



مدونة المناهج السعودية

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الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

# مكتبة ثاني تميم

لادوات المكتبية - المدرسية - بحوث وطباعة

جميع الكتب

( دينية - علمية - أدبية - مقررات جامعية )

تصوير وتغليف

الميد الأول

1-2-3-4

مركز خدمة الطالب

أخبار / السنة العشرية

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شارع الورود - بجوار المناسبات السعدة . (الهرم الأبيض سابقاً)

014 4430302

نسيب 1-2-3-4 / أخبار / السنة العشرية / عبد المرزاق

# Chapter "1" : The Chemistry of Organic Molecule

The organic molecules includes: carbohydrates, lipids, proteins and nucleic acids.

1- Carbohydrates: Have C : H : O ratio of 1:2:1 ( $C_6H_{12}O_6$ ) = H-C-OH

a- monosaccharides: the monomers of Carbohydrates, one ring.

Ex.: - Hexoses (six carbon atoms): Glucose, fructose and Galactose. ( $C_6H_{12}O_6$ )

- pentose ( five carbon atoms): Ribose and Deoxyribose.

=Function of Monosaccharides : \* Glucose is broken down during cellular respiration and produces ATP molecules . ( ATP is a highly energy molecule).

\* Ribose and Deoxyribose are found in the nucleic acids. ( RNA and DNA).

b- Disaccharides : Two monosaccharides joined during a dehydration reaction.

Ex.: - Maltose Formed from two glucose monomers. (Glucose + Glucose).

-Sucrose forms from: (Glucose + fructose) .

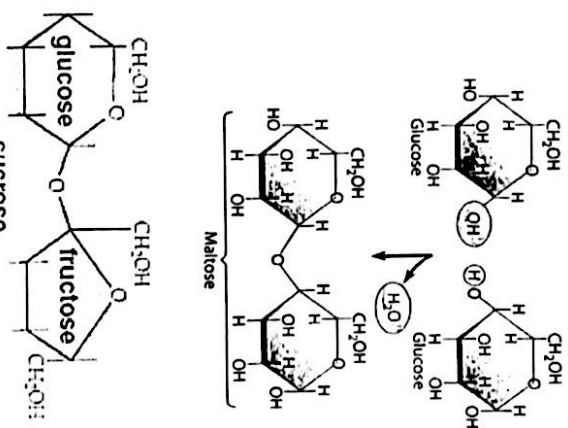
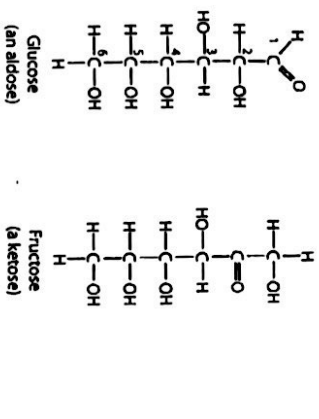
It is extracted from sugarcane or sugar beets.

- Lactose is found in milk ( Glucose + Galactose).

c- Polysaccharides are polymers of monosaccharides linked together

by dehydration reactions. When an organism needs energy,

the polysaccharide is broken down to release sugar molecules.



الخطبات التي ألقى بها في الندوة العلمية التي أقيمت في جامعة القاهرة في ١٤٢٩-١٤٣٠ هـ  
 الخطبات الإلكترونية منشورة ٥٥٩١٢٤٧٥

## 1- Storage molecules: جزيليات تخزينية

- Starch is a storage polysaccharide in plants. في النباتات سكار عديدة تخزينية  
البطاطس البقوليات الحبوب  
الذرة الأرز  
مصادر رئيسية
- Glycogen: is a storage polysaccharide in animal. Most of our glycogen is stored in our liver and muscle cells. مخزن في الكبد والخلايا العضلية

## 2- Structural molecules: جزيليات تركيبية

- Chitin, is used by insects and crustaceans to build their exoskeleton, found in Fungi. الكيتين الهيكل الخارجي الفطريات
- Cellulose encloses plant cells ( cell wall). الجدران الخلوية الإجابات الصحيحة آخر الفصل

- 1) Glucose is the source of ..... For the cell. a- sugars b- ATP c- lipids d- proteins
- 2) Sucrose is extracted from stems of..... or the roots of..... a- sugar beet , sugar cane b- potato , sugar beet c- sugar cane , sugar beet )
- 3) Monosaccharide is the monomer of: a - Amino acid b - Nucleic acid c - Carbohydrates d - Portions
- 4) All of these are carbohydrates except : a - Wax b - Lactose c - Monosaccharide d - Lactose
- 5) Nucleic acid is formed from repeating unit of: a - Amino acid b - Nucleotide c - Carbohydrates d - Portions
- 6) Animals store sugar as: a - Starch b - Glycogen c - Glucose d - Cellulose
- 7) Maltose is produced from three glucose monomers. a - true b - false
- 8) Chitin is used by insects and crustaceans to build their exoskeleton. a - true b - false
- 9) Example of monosaccharide is: a - Starch b - Glycogen c - Glucose d - Maltose
- 10) Glucose is stored in plants in the form of glycogen. a - true b - false
- 11) Glucose is stored in our liver in the form of glycogen. a - true b - false

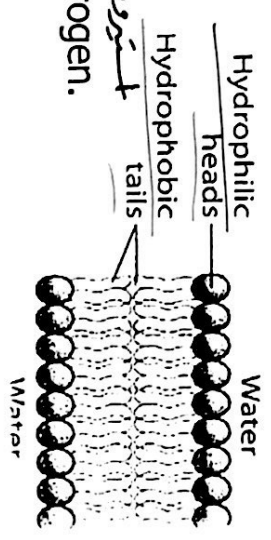
- 12) Example of disaccharide is: a — Starch      b — Glycogen      c — Glucose      d — Maltose
- 13) Carbohydrates as Cellulose is found in: a — Liver      b — Plants      c — Insects      d — Skin
- 14) The majority of carbohydrates have a carbon to oxygen to hydrogen ratio of: a. 2:1:2      b. 1:2:1      c. 2:2:1      d — 1:1:2
- 15) The carbon skeleton of fructose has.....carbon atoms. a. Six      b. Seven      c. Eight      d — five
- 16) The function of carbohydrates is: a. Energy storage      b. Repair tissues      c. Build the body
- 17) The simple Carbohydrate (Monosaccharide) is made up of: a. One ring      b. Two rings      c. Three rings or more
- 18) The five carbon sugar is called: a. Pentose sugar      b. Hexose sugar      c. None
- 19) Starch is made of numerous repeating units of: a — Sucrose      b — Fructose      c — Glucose      d — Maltose
- 20) Which carbohydrate is found in the cell walls of plants? a — Starch      b — Glycogen      c — Chitin      d — Cellulose

2- Lipids: Subunit of fat = fatty acids

للدهون  
الذائبة في الماء (Hydrophobic) ، for energy storage.  
- insoluble in water, (Hydrophobic) ، for energy storage.  
أعلى طاقة مخزنة فيه واحد جرام  
- A gram of fat stores energy more than twice than carbohydrates.  
دهون غير مشبعة دهون مشبعة  
- Unsaturated fats : double bonds , liquid = plant oils. Corn oil, olive oil, and other vegetable oils.  
سائلة  
- Saturated fats : single bonds , solid = Most animal fats like Butter and beef.  
صلبة  
قد تسهم في أمراض الجهاز الوريدي  
- Saturated fats may contribute to cardiovascular disease.  
دهون مفسفرة  
الأغشية الخلوية  
دهون مفسفرة

1 gm of Fat = 9 cal.  
1 gm of Carb. = 4 cal.

- ① **Saturated** : single bonds , solid = Most animal fats like Butter and beef.
- ② **Phospholipids**: in cell membranes.
- ③ **Steroids are lipids** = four fused rings. Ex. : Cholesterol, Testosterone, Estrogen.
- ④ **Waxes** : for protection: ( ear wax , bees wax and cuticles )



21) All of these are correct for lipids except:

a - Long term energy storage

b - Insoluble in water

c - Soluble in water

d - Component of plasma membrane

22) Corn oil, olive oil, and other vegetable oils are unsaturated fats. a - true

b - false

23) Steroid & Fat & Wax are: a - Carbohydrates

b - Lipids

c - Carbohydrates

d - Portions

24) The subunit of fats is fatty acids. a - true

b - false

25) Oils are example of: a-unsaturated fats

b-Saturated fats

c- Proteins

26) Saturated fats are:

a. More common in plants than in animals.

b. Associated with cardiovascular disease.

c. liquid at room temperature.

27) Lipids contain:

a- More energy per gram than other biological molecules.

b- Less energy per gram than other biological molecules .

c -Equal energy per gram than other biological molecules.

