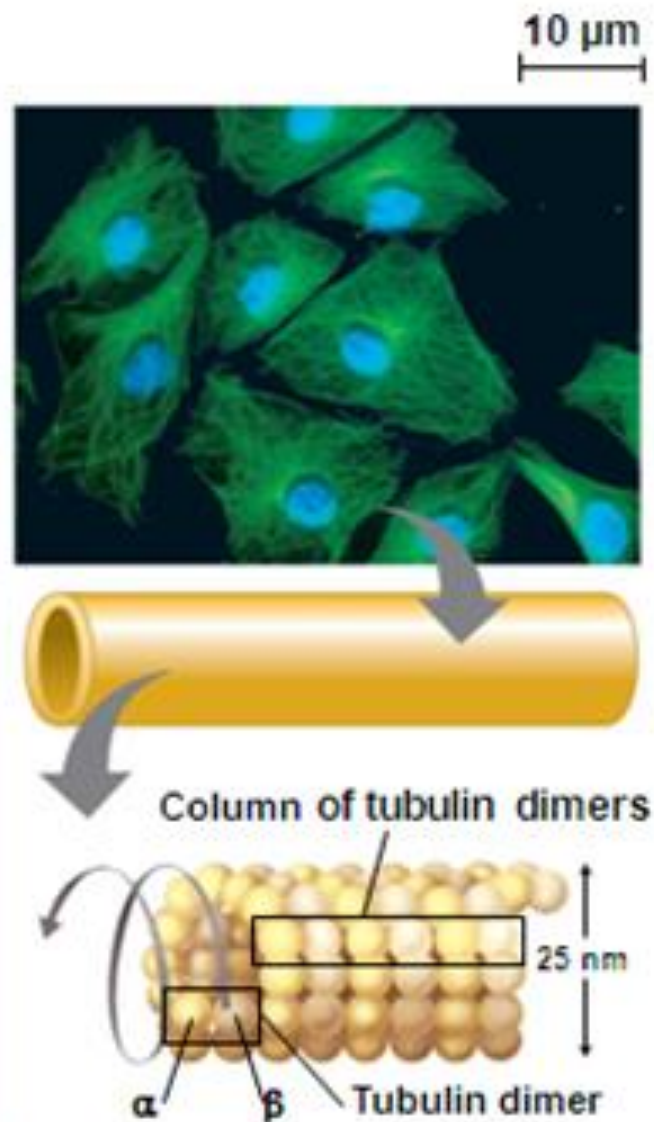


Table 6-1a

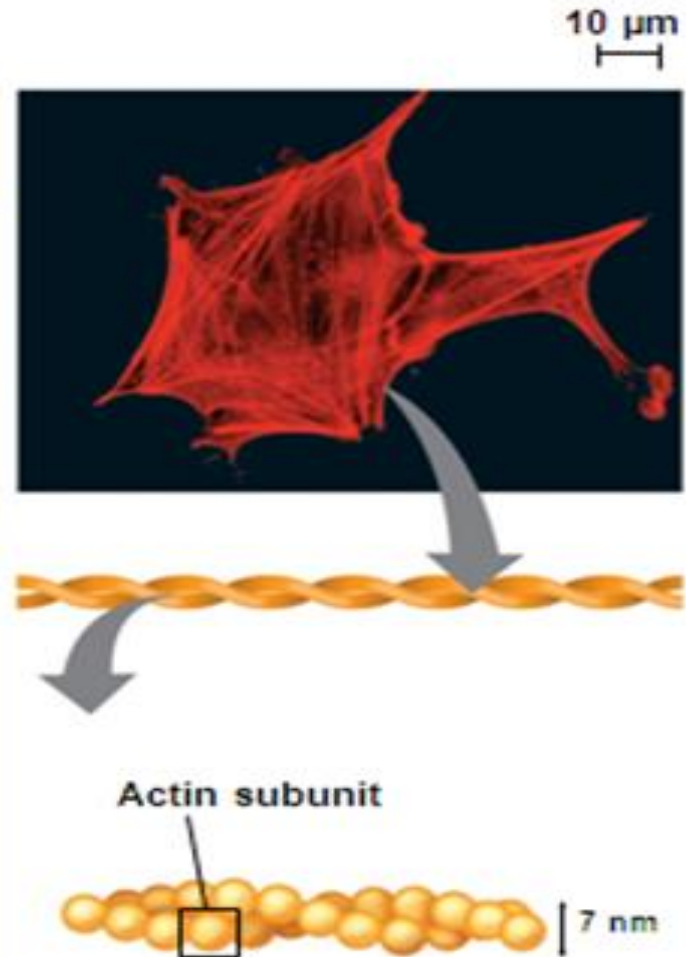
Property	Microtubules (Tubulin Polymers)
Structure	Hollow tubes; wall consists of 13 columns of tubulin molecules
Diameter	25 nm with 15-nm lumen
Protein subunits	Tubulin
Main functions	Maintenance of cell shape Cell motility Chromosome movements in cell division Organelle movements