28) Animal fats are: a-unsaturated fats

b-Saturated fats

c- Both

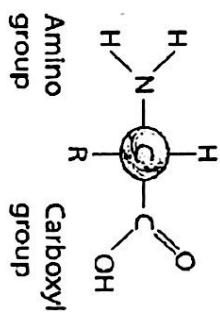
29) Steroids are : a. Carbohydrates

b. Proteins

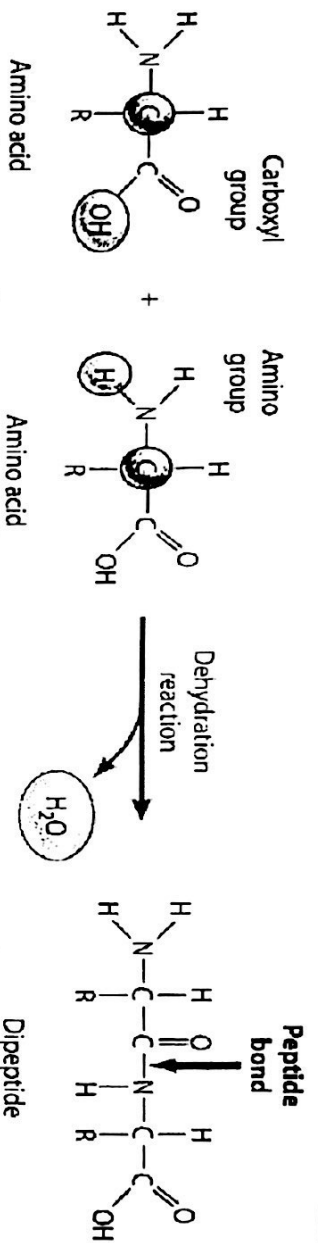
c. Lipids

3- Proteins: Subunit of protein = amino acids

- A protein is formed of amino acid monomers linked by peptide bonds.



روابط ببتيدية  
أحماض أمينية



- Proteins are important to the structures of cells and organisms.

- The most important role for proteins is as enzymes.

- Hemoglobin is a transport protein that transports O<sub>2</sub>.

- There are 20 building blocks. Ex. :- glycine (The simplest), Leucine, Serine and Aspartic acid.



30) The subunit of a protein fatty acids.      a — true

31) In amino acid the bond between them is called:  
 a — Peptide bond      b — A covalent bond  
 c — Ionic bond      d — Both A and B are correct



32) Amino acids molecules are characterized by the presence of the atomic grouping: a . H - C      b . NH<sub>2</sub> — COOH      c . H-C-OH

33) Which of these is not Protein? a . Amino acid      b . Maltose      c . Hemoglobin      d — Enzymes

34) Amino acid subunits form:      a. Carbohydrates      b. Proteins      c. Lipids

35) Proteins are made from amino acids linked by.....bond.      a. phosphate      b. ester      c. peptide      d. ionic

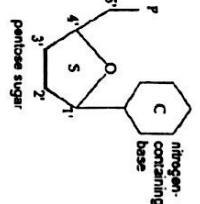
#### 4- Nucleic acids: الأحماض النووية

النوكليوتيدات

- ↓ The monomers that make up nucleic acids are nucleotides.
- ↓ Nucleotide is composed of pentose sugar, nitrogenous base and phosphate group.
- ↓ Nucleic acids are **DNA** ( Deoxyribonucleic acid ) and **RNA** ( ribonucleic acid ).



phosphate P

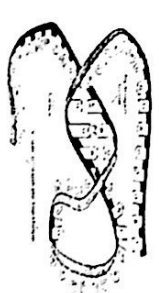


a. Nucleotide structure

	DNA	RNA
نوع السكر The sugar	Has Deoxyribose sugar	Has Ribose sugar
The nitrogenous bases	adenine (A), thymine (T), cytosine (C), guanine (G).	adenine (A), uracil (U), cytosine (C), guanine (G).
السلسلة The strand	مزدوجة Double stranded structure	مفردة Single strand
الأنواع Types	نوع واحد One type	<ul style="list-style-type: none"> <li>• There are: ribosomal RNA (rRNA) ريبوسومي</li> <li>• transfer RNA (tRNA) ناقل</li> <li>• And messenger RNA (mRNA) مرسل</li> </ul>

DNA في  
رابطة هيدروجينية  
T C A  
نات برابط  
هيدروجينية  
ب C A G

A ..... T  
C ..... G





- 36) RNA has the nitrogenous bases: a – T,C,G,U      b – A,C,G,U      c – A,T,C,G      d – A,T,G,U
- 37) The sugar of RNA is Deoxyribose.      a – true      b – false      c – A,T,C,G      d – A,T,G,U
- 38) The unit of Nucleic acid structure is: a – Amino acid      b – Nucleotide      c – Cell      d – fatty acid
- 39) The nitrogenous base that is not found in DNA is :  
 a. Adenine      b. Guanine      c. Uracil      d – Thymine
- 40) The nitrogenous base that is not found in RNA is: a. Adenine      b. Thymine      c. Uracil      d. Guanine

KEY ANSWERS													
1)	B	2)	C	3)	C	4)	A	5)	B	6)	B	7)	B
8)	A	9)	C	10)	B	11)	A	12)	D	13)	B	14)	D
15)	A	16)	A	17)	A	18)	A	19)	C	20)	D	21)	C
22)	A	23)	B	24)	A	25)	A	26)	B	27)	A	28)	B
29)	C	30)	B	31)	<u>D</u>	32)	B	33)	B	34)	B	35)	C
36)	B	37)	B	38)	<u>B</u>	39)	C	40)	B				

*With my best wishes*



## Chapter "2"

# Cell Structure and Function

# BIOLOGY

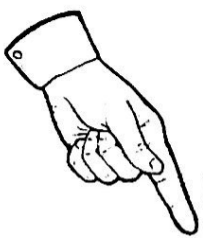
(BIO 101)

أول السنته التمهيدية

المادة المميزة في :

The Second Semester (1439 – 1440)

DR. ABDULRAZZAK N. EL-SALEH



أول السنته التمهيدية  
في كل فتره

# Chapter "2" : Cell Structure and Function

## 2.1 Cellular Level of Organization

The cell theory is based upon the work of Schleiden, Schwann, and Virchow. It states that:

- 1- All organisms are composed of cells.
- 2- Cells are the basic units of structure and function in organisms.
- 3- Cells come only from preexisting cells, because cells are self-reproducing.

There are two different types of cells :

### 1- Prokaryotic cells:

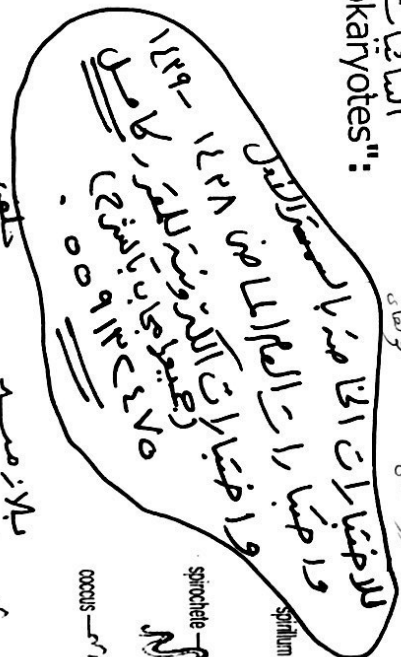
lack a membrane bounded nucleus, found in Bacteria and Archaea. [Have nucleoid]

### 2- Eukaryotic cells :

have a nucleus and organelles . found in animal cells, plant cells, fungi and protists.

### 2.2 Prokaryotic cells: \* Shapes of bacteria "Prokaryotes":

- ✓ A rod shaped bacterium = bacillus
- ✓ A Spherical shaped bacterium = coccus.
- ✓ A Spiral and rigid = Spirillum
- ✓ A Spiral and flexible = Spirochetes.
- Many bacteria also have an extrachromosomal piece of circular DNA : a plasmid.



- 1) Eukaryotic cells are so named because they lack a membrane bounded nucleus. A. True B. False
- 2) Many bacteria have an extra chromosomal piece of circular DNA called: A. Ribosome B. Mitochondria C. Plasmid D. Lysosome
- 3) Cells that lack (do not have) membrane bound nucleus are: A. Prokaryotic cells B. Eukaryotic cells C. Both
- 4) Bacteria and Archaea have: A. Prokaryotic cells B. Eukaryotic cells C. Both
- 5) Plant cells, Animal cells, Fungi and many Protists have: A. Prokaryotic cells B. Eukaryotic cells C. Both
- 6) Eukaryotic cell : A. Has a nucleus B. Lack a membrane bound nucleus C. Both
- 7) A rod shaped bacterium is called: A. Coccus B. Bacillus C. Spirilla D. Spirochete
- 8) Spherical shaped bacterium is : A. Coccus B. Bacillus C. Spirilla D. Spirochete

2.3 Introducing Eukaryotic Cells: Eukaryotic cells have compartments called organelles.

الحيوانية Animal cell	النباتية Plant cell
<ul style="list-style-type: none"> <li>• Has centrosome. جسم كروبي.</li> <li>• Has lysosomes. أجسام حملاة.</li> <li>• No cell wall found.</li> <li>• No chloroplasts found.</li> </ul>	<ul style="list-style-type: none"> <li>• No centrosome found.</li> <li>• No lysosomes found.</li> <li>• Has cell wall جدار خلوي.</li> <li>• Has chloroplasts. بلاستيدات خضراء.</li> </ul>



## 2.4 The Nucleus and Ribosomes

- 1- The Nucleus: (The command center of the cell)
- Some cells, such as skeletal muscle cells, can have more than one nucleus. *بعض الخلايا*
  - The nucleus contains chromatin, that condenses into chromosomes. *التي تحتوي على كروماتين تتكثف إلى كروموسومات*