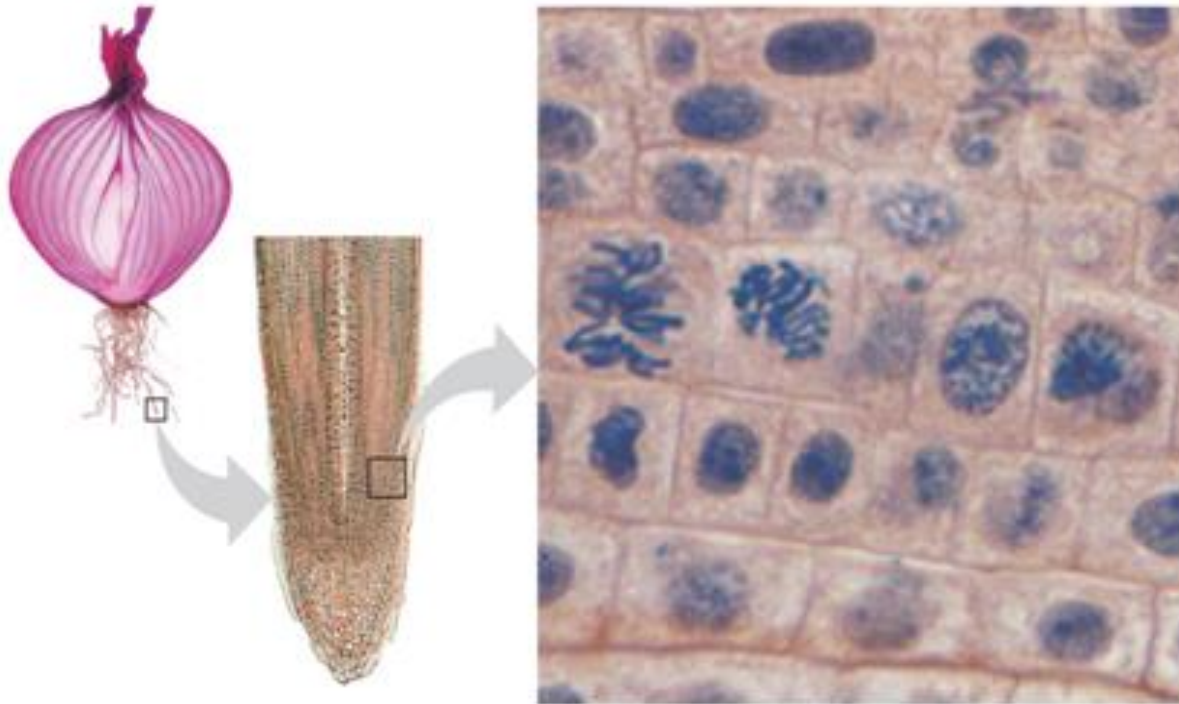


Microfilaments

Table 6-10

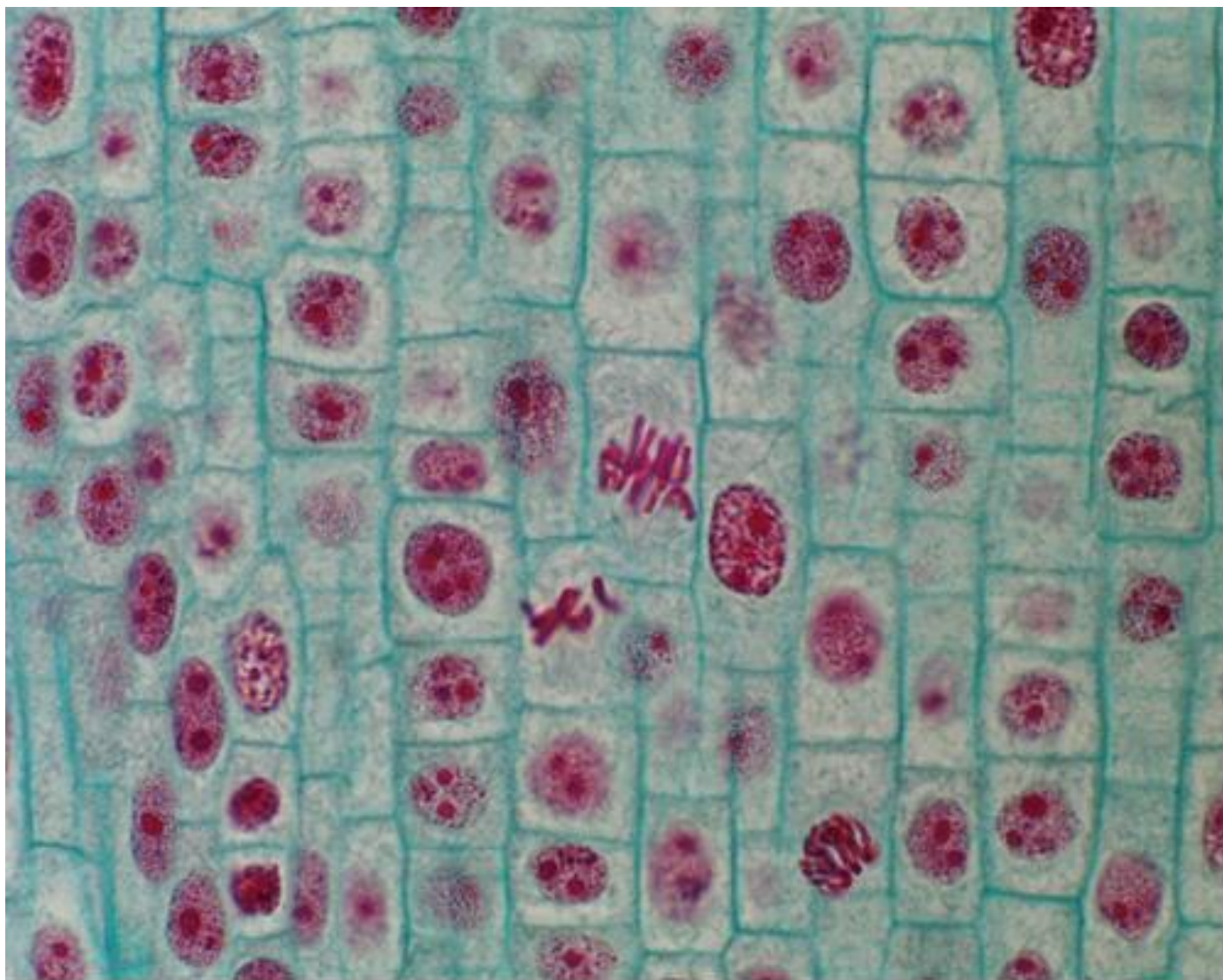
Property	Microfilaments (Actin Filaments)
Structure	Two intertwined strands of actin
Diameter	7 nm
Protein subunits	Actin
Main functions	Maintenance of cell shape Changes in cell shape Muscle contraction Cytoplasmic streaming Cell motility Cell division