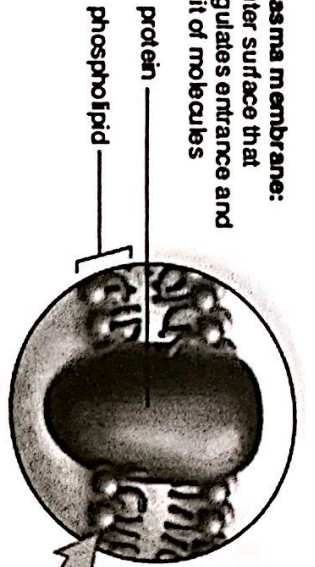
Plant cell



Animal cell



**Plasma membrane:**  
outer surface that regulates entrance and exit of molecules



**Cytoskeleton:** maintains cell shape and assists movement of cell parts:

**Microtubules:** protein cylinders that move organelles

**Intermediate filaments:** protein fibers that provide stability of shape

**Actin filaments:** protein fibers that play a role in change of shape

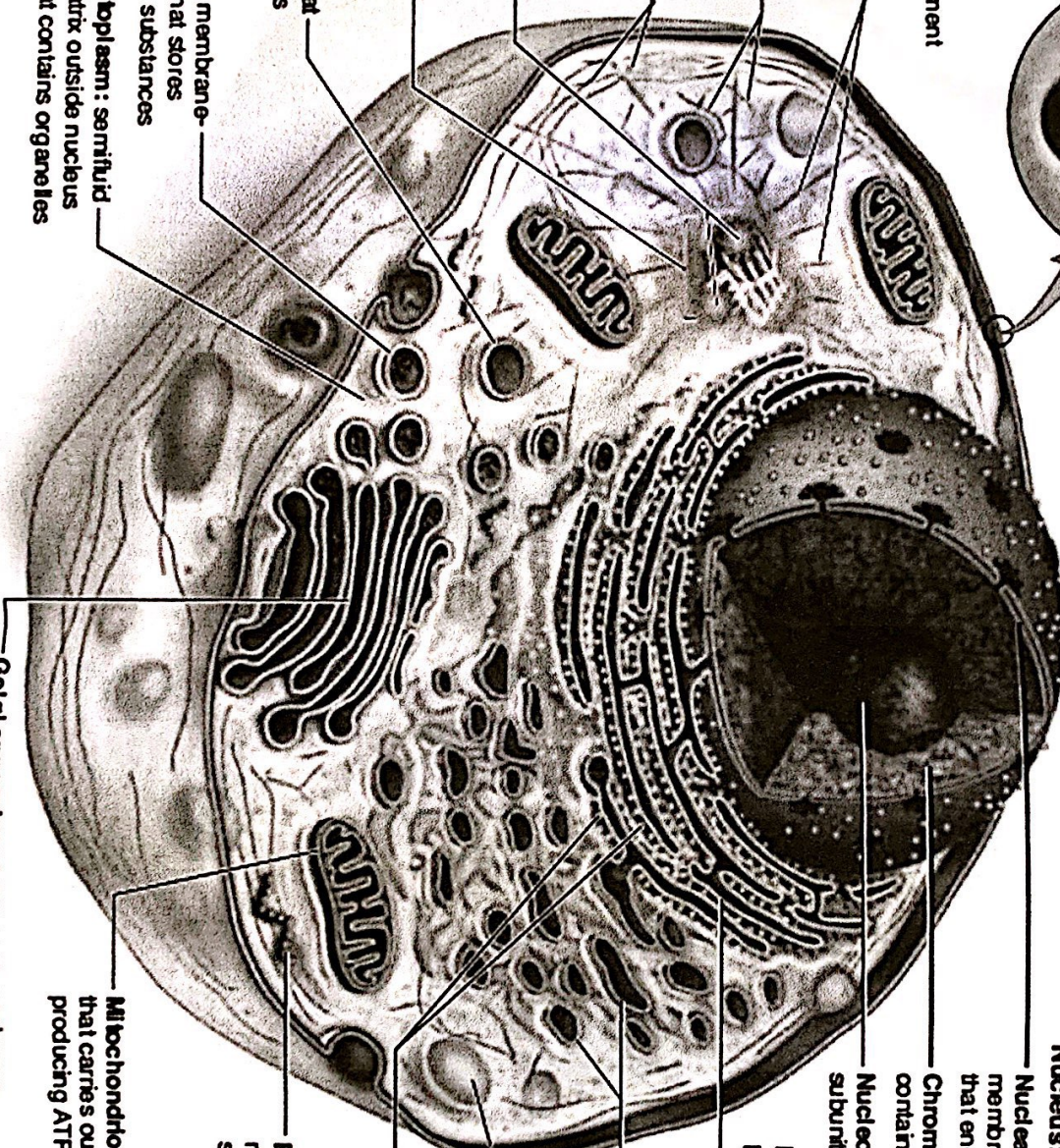
**Centrioles:** short cylinders of microtubules of unknown function

**Centrosome:** microtubule organizing center that contains a pair of centrioles

**Lysosome:** vesicle that digests macromolecules and even cell parts

**Vesicle:** small membrane-bounded sac that stores and transports substances

**Cytoplasm:** semifluid matrix outside nucleus that contains organelles



**Nucleus:** command center of cell

**Nuclear envelope:** double membrane with nuclear pores that encloses nucleus

**Chromatin:** diffuse threads containing DNA and protein

**Nucleolus:** region that produces subunits of ribosomes

**Endoplasmic reticulum:** protein and lipid metabolism

**Rough ER:** studded with ribosomes that synthesize proteins

**Smooth ER:** lacks ribosomes, synthesizes lipid molecules

**Peroxisome:** vesicle that is involved in fatty acid metabolism

**Ribosomes:** particles that carry out protein synthesis

**Polyribosome:** string of ribosomes simultaneously synthesizing same protein

**Mitochondrion:** organelle that carries out cellular respiration, producing ATP molecules

**Golgi apparatus:** processes, packages, and secretes modified proteins

**Nucleus:** command center of cell

**Nuclear envelope:** double membrane with nuclear pores that encloses nucleus

**Nucleolus:** produces subunits of ribosomes

**Chromatin:** diffuse threads containing DNA and protein

**Nuclear pore:** permits passage of proteins into nucleus and ribosomal subunits out of nucleus

**Ribosomes:** carry out protein synthesis

**Centrosome:** microtubule organizing center (lacks centrioles)

**Endoplasmic reticulum:** protein and lipid metabolism

**Rough ER:** studded with ribosomes that synthesize proteins

**Smooth ER:** lacks ribosomes, synthesizes lipid molecules

**Peroxisome:** vesicle that is involved in fatty acid metabolism

**Golgi apparatus:** processes, packages, and secretes modified proteins

**Cytoplasm:** semifluid matrix outside nucleus that contains organelles

**Central vacuole:** large, fluid-filled sac that stores metabolites and helps maintain turgor pressure

**Cell wall of adjacent cell**

**Middle lamella:** cements together the primary cell walls of adjacent plant cells

**Chloroplast:** carries out photosynthesis, producing sugars

**Granum:** a stack of chlorophyll-containing thylakoids in a chloroplast

**Mitochondrion:** organelle that carries out cellular respiration, producing ATP molecules

**Microtubules:** protein cylinders that aid movement of organelles

**Actin filaments:** protein fibers that play a role in movement of cell and organelles

**Plasma membrane:** surrounds cytoplasm, and regulates entrance and exit of molecules

**Cell wall:** outer surface that shapes, supports, and protects cell

الانزيمات الهوائية: كبريت  
على السورال ضرورية  
رسانة في الميتوكوندريا

جدار الخلية المجاورة

الصفحة الوسطى: توضع  
جدران الخلية الأولية  
لخلايا نبات مجاورة

البلاستية الخضراء: تقوم بعملية  
تحويل طاقة الشمس وضوء ونتاج  
السكرات

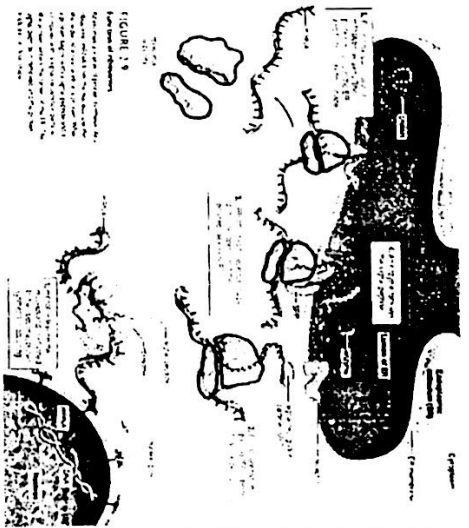
مجموعة من التراكيب  
الخضراء في الكلوروبلاست  
في البلاستية الخضراء

- The chromosomes are the carriers of genetic material. *حاملات المادة الوراثية*. The egg and sperm, have half the chromosome number. *البيوض والحيوانات المنوية*
- The nucleus is separated from the cytoplasm by a double membrane, known as the nuclear envelope. *منفصلة عن السيتوبلازم*
- The nucleolus a dark region which produces ribosomes. *النوية منطقة البروتينات*

## 2- The Ribosomes: (particles where protein synthesis occurs)

- They are composed of two subunits, one large and one small. *مكونة من وحدتين كبيره وصغيرة*
- The number of ribosomes in a cell depends on its functions. *عدد حبة يرتبط على الخلايا*
- There are a Free and attached ribosomes, single, in groups "polyribosomes". *مرتبطة بحبيبات مفردة*

?