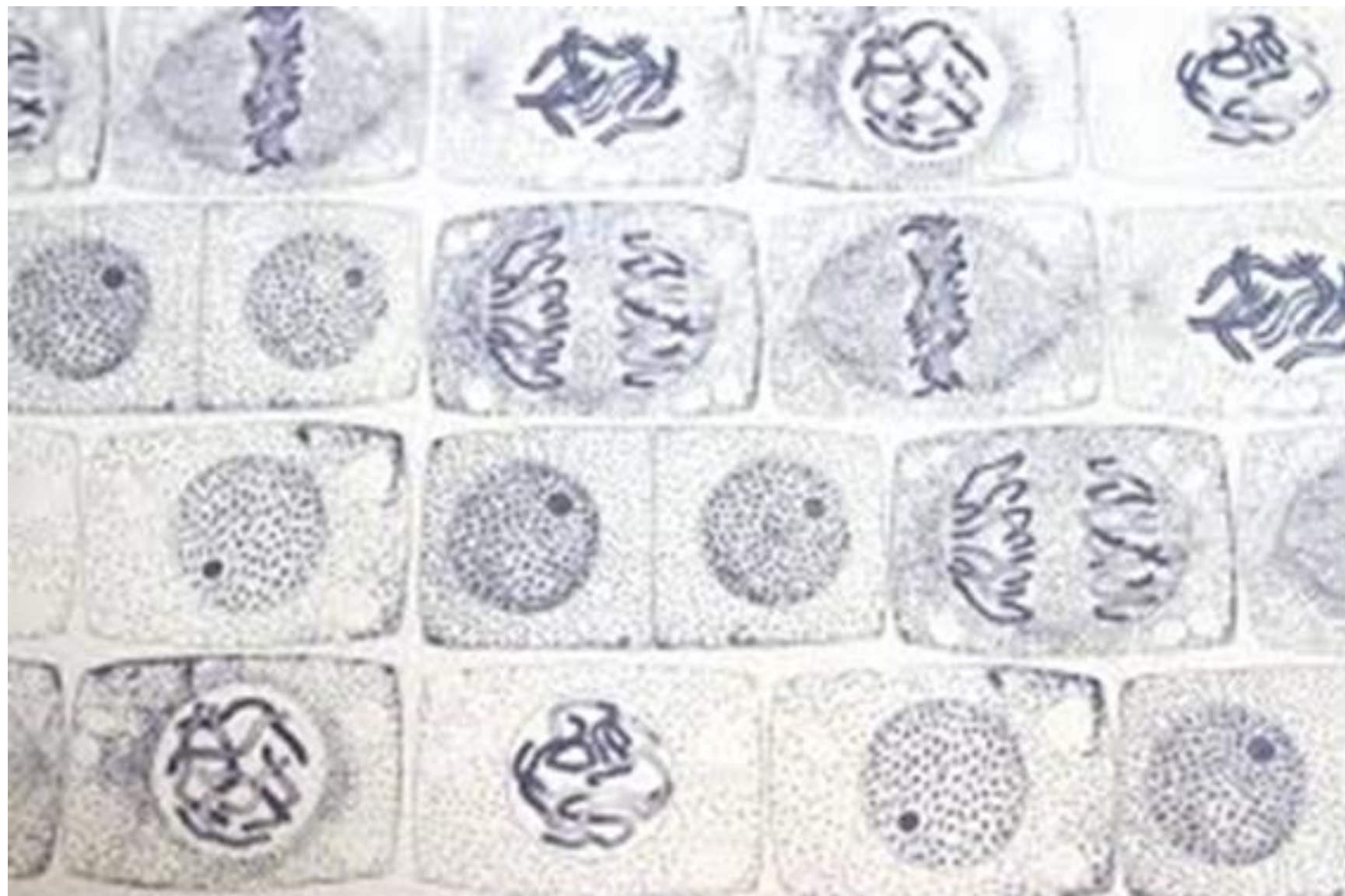




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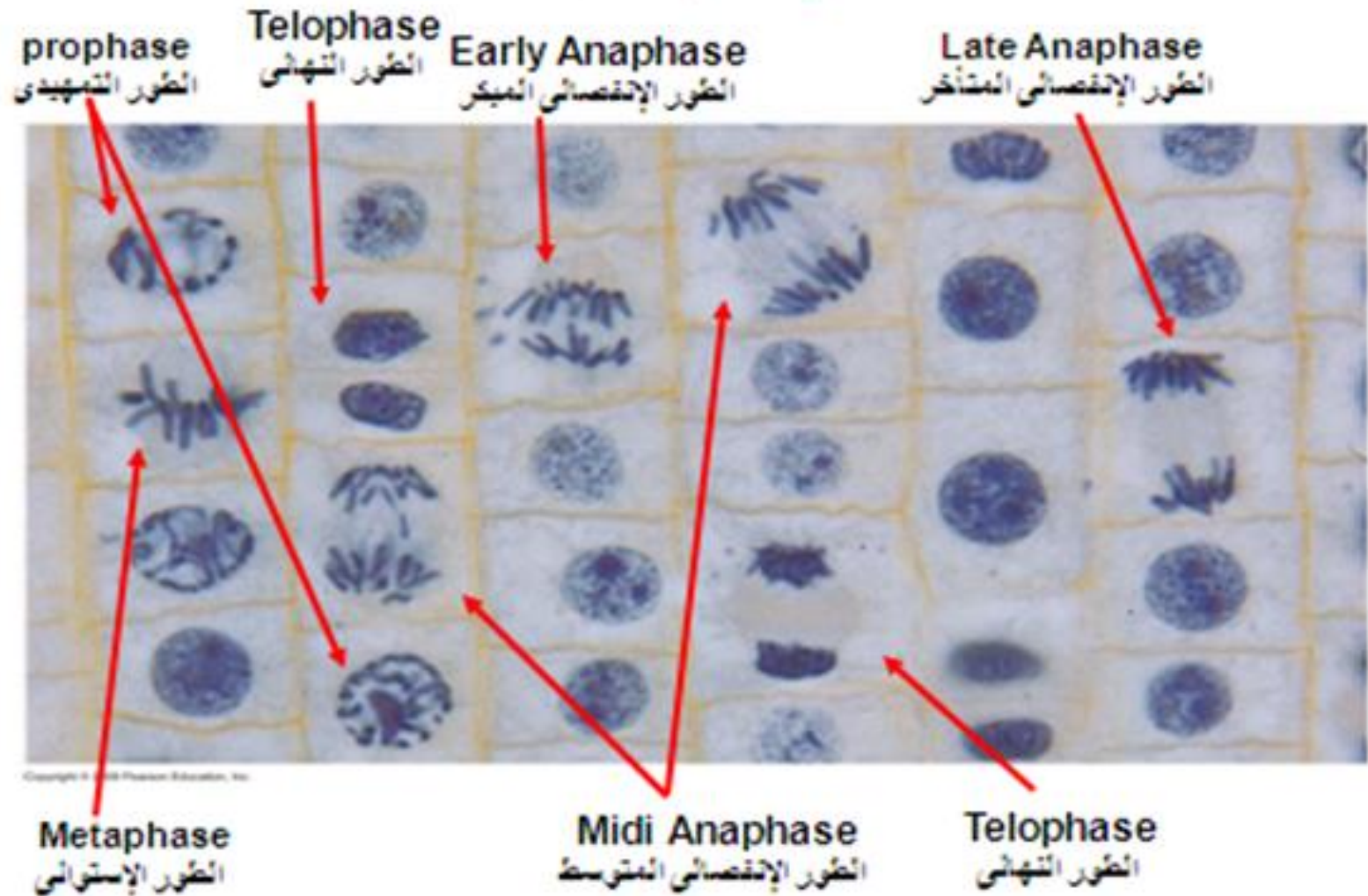
Growth (in an onion root)
النمو (في احدي جذور نبات البصل)