9) The ribosomes are particles where protein synthesis occurs: A. True B. False

10) Some cells, such as skeletal muscle cells, can have more than one nucleus: A. True B. False

11) The Command center or genetic control-center of the cell is : Lysosome A. True B. False

12) The main function of ribosome is synthesis of: A. Carbohydrates B. Proteins C. Lipids

13) A Ribosome is made up of: A. One subunit B. Two subunits C. Three subunits

14) .....is the main center of the cell. A. Mitochondria B. Chloroplast C. Ribosome D. Nucleus

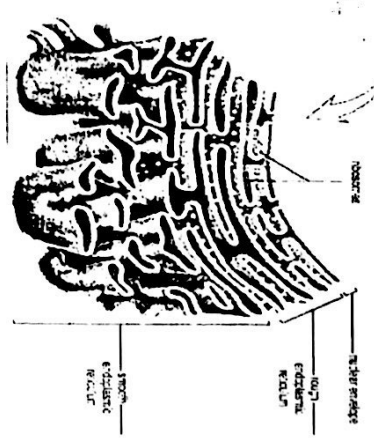
15) Eukaryotic cells have compartments called..... A. Organs B. Organelles C. Ribosomes D. Lysosomes

## 2.5 The Endomembrane System

- The endomembrane system consists of : The nuclear envelope, the membranes of the endoplasmic reticulum, the Golgi apparatus and several types of vesicles. *الجهاز الاغشائية الداخلي*

### 3- The endoplasmic reticulum: (ER)

- The ER consists of rough ER and smooth ER, transport molecules to other parts of the cell.
- **Rough ER** : Carries ribosomes , rough ER produce proteins and glycoproteins.



• **Smooth ER** : does not have ribosomes.

- In the testes, smooth ER produces testosterone "lipids".
- In the liver, smooth ER helps detoxify drugs.

### 4-The Golgi Apparatus:

- Consists of slightly curved, flattened saccules with visicles at the edges.
- The Golgi apparatus sorts the modified molecules and packages them into vesicles.
- In animal cells, some of these vesicles are lysosomes.



### 5- Lysosomes: الأجزاء الحاملة

- In animal cell only
- They are produced by the Golgi apparatus.
- They have a hydrolytic digestive enzymes.
- They destroy non- functional organelles.
- Digests bacteria in white blood cells.
- Cellular digestion occurs in lysosomes.

a. Mitochondrion and a peroxisome in a lysosome



- 16) Lysosomes act to.... : A. Produce proteins      B. Carry ribosomes      C. Destroy nonfunctional organelles      D. Produce energy
- 17) The rough endoplasmic reticulum carries : A. Chromosomes      B. Ribosomes      C. Lysosomes      D. Centrosomes
- 18) Lysosomes and Centrioles are not present (absent) in: A. Plant cells      B. Animal cells      C. Both
- 19) Intercellular digestion takes place in : A. Mitochondria      B. Lysosomes      C. Nucleus
- 20) Testosterone is a ..... Produced by ..... In the tests.

- A. Lipid — smooth ER      B. Lipid — rough ER      C. Steroid hormone - ribosomes      D. Steroid hormones — rough ER

## 2.6 Other Vesicles and Vacuoles :

### 6- Peroxisomes :

- All peroxisomes contain enzymes whose actions result in hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>).  
الإنزيمات      فوسفات      فوسفات
- They are synthesizing and breaking down lipids. In the liver, some peroxisomes produce bile.  
الدهون      الكبد      الصفراء

### 7- Vacuoles : " In plant cell only "

- Plant vacuoles contain water, sugars, salts, pigments and toxins.  
الماء والسكريات والأملاح والصبغات السامة والسموم
- The pigments are responsible for the colors of flowers and some leaves.  
اللون      النباتيات البرية      الحيوانات المستتجة
- The toxic substances protect a land plant from herbivorous animals.  
السموم      الفجوة المركزية

### Plant Cell Central Vacuole:

- take up to 90% of the volume of the cell.  
تأخذ      الإنتاج      النباتات
- Storage of both nutrients and waste products.  
تخزين      المواد الغذائية      النفايات
- It supports the cell and maintains hydrostatic pressure in plant cells.  
يدعم      الضغط      الهيدروستاتيكي



FIGURE 2.15 Plant cell central vacuole.

## 2.7 The Energy Related Organelles : عمليات مرتبطة بالطاقة

البلاستيدات الخضراء

### 8 - Chloroplasts: " In plant cell only"

تلازمة الخبيث

• Chloroplasts have a three membrane system.

مهاط

عجاءو مزروج

• They are bounded by a double membrane which encloses:

ستروما شبه سائلة

محتوى على

تأيلولة

– The semifluid stroma, which contains enzymes and thylakoids.

اندا بلاكوتيه

الجران

– A stack of thylakoids is a granum.

الكولوروفيل

بقيع

الطاقة الشمسية

تتبع

• Chlorophyll and the other pigments that capture Solar energy are located in the Chloroplasts

• The function:

عملية البناء الضوئي

تحدث

◦ Photosynthesis occurs in Chloroplast.

الطاقة لضوءية

سكر

طاقة كيميائية

◦ Converts solar energy to chemical energy (sugar).

تحتفظ

ماء

ثابت أكسجين كبريت

◦ Photosynthesis requires water, carbon dioxide and solar energy.

Other Types of Plastids :

البلاستيدات الملونة

لونه

المشار أوراق الزينة

المخزير

بعض

• Chromoplasts : responsible for the color of autumn leaves, fruits, carrots, and some flowers.

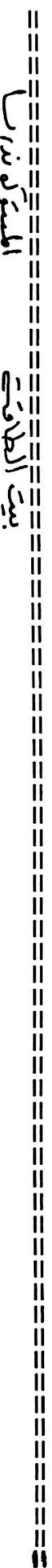
البلاستيدات الشفافة

تخزن

النشا

الزيوت

• Leucoplasts : colorless plastids that store starches and oils.



### 9- Mitochondria : (The powerhouse of the cell)

الميتوكوندريا

بيت الطاقة

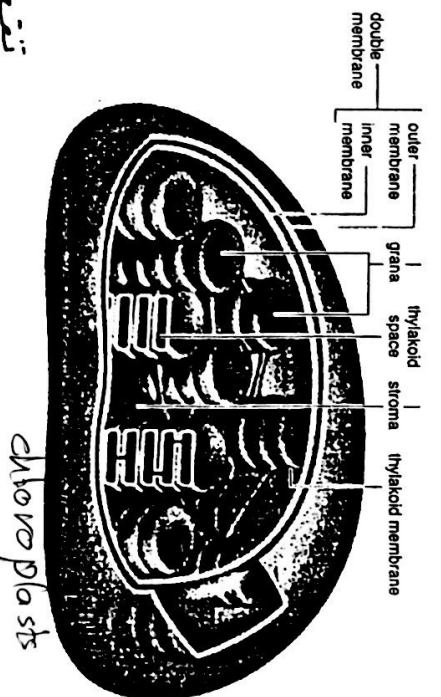
الخلايا

العضلة

أجزاء

• Mitochondria have outer and inner membrane. The inner membrane forms a cristae .

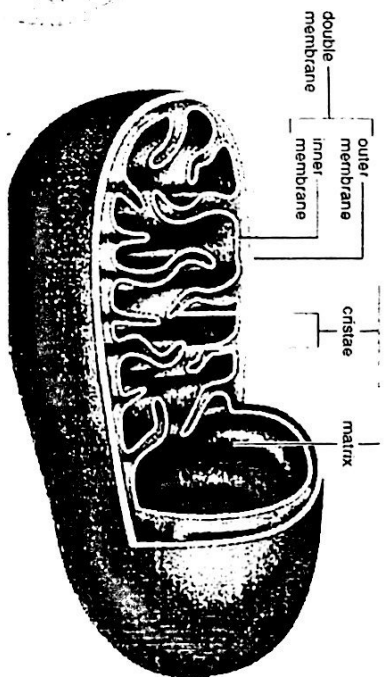
◦ The inner membrane encloses a semifluid matrix, which contains DNA and ribosomes.



- The number of mitochondria depending on their activities.

The function:

- Mitochondria produce most of the ATP utilized by the cell.
- ATP is a highly energy molecule.
- Cellular respiration occurs in mitochondria.



- 21) Peroxisomes are membrane bounded vesicles that enclose enzymes whose actions result in hydrogen peroxide : A. True      B. False
- 22) Chlorophyll and the other pigments that capture solar energy are located in: B. Chloroplasts      C. Ribosomes      D. Mitochondria
- 23) The number of mitochondria varies in cells depending on their shapes: A. True      B. False
- 24) Chloroplast, central vacuole and cell wall are present only in : A. Animal cells      B. Plant cells      C. Both
- 25) The energy related organelles are: A. Nucleus and lysosome      B. Mitochondria and chloroplasts      C. Ribosome and endoplasmic reticulum
- 26) The cell organelle where photosynthesis takes place and convert solar energy to chemical energy of food is: A. Mitochondria      B. Chloroplast      C. Ribosome
- 27) Stroma and thylakoids are parts of : A. Mitochondria      B. Chloroplast      C. Nucleus
- 28) The Cellular Respiration takes place in: A. Mitochondria      B. Endoplasmic reticulum      C. Vacuole
- 29) The power houses of cell that produce most of the ATP needed by the cell are : A. Lysosome      B. Peroxisome      C. Mitochondria

0559132475

د. عبدالقادر

- 7 -

المعلم عبدالقادر : الرقم التلويقي 0559132475

- 30) All of these are incorrect for the main source of energy in the cell except: A. Mitochondria B. Chloroplast C. Ribosome D. Nucleus
- 31) Chloroplast carries out : A. Photosynthesis B. Respiration C. Protein synthesis D. Lipid synthesis
- 32) ATP : A. Provides enzymes for metabolism B. has helical structure C. is a highly energy molecule D. Is an amino acid
- 33) The role of central vacuole in plant cell is to reserve: A. Toxic substances B. Pigments C. Water, salts, sugars D. All are correct
- 34) The toxic substances protect a land plant from herbivorous animals . A. True B. False
- 35) The attractive color of flower petals is due to the pigment in vacuole A. True B. False