Mitosis

الانقسام الميوزي



Animal Mitosis -- Review

Interphase



Prophase



Metaphase



Anaphase



Telophase



Cytokinesis



Plant Mitosis -- Review

Interphase



Prophase



Metaphase



Anaphase



Telophase



Cytokinesis



✓

MEIOSIS I: Homologous chromosomes separate

الانقسام الاختزالي الأول: انفصال الأزواج الكروموسومية المتماثلة

INTERPHASE

الطور البيني

PROPHASE I

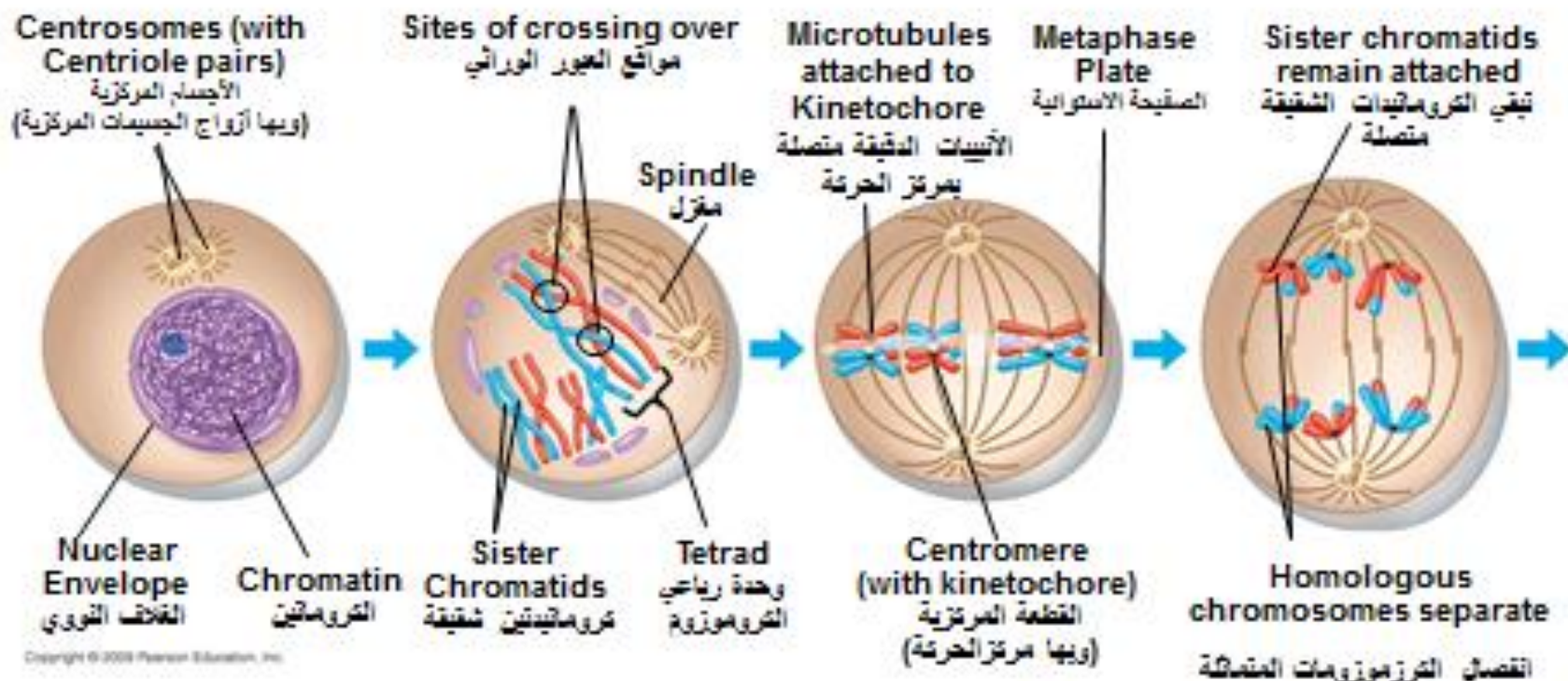
الطور التمهيدي الأول

METAPHASE I

الطور الاستوائي الأول

ANAPHASE I

الطور الانفصالي الأول



The stages of meiosis I

أطوار الانقسام الاختزالي الأول

MEIOSIS II: Sister chromatids separate

الانقسام الاختزالي الثاني: انفصال الكروماتيدات الشقيقة

TELOPHASE I AND CYTOKINESIS

الطور النهائي الأول والانقسام
الميتوزائري

PROPHASE II

الطور التمهيدي الثاني

METAPHASE II

الطور الاستوائي الثاني

ANAPHASE II

الطور الانفصالي الثاني

TELOPHASE II AND CYTOKINESIS

الطور النهائي الثاني
والانقسام الميتوزائري

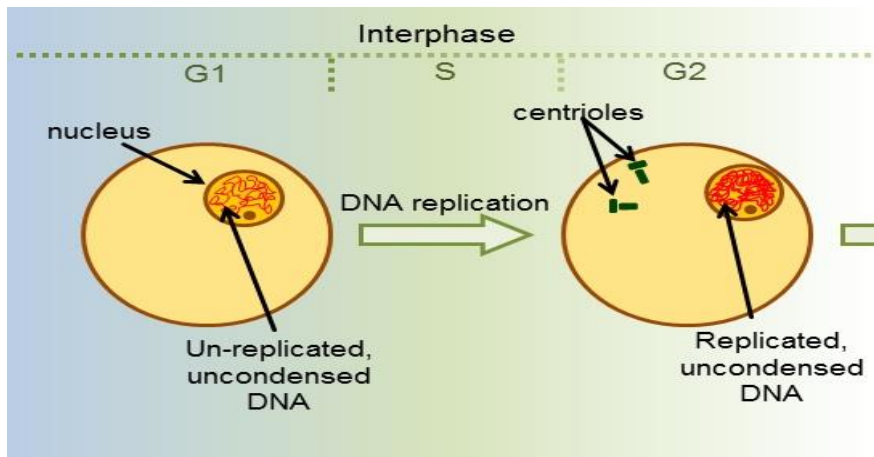
Cleavage furrow
أخدوة انخسار

Sister chromatids
Separate
انفصال الكروماتيدات الشقيقة

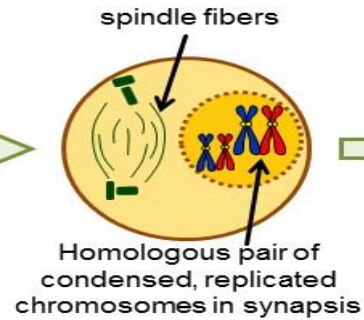
Haploid daughter
cells forming
تكون الخلايا الأحادية البوية

Copyright © 2008 Pearson Education, Inc.

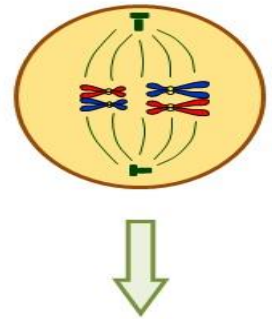
The stages of meiosis II
أطوار الانقسام الاختزالي الثاني



Meiosis I: Prophase 1



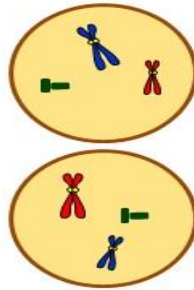
Meiosis I: Metaphase 1



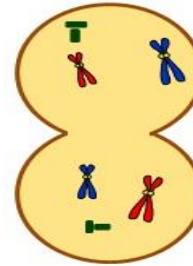
Meiosis II: Prophase 2



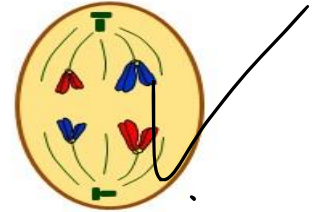
Meiosis I: Products
2 haploid cells



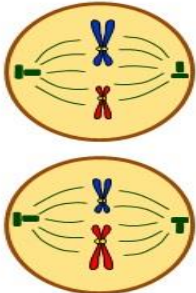
Meiosis I: Telophase 1



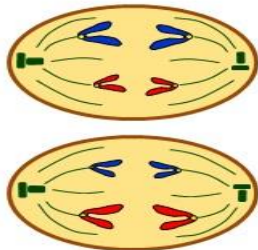
Meiosis I: Anaphase 1



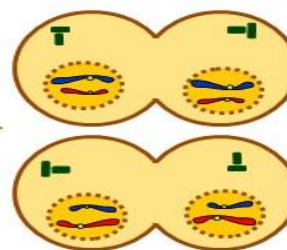
Meiosis II: Metaphase 2



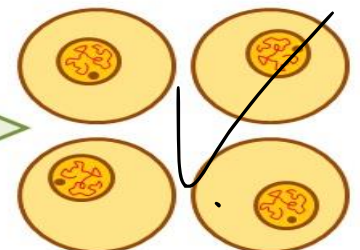
Meiosis II: Anaphase 2



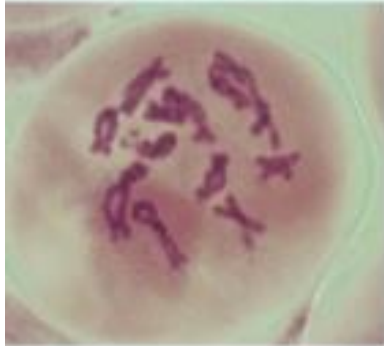
Meiosis II: Telophase 2



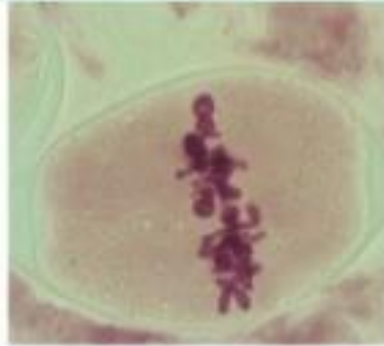
Meiosis II: Products
4 haploid cells = gametes