KEY ANSWERS						
1) B	2) C	3) A	4) A	5) B	6) A	7) B
8) A	9) A	10) A	11) C	12) B	13) B	14) D
15) B	16) C	17) B	18) A	19) B	20) A	21) A
22) B	23) B	24) B	25) B	26) B	27) B	28) A
29) C	30) A	31) A	32) C	33) D	34) A	35) A

*With my best wishes*

## Chapter "3"

# The Cell Cycle and Cellular Reproduction

# BIOLOGY

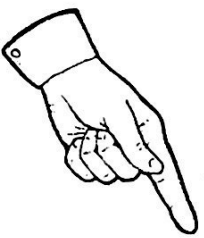
(BIO 101)

## أول السنته التمهيدية

المادة المعيرة في

The Second Semester (1439 – 1440)

DR. ABDULRAZZAK N. EL-SALEH



أسئلة اختبارية  
قد لا تقرأ

# Chapter "3": The Cell Cycle and Cellular Reproduction

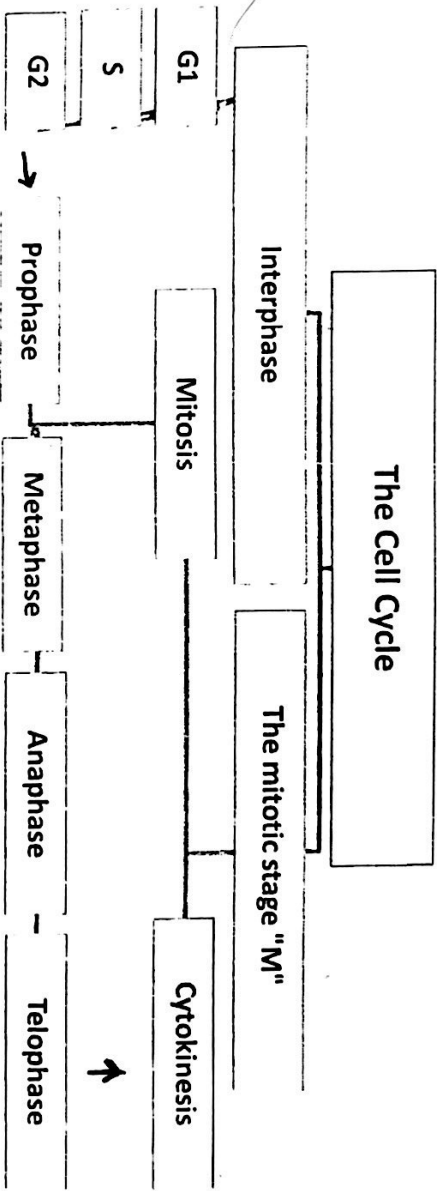
دورة الخلية

دورة الخلية

دورة الخلية

## 3.1 The Cell Cycle:

- A set of stages takes place between two successive cell divisions.



The two portions of the cell cycle are:

- Interphase: ( G1 , S , G2 )
- The mitotic stage "M": ( Mitosis – Cytokinesis )

### Interphase:

- It takes about 90% of the cell cycle, consists of three stages:

### G1 - Stage

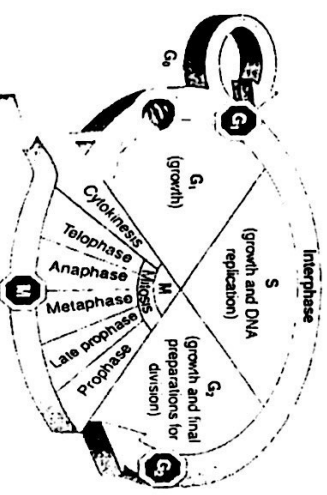
- The cell increases in size, doubles its organelles,

( such as mitochondria and ribosomes ), and accumulates materials for DNA synthesis.

- Some cells, such as nerve and muscle cells do not complete the cell cycle and are arrested on ( G<sub>0</sub> ).

### S - Stage: DNA synthesis or replication occurs.

### G2 Stage: the preparation of mitosis occurs.



مرحلة الانقسام الخلوبي

[Karyokinesis = nuclear division]

❖ **M (Mitotic) Stage:**

انقسام النواة

الاستئصال

• Includes **mitosis** (nuclear division) and **cytokinesis** (division of the cytoplasm).

### 3.2 Mitosis and Cytokinesis

❖ **Mitosis division:**

❖ **Eukaryotic Chromosomes:**

كروموسومات حقيقية النواة  
مترابطة  
بروتينات صغرى

• The DNA in the chromosomes is associated with various proteins, including **histones**.

• When eukaryotic cell is not undergoing division, DNA is located within **chromatin**.

• Before mitosis begins, chromatin becomes highly coiled and condensed **chromosomes**.

• Chromosome is composed of two sister **chromatids** held together at a **centromere**.

• Each species has a characteristic chromosome number.

• **The full or diploid (2n) number** of chromosomes that is found in all cells of the individual. (in Human = 46)

• The diploid number includes two chromosomes of each kind.

• Half the diploid number, called the **Haploid (n) number** of chromosomes, contains only one chromosome

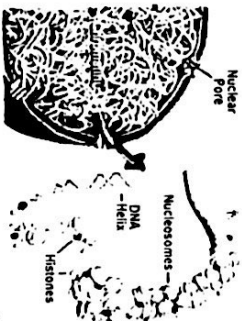
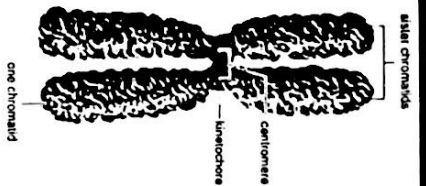
• **sperm and egg** cells (In Human = 23)

• The cell cycle consists of: A. Interphase B. Mitosis C. Cytokinesis D. All

• Which of the following represents a haploid stage during human life cycle? A. Egg cells B. Kidney cells C. Liver cells D. Brain cells

• The Interphase lasts about: A. 5% of the cell cycle B. 10% of the cell cycle C. 90% of the cell cycle D. 45% of the cell cycle

• Mitosis division takes place at cells of: A. skin B. ovaries C. testes D. testes & ovaries



- 1) The cell cycle consists of: A. Interphase B. Mitosis C. Cytokinesis D. All
- 2) Which of the following represents a haploid stage during human life cycle? A. Egg cells B. Kidney cells C. Liver cells D. Brain cells
- 3) The Interphase lasts about: A. 5% of the cell cycle B. 10% of the cell cycle C. 90% of the cell cycle D. 45% of the cell cycle
- 4) Mitosis division takes place at cells of: A. skin B. ovaries C. testes D. testes & ovaries

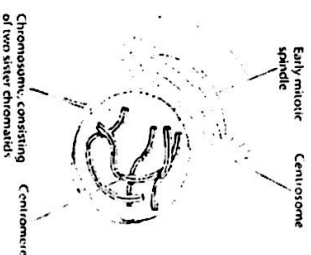
- 5) Diploid number in human: A. 23 chromosomes B. 46 chromosomes C. 92 chromosomes D. 10 chromosomes
- 6) G1, S and G2 are parts of the: A. Prophase B. Metaphase C. Interphase D. 10 chromosomes
- 7) DNA synthesis or replication takes place during: A. G1 stage B. S stage C. G2 stage D. 10 chromosomes
- 8) The division of nucleus or nuclear division is: A. Mitosis B. Cytokinesis C. Both mitosis and cytokinesis
- 9) Cytokinesis is referred to the: A. Division of nucleus B. Division of cytoplasm C. None of these
- 10) The full or diploid number of chromosomes which includes two chromosomes of each kind that is found in all cells of the individual is :  
A.  $2n$  B.  $n$  C. None of these
- 11) Half of diploid number, which contains one chromosome of each kind, typically sperm and egg in animal cells is  
A. Diploid ( $2n$ ) B. Haploid ( $n$ ) C. Both
- 12) The sister chromatids are attached at the point called: A. Histone B. Chromosome C. Centromere D. Centrosome
- 13) The Mitotic Stage (M) is composed of: A. Meiosis & cytokinesis B. G1 & cytokinesis C. Mitosis & cytokinesis D. All are correct
- 14) Mitosis takes place during: A. Sexual Reproduction B. Cell growth C. Division of bacteria D. None
- 15) The cell increases in size and doubles its organelles during : A. G1 stage B. S stage C. G2 stage D. G0 stage
- 16) Some cells, such as nerve and muscle cells do not complete the cell cycle and are permanently arrested during:  
A. G1 stage B. S stage C. G2 stage D. G0 stage
- 17) Nuclear division will be done in: A. Interphase B. S stage C. Mitosis D. G2 stage

### الانقسام النوري مراحل

❖ **Phases of Mitosis:** Prophase, Prometaphase, Metaphase, Anaphase and Telophase

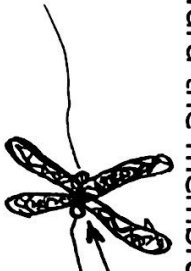
#### 1- Prophase:

- Chromatin has condensed to chromosomes.  
الكروماتين المتكثف كروموسومات
- The nucleolus disappears, the nuclear envelope fragments.  
النوية تختفي الغلاف النووي يتجزأ





الظواهر الانقسامية  
 In animal cells, an array of microtubules radiates toward the membrane from the centrosomes. These structures are called **asters**.  
 جُيُوط نجمية



- 2- **Prometaphase:** الغلاف النووي يختفي  
 Nuclear envelope disappears.  
 كل في وسط الكروماتيد كروماتيد  
 Kinetochore appears on each chromatid, starts spindle formation.

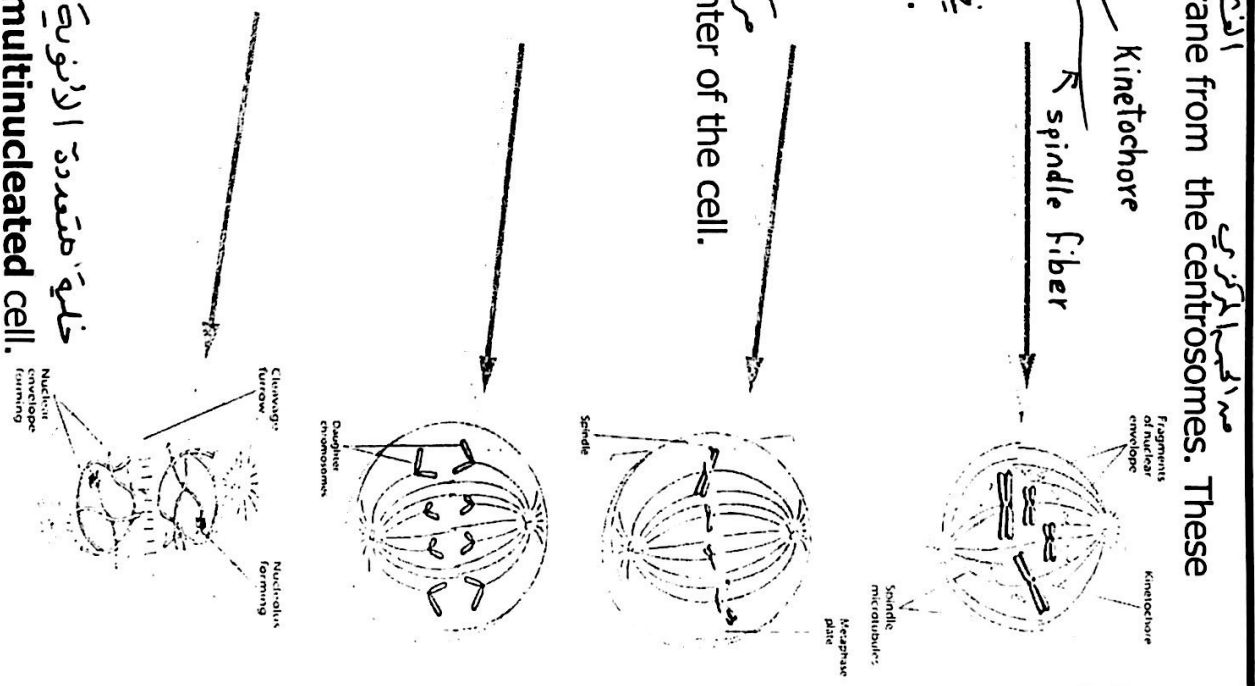
3- **Metaphase:** الظهور المتوازي  
 كتميل  
 Spindle fibers complete.

- Centromeres of (Chromosomes) arrange at metaphase plate or center of the cell.  
 المصفحة المركزية

- 4- **Anaphas :** الظهور الانفصالي  
 انفصال الكروماتيدات الشقيقة  
 Sister Chromatids (separate) to become daughter Chromosomes,  
 باتجاه متعاكس  
 and move toward the spindle poles.

- 5- **Telophase :** الظهور النهائي  
 جُيُوط المغزل يختفي  
 Spindle disappears, but nuclear envelopes and nucleolus  
 يظهر  
 appears in each daughter cell.  
 يحدث الانقسام المتساوي

- ◆ **Cytokinesis:** Cytokinesis is the division of the **cytoplasm**.  
 انقسام السيتوبلازم يحدث  
 • When mitosis occurs but cytokinesis doesn't occur, the result is a **multinucleated cell**.



الانقسام الحيوي البروزي

الخلايا الحيوانية

تقسم

• **Cytokinesis in animal cells** : by **Cleavage Furrow** .

الخلايا النباتية

• **Cytokinesis in Plant Cells** : by **Cell Plate**.

The new cell plate known as **primary cell walls**.

وتلازمه الانقسام الميتوكتيبي

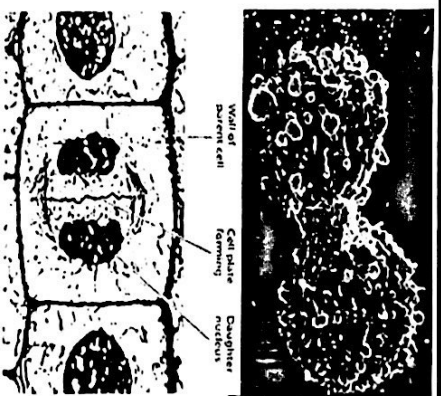
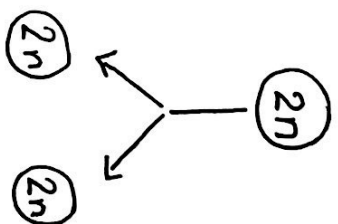
◆ **The Functions of Mitosis** :

• Mitosis permits **growth and repair**.  
تسمح الانسجة المتجددة

• Cell division in which a diploid (2n) mother cell divides to produce  
لتعطي

two diploid (2n) daughter cells.

• Chromosome number and kinds remains same as the original parent cell.  
في الخليه الام كما هو بظلال ونوعها عدد الكروموسومات



### 3.4 Prokaryotic Cell Division:

انقسام الخلايا بدائية الخلية

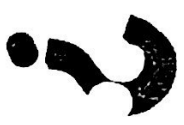
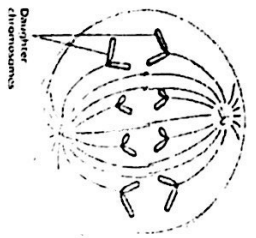
• Cell division in **unicellular** organisms, such as **prokaryotes** (Bacteria),  
التي بدائية الخلية مثل المخلوقات وحيدة الخلية  
ينتج  
produces **two** new individuals.  
كما شر لا جنسي

• This is **asexual reproduction**.

The type of this **asexual reproduction** is called **Binary fission**.  
أنشطار متساوي



- 18) If a parent cell has 14 chromosomes prior to mitosis, how many Chromosomes will each daughter cell have?  
 A. 28 chromosomes      B. 14 chromosomes      C. 7 chromosomes      D. 21 chromosomes
- 19) In animal cells, cytokinesis occurs by a cleavage furrow followed by a slowly circular constriction appears between the two daughter cells.  
 A. True      B. False
- 20) Mitosis permits:      A. Reduction the number of cells.      B. Growth and repair of tissues .      C. Reduction the number of chromosomes .
- 21) The chromosomes move toward the spindle poles during :      A. Prophase      B. Metaphase      C. Anaphase      D. Telophase
- 22) The nucleolus disappear during:      A. Prophase      B. Metaphase      C. Anaphase      D. Telophase
- 23) Cytokinesis in plant cell takes place by formation of by Cell plate.      A. True      B. False
- 24) Cytokinesis on animal cells takes place by formation of :      A. Cleavage furrow      B. Cell plate      C. Both cleavage furrow and cell plate
- 25) When mitosis occurs but cytokinesis doesn't occur, the result is a:      A. Multinucleated cell      B. Uninucleated cell      C. Both
- 26) In animal cells, an array of microtubule radiate towards the plasma membrane from the centrosomes. These structures are called:  
 A. Cell plate      B. Asters      C. Nucleolus
- 27) The centromeres of the duplicated chromosomes are arranged at the metaphase plate or the center of the cell during:  
 A. Prophase      B. Metaphase      C. Anaphase
- 28) The sister chromatids separate and become daughter chromosomes that move towards the poles during :  
 A. Prophase      B. Metaphase      C. Anaphase
- 29) The diagram represents :      A. Prophase      B. Metaphase      C. Anaphase
- 30) prokaryotes reproduces by asexual reproduction that is called Binary fission.      A. True      B. False
- 31) Mitosis require:      A. One nuclear division.      B. Two nuclear divisions.      C. Three nuclear division.      D. Four nuclear divisions.
- 32) Cells are making mitosis for:  
 A. Maintaining the chromosome number in all body cells.      B. Formation of Gametes.  
 C. Growth and repair tissues.      D. Both A and C are correct.



- 33) The spindle fibers are attached to the chromosome at mitosis in : A. Prophase B. Metaphase C. Anaphase D. Prometaphase
- 34) The phases of Mitosis cell division are:

A. Prophase, Metaphase, Telophase , Anaphase  
B. Metaphase, Telophase , Anaphase , Prophase  
C. Prophase, Metaphase, Anaphase , Telophase  
D. Prophase, Metaphase, Anaphase

- 35) During prophase stage , the .....disappears. A. Nuclear membrane B. DNA C. Centrosomes D. Nucleolus

- 36) Nuclear envelopes and nucleolus appears in each daughter cell during: A. Prophase B. Metaphase C. Anaphase D. Telophase

- 37) Cytokinesis in plant cells, involves the building of a.....between the daughter cells.