(a) Prophase I



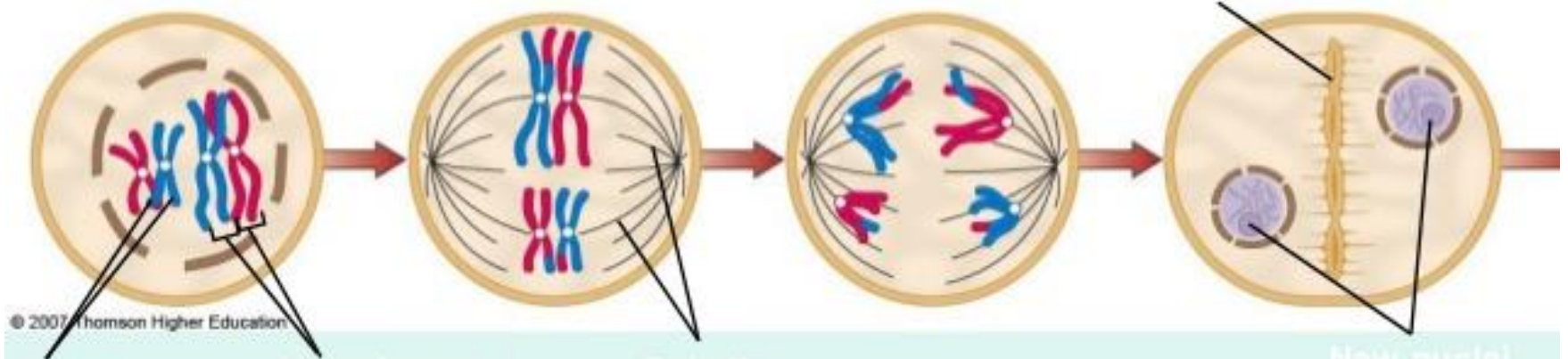
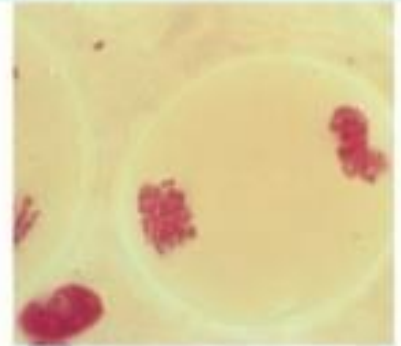
(b) Metaphase I



(c) Anaphase I



(d) Telophase I



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Each
chromosome
consists of
two
chromatids

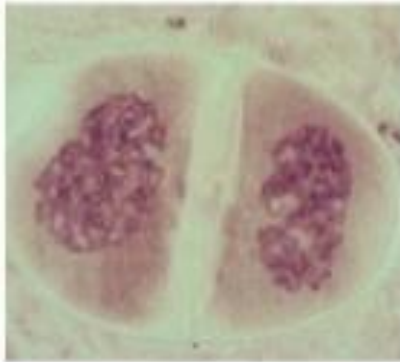
Homologous
chromosomes

Spindle
microtubules

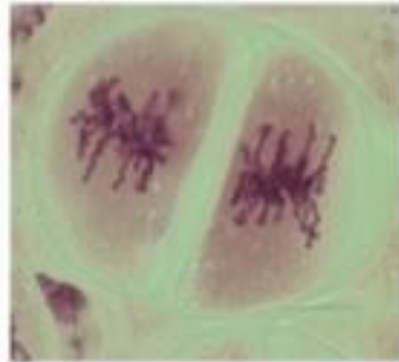
New nuclei

Meiosis

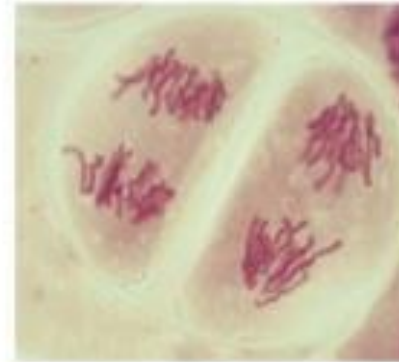
(e) Prophase II



(f) Metaphase II



(g) Anaphase II



(h) Telophase II