- A. Cell plate B. Septum C. Cleavage furrow D. Division of cytoplasm
- 38) The diagram represents: A. Prophase B. Metaphase C. Anaphase D. Telophase



للأضغيات الكروموسومية / أضغيات الأضغيات الكروموسومية  
١٤٢٩ - ١٤٣٠

KEY ANSWERS													
1)	D	2)	A	3)	C	4)	A	5)	B	6)	C	7)	B
8)	A	9)	B	10)	A	11)	B	12)	C	13)	A	14)	B
15)	A	16)	D	17)	C	18)	B	19)	A	20)	B	21)	C
22)	A	23)	A	24)	A	25)	A	26)	B	27)	B	28)	C
29)	C	30)	A	31)	A	32)	C	33)	D	34)	C	35)	D
36)	D	37)	A	38)	B								

*With my best wishes*

## Chapter "4"

# Meiosis and Sexual Reproduction

# BIOLOGY

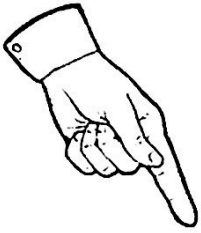
(BIO 101)

أولياء السنة التحضيرية

المسئلة المميزة في

The Second Semester (1439 – 1440)

DR. ABDULRAZZAK N. EL-SALEH



أسئلة الاختبار السابق  
في 15 مارس

# Chapter "4": Meiosis and Sexual Reproduction

## 4.1 : Halving the Chromosome Number

التصنيف

نوع

الانقسام الاختزالي

يختزل

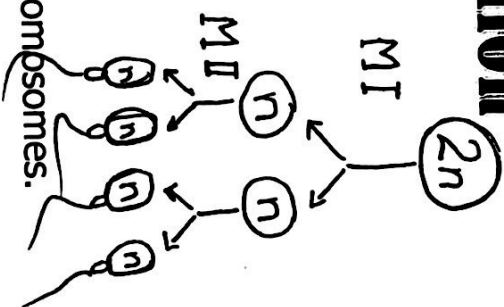
الكرسومومات

عدد

**Meiosis** is the type of nuclear division that reduces the chromosome number from the diploid (2n) number to the haploid (n) number.

• The **diploid (2n) number** refers to the **total** number of chromosomes.

• The **haploid (n) number** of chromosomes is **half** the diploid number.



- ✦ In humans, the diploid number of 46 is reduced to the haploid number: (23).
- ✦ **Gametes** (reproductive cells, the sperm and egg) have the **haploid** number of chromosomes.
- ✦ Fusion of gametes form a cell called a **zygote** which has the diploid (2n) number of chromosomes.
- ✦ Meiosis requires two nuclear divisions and produces four haploid daughter cells, each having half the total number of chromosome.



- 1) Meiosis requires ..... A. One nuclear division      B. Two nuclear divisions      C. Three nuclear divisions      D. Four nuclear divisions
- 2) Fusion of gametes (sperm and egg) form a cell called..... A. Eosinophil      B. Lymphocyte      C. Zygote      D. Red blood cell
- 3) Meiosis requires two nuclear division and produces four haploid cells.      A. True      B. False
- 4) In humans, the diploid number of chromosomes is ..... A. 44      B. 23      C. 46      D. 22
- 5) In human, meiosis occurs only in ..... A. Liver      B. Skin      C. Kidney      D. Testes
- 6) If a parent cell has 46 chromosomes, after meiosis each daughter cell has..... A. 38 chromosomes      B. 46 chromosomes      C. 92 chromosomes      D. 23 chromosomes



- 7) The..... number refers to the total number of chromosomes. A. Diploid B. haploid C. Diploid and haploid
- 8) The .... number refers to the half number of chromosomes. A. Diploid B. haploid C. Diploid and haploid
- 9) The haploid number in humans is..... A. 23 B. 47 C. 46
- 10) The .....have the haploid number. A. Egg and sperm B. gametes C. Both of them
- 11) The ..... have the diploid number. A. Zygote B. gametes C. Alleles
- 12) The meiosis produces .....daughters. A. Two diploid B. four haploid C. Four diploid



انزاج الكروموسومات المتماثلة  
خليا الجنس

Homologous Pairs of Chromosomes

- \* In diploid body cells, the chromosomes occur in pairs which are called **Homologous chromosomes**.  
حوامل نسج الجين من البدائي المتماثلة
- \* Alternate forms of a gene are called **alleles**.  
مورثات الزوج المتماثل من الكروموسوم الواحد والآخر
- \* One member of a homologous pair was inherited from the male parent, and the other was inherited from the female parent by way of the gametes.  
المؤنث

الخلايا الجرثومية  
مصير

Fate of Daughter Cells

- \* In the plant life cycle, the daughter cells become **haploid spores** that germinate to become a haploid generation "Gametophyte". This generation produces the gametes by mitosis.  
دورة حياة النبات تصبح الخلايا الجرثومية لتصبح أبوية تنمو لتصبح مسطوية الأنتمة المستقرية المنتجة
- \* In the animal life cycle, the daughter cells become **the gametes** either **sperm** or **eggs**.  
دورة حياة الحيوان تصبح الخلايا الجرثومية لتصبح الحيوانات المنوية والبويضات

## 4.2: Genetic Variation ; الانتواع الوراثي

الاستمرار الاختزالي

\* Meiosis provides a way to keep the chromosome number constant generation after generation. عدد الكروموسومات ثابت جيل بعد جيل

يصل على الانتواع الوراثي عن طريق العصور الوراثية

\* Meiosis brings about genetic variation in a way which is called: **Crossing over**. (زروع الكروموسومات المتماثلة) كروماتيدات غير متماثلة

\* **Crossing over**: Exchange of genetic material between non-sister chromatids of a bivalent. تبادل المادة الوراثية بين

### \* Significance of Genetic Variation :

كيفية الانتواع الوراثي له أهمية

The amount of genetic variation achieved through meiosis is important to the survival of a species. مقدار التباين الوراثي المحقق من خلال الانقسام الاختزالي مهم لبقاء النوع



13) Which is correct?

A. Homologous pair was inherited from one parent. B. Homologous chromosomes occur in pairs.

C. Homologous chromosomes differ completely from each others. D. All answers are correct.

14) Alternate forms of a gene are called..... A. Alleles B. Sister chromatids C. Non sister chromatids D. Homologous chromosomes

15) The spores of the plant cells become..... generation. A. haploid B. diploid C. Both

16) Exchange of genetic material between non-sister chromatids of a bivalent during meiosis called .

A. Crossing over B. Independent assortment of homologous C. both

17) Meiosis takes place during.....

A. asexual reproduction B. formation of gametes C. cell growth and repair D. none

18) Fusion between male and female gamete give rise to..... A. haploid cell B. oogenesis C. zygote D. none

19) Crossing over is an exchange of genetic material between sister chromatids of a bivalent. A. True B. False



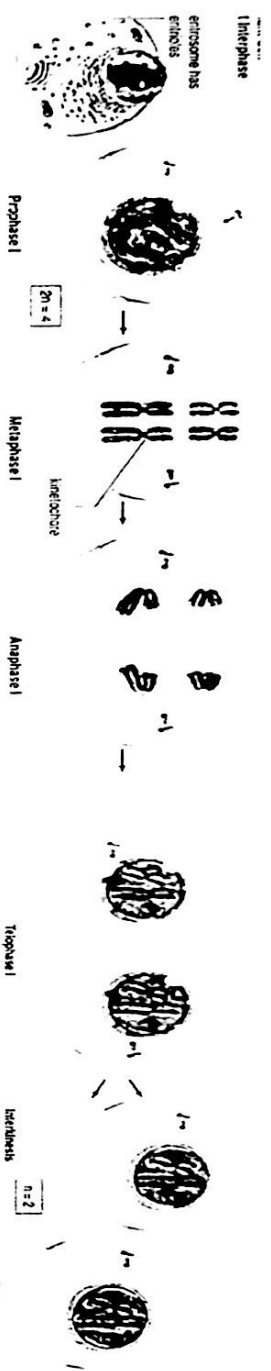


### 3. The Phases of Meiosis: أطوار الانقسام الاختزالي

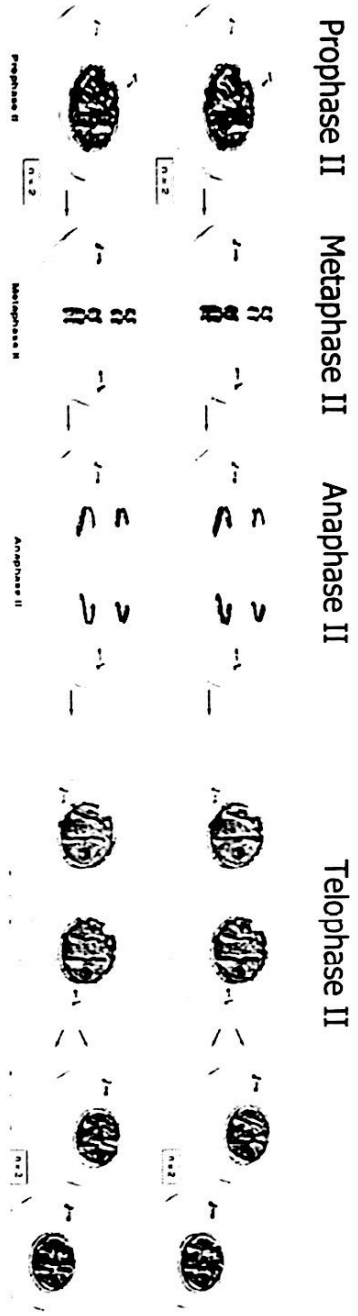
- Consist of two nuclear divisions (Meiosis-I & Meiosis-II). انقسامان نوكلينيين

**Meiosis I :** (Chromosomes becomes half, from diploid to haploid) الطور التمهيدي الأول

- 1- Prophase-I:** Chromosomes duplicated, bivalents form and crossing over takes place. الطور التمهيدي الأول
- 2- Metaphase-I:** Homologous pairs align at metaphase plate. الطور التمهيدي الأول
- 3- Anaphase-I:** Homologous chromosomes separate and move towards opposite poles. الطور التمهيدي الأول
- 4- Telophase-I :** Spindle disappears, nucleolus and nuclear membrane reappears. الطور التمهيدي الأول



**Meiosis II :** (No change in chromosomes number, from haploid to haploid) لا تغيير لا



#### 4.4 Meiosis Compared to Mitosis :

الانقسام الاختزالي مقارنة بالانقسام المساوي

	Mitosis	Meiosis
1	Occurs in all tissues "somatic cells" الخلايا الجسدية الانسجة كل حيث	Occurs only in the reproductive organ "gonads" "testis and ovary" الانقسام الاختزالي في الأعضاء التناسلية فقط حيث المبيض الخصية
2	For growth and repair لتكوين الانسجة	Produce the gametes "sperms and eggs" For genetic variation. الانتاج الجنسي
3	Requires only <u>one</u> nuclear division انقسام نووي واحد	Requires <u>two</u> nuclear divisions يحتاج 2 انقسامات نووية
4	Produces <u>two</u> diploid daughter cells ينتج خليتين	Produces four haploid daughter cells ينتج 4 خلايا نصفية
5	The daughter cells are genetically identical to each other. الخلايا الابرية متطابقة وراثياً	The daughter cells are neither genetically identical to each other. الخلايا الابرية غير متطابقة وراثياً
6	-----	During prophase I, bivalents form and <u>crossing-over</u> occurs حيث تتكون البصمات المتبادلة
7	During metaphase in mitosis, <u>individual</u> chromosomes align at the metaphase plate. مزديّة فردية	During <u>metaphase I</u> of meiosis, bivalents independently align at the metaphase plate. تصطف البصمات المتبادلة في المركز
8	During <u>anaphase</u> of mitosis, sister chromatids separate. الانقسام	During <u>anaphase I</u> of meiosis, homologues of each bivalent separate. انقسام

?

20) This diagram illustrates.....

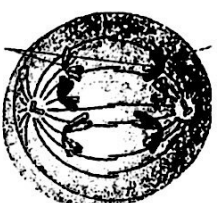
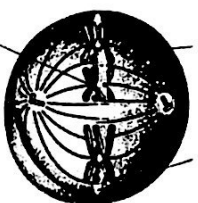
- A. Prophase I      B. Metaphase I

21) Crossing over occurs during.....

- A. Prophase I      B. Metaphase I  
C. Anaphase I      D. Telophase I

22) This diagram represents the .....

- A. Metaphase of meiosis -II  
B. Anaphase of meiosis II  
C. Metaphase of meiosis -I  
D. Anaphase of meiosis -I



- 23) In diploid body cells, the chromosomes occur in pairs which are called: A. homologues. B. gametes C. None of them
- 24) Homologous chromosomes separate and move toward the poles : A. Prophase I B. Metaphase I C. Anaphase I
- 25) Sister chromatids separate and move toward the poles in:..... A. Prophase II B. Metaphase II C. Anaphase II
- 26) The reductive division that occur in gonads is:..... A. meiosis B. mitosis C. Interphase
- 27) After meiosis, the daughter cells are neither genetically identical to each other. A. True B. False

دورة حياة الإنسان

#### 4.5 :The Human Life Cycle :

- ◆ **Life cycle** : all the reproductive events that occur from one generation to the next generation.
- In animals, including humans, the individual is always diploid, and meiosis produces the gametes (gametogenesis), the only haploid phase of the life cycle.
  - In males, **spermatogenesis** occurs in the **testes** and produces **sperms**.
  - In females, **oogenesis** occurs in the **ovaries** and produces **eggs**.
  - A sperm and egg join at fertilization and form a **zygote**(2n), which restoring the diploid chromosome number.
  - Zygote by mitosis forms fetus. After birth, mitosis permits the growth of the child.
  - Plants have a haploid generation, known as **gametophyte**, and diploid generation called **sporophyte**.
  - Mosses growing on bare rocks and forest floors are the haploid generation, and the diploid generation is short-lived.



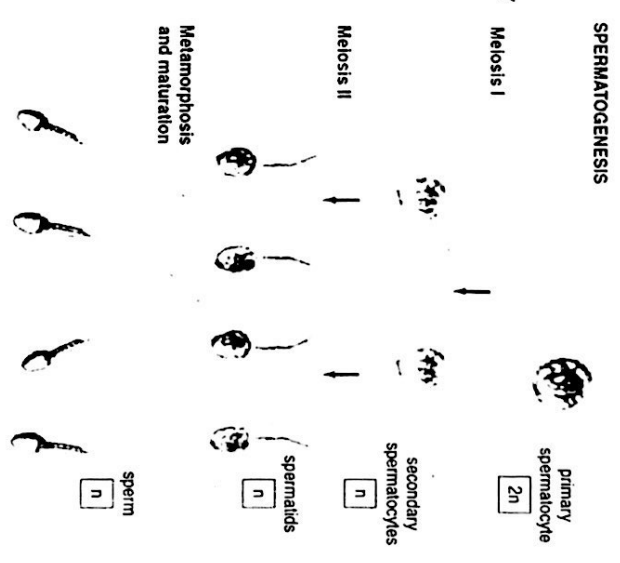
In most **fungi** and **algae**, the zygote is the only diploid portion of the life cycle, and it undergoes meiosis.  
 Therefore, the black mold that grows on bread and the green scum are haploid.  
 The majority of **plant species**, including pine, corn, and sycamore, are usually diploid, and the haploid

generation is short-lived.  
 In human males, **spermatogenesis** occurs within the **testes**, and in females, **oogenesis** occurs within the **ovaries**.

**Spermatogenesis and Oogenesis in Humans**

**The testes :**  
 spermatogonia "stem cells" (46 Chr.) → primary spermatocytes (46 Chr.)  
 meiosis I → two secondary spermatocytes(23 Chr.) → spermatozoa ("Sperm"(23 Chr.)

**The ovaries :**  
 contain stem cells called **oogonia** that produce many **primary oocytes**  
 (46 chromosomes) during fetal development. They even begin oogenesis, but only a few continue when a female is sexually mature.



The result of meiosis I is **two haploid cells** ( 23 chromosomes).

- One of these cells, termed the **secondary oocyte** receives almost all the cytoplasm.
- The other is a **polar body** that may either disintegrate or divide again.

The **secondary oocyte** begins meiosis II but stops at metaphase II. Then the secondary oocyte leaves the ovary and enters an **oviduct**.



28) Spermatogenesis produces .....

- A. Skin cells
- B. Sperms
- C. Eggs
- D. Brain cells

29) ..... is involved in the growth of the child and repair of tissues. A. Meiosis I

B. Meiosis I

C. Mitosis

30) The testes of human male contains stem cells called.....while the ovaries contain..... A. spermatogonia — Oogonia B. Oogonia — spermatogonia

31) Primary spermatocyte is .....while Secondary spermatocyte is..... A. diploid --- haploid

B. haploid — diploid

32) Primary oocyte is .....while Secondary oocyte is..... A. diploid --- haploid

B. haploid — diploid

33) .....receives almost all the cytoplasm after meiosis I of primary oocyte. A. Secondary oocyte

B. Polar body

34) In human male spermatogenesis occurs within..... A. sperm

B. ovaries

C. testes

D. egg

35) In human oogenesis occurs within..... A. sperm

B. ovaries

C. testes

D. egg

36) The egg leaves the ovary and enters an oviducts after: A. Metaphase -I

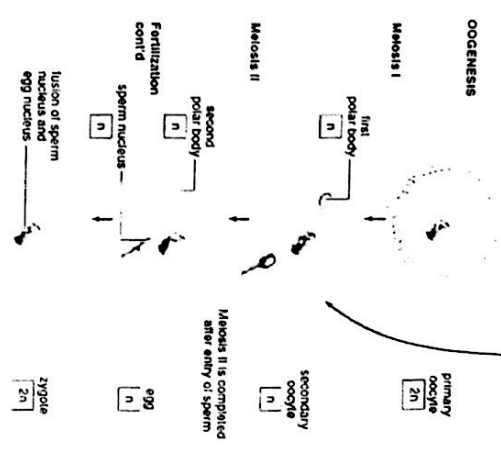
B. Metaphase-II

C. Prophase-I

D. Prophase-II

37) Plants have a haploid generation , known as the sporophyte, and diploid generation called the gametophyte. A. True

B. False



38) Cells are making mitosis for:

- A. Maintaining the chromosome number in all body cells.
- B. Formation of Gametes.
- C. Growth and repair tissues.
- D. Both A and C are correct.



KEY ANSWERS													
1)	B	2)	C	3)	A	4)	C	5)	D	6)	D	7)	A
8)	B	9)	A	10)	C	11)	A	12)	B	13)	B	14)	A
15)	A	16)	A	17)	B	18)	C	19)	B	20)	C	21)	A
22)	C	23)	A	24)	C	25)	C	26)	A	27)	A	28)	B
29)	C	30)	A	31)	A	32)	A	33)	A	34)	C	35)	B
36)	B	37)	B										

*With my best wishes*



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