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DATA3LOM
2025

- Branch of Zoology study the internal microscope structure of "tissues" which of the organism basic structure unit and. The new cells arise from old cell has been Divided.

* النسيج الحيواني يتبدأ حياتها خلية واحدة:

Zygote → Cells → 3 layers Primary germ layers

- outer "ectoderm"
- middle "mesoderm"
- inner "endoderm"

* النسيج ← تنظيم خلايا الخلية واحدة بحيث تتكون من خلايا متماثلة في الشكل والوظيفة.

.. Tissue .. specialized groups of cell:

similar in structure

Perform the same function

- every group of cell make tissue that cells connected together by substance called. matrix = intercellular.

- Tissue don't exist by of as is dated They connect together making organs.

Types of Tissue : (1) epithelium النسيج

(2) muscular العضلات

(3) connective النسيج

(4) nervous الأعصاب

EPIthelium Tissue

- [1] originated from all the 3 germ layer.
- [2] component of tissue "cell" laying on basic membrane.
- [3] Naming **ePiThelium** : covering outer surface body.
endoThelium : laying on inner hollow organs.
يغطي الأغشية المخاطية والأعضاء الجوفاء.
- mesoThelium** : laying internal body cavity.
- [4] matrix is very "scanty" خفيف جداً لدرجة أنها غير مرئية، وفي بعض الأحيان.
- [5] Blood vessels, lymphatic can't be seen between ePiThelium tissue.
- [6] Nerve fibers can be seen.
- [7] Nutrients reach the cell by Diffusion from the basement membrane.
- [8] Cells has ability for multiplication regeneration.
- [9] same comp. can be modified to form new func, **أقسام**
 - [1] Be secretory → glandular ePiThelium **أفراز**
 - [2] Produce germ cell → germinal ePi.
 - [3] receive nervous signal **Neuro ePiThelium**.

Function

- Protect the body against bad things **دفع**
- Absorptive function → Gastro-intestinal ePiThelium **امتصاص**
- sensory by Neuro ePiThelium **أعصاب**
- Produce gametes → germinal ePiThelium **إنجاب**
- secretory → glandular eP. **أفراز**
- excretory → renal tubules. **إفراز**

Classification of Epithelium Tissue

Structure "shape" "arrange"

Function

Simple Form

Stratified Form

one layer of cell

more than one layer of cell

* يتم تصنيف الـ stratified على حسب الشكل الخارجى للخلية الخارجيه.

→ Simple

[1] Simple squamous epithelium.



• Don't lining on basic men.

• Bowman's capsule of kidney. Flattened cell, Nuclei.

[2] simple cuboidal epithelium



• Central, Round Nuclei

• Thyroid follicles, in kidney.

[3] simple columnar epithelium

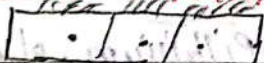


• مبطنة المعدة، لها وظيفة إفراز وامتصاص في intestine.

• secretory in stomach

• absorption in intestine.

[4] ciliated squamous columnar



• يوجد في الشعب الهوائية

• Bronchioles of lung

[5] Pseudostratified



• 2 rows of cells appear as 2 layer. duct of parotid gland.

[6] ciliated pseudostratified ep.



• الشعب الهوائية

• Found in the Trachea.



Lecture: **Zoology**
"Histology"
Lec 2 , 3 , 4

By: **Ahmed Salah**

اللَّهُمَّ انْفَعْنِي
بِمَا عَلَّمْتَنِي
وَعَلَّمَنِي مَا
يَنْفَعُنِي وَزِدْنِي
عِلْمًا



[2] Connective Tissues

★ Characters:

- ① origin: from mesoderm
- ② Matrix: extensive
- ③ No basement membrane
- ④ Contain blood vessels
- ⑤ Contain of cells, fibers and extracellular material
- ⑥ Cell types classified as "fixed" or "wandering"

★ Functions: in Support, as a medium for exchange between blood and tissues, for Storage, and for Protection and repair

★ Connective tissue fibers

Three types:

[1] Collagenous fibers:

Strong and resist stretch - By boiling
→ gelatin

★ wavy branching bundles formed of non-branching fibers

[2] Elastic fibers

Structure: Formed of 2 types of Protein
Amorphous protein called elastin in the
center surrounded by microfibrillar protein

- ★ Single, thin, branched
- ★ Yellow in fresh state

[3] Reticular fibers

Structure: formed mainly of type 3 collagen
where tropocollagen molecules. They contain
6-12% hexoses, compared to 1%.

Function: supporting network that allow motile
cells to move about in loosely arranged
tissue as bone marrow

★ Types of Connective tissue

[1] Connective tissue Proper: Having jelly-like
matrix (6 types)

[2] Skeletal C.T: with semi solid or solid
matrix (cartilage, bone)

[3] Vascular C.T: Having fluid matrix
(blood, lymph)

* Connective tissue proper

Having Jelly-like matrix; 6 types

① Areolar (Loose) C.T

Contains all types of C.T cells and fibers - matrix: extensive with cavities

Sites: under epithelia, subserous, around blood vessels

function: connect and support other tissues like epithelium, blood elements and nerves

* Fibrous Connective tissues

Contains: fibroblasts and collagenous fibers
matrix: scars

types, sites: ① Regular: having regular collagen bundles ② Irregular: with irregular collagen bundles

* Elastic connective tissue

Contains: fibroblasts and elastic fibers
matrix: little

found: in arteries and large vessels

* Mucous Connective tissue

Contains: large stellate-shaped fibroblasts with some collagen fibers

Protects adjacent structures from pressure

* Adipose connective tissue

Contains: a large number of fat cells forming lobules separated by C.T. septa of collagenous and elastic fibers. It may be white or Brown and (generating Heat)

* Reticular connective tissue:

Contains: reticular cells and bundles of thin sites: around liver sinusoids, lymphatic organ

function: Supportive in its sites.

* Skeletal Connective tissue:

* Specialized types of C.T

* matrix of cartilage of semi-solid

* matrix of bone is solid

* Cartilage: **matrix**: composed of amorphous ground substance and TYPE II collagen fibrils stains deeply basophilic

* Perichondrium

* Chondrocytes

* chondrogenic

* Histophysiology

[2] Bone: **matrix**: organic portion is composed of about 95% Type I collagen and amorphous substance

* Contains chondroitin 4-sulfate, Chondroitin 6-sulfate and Keratan sulfate

* **Blood**: is a unique form of connective tissue which a fluid matrix

RBCs

Number: 4,5 to 5,5 m^3 blood, they are of one Type

Not true cells

they have no nuclei and no cell

they have no movement

diameter: 7,5 μ

contain Hb

They develop in red bone marrow

Life span: about 4 months

WBCs

Number: 5000 to 11000 m^3 blood, they are of 5 types

they are true cells

They contain nuclei and cell

Spherical cells

diameter: 8-18 μ

having no Hb

Lymphatic tissue

Life span: from few days to years

* **Plasma**: It is the fluid matrix of blood and composed of 90% water and the remaining 10% comprises inorganic and organic constituents

[3] **muscular tissue**

* They are characterized by:

- ① Arise from mesoderm
- ② from the muscles of the body
- ③ They are formed of an elongated cells
- ④ The Plasma membrane of muscle fibre is called **Sarcolemma**

* the muscles of the body 3 Types

unstriated muscles	striated muscles	cardiac muscles
Their contraction produces peristaltic movement to drive the food along the digestive tract They are elongated and pointed at both ends	show transverse striations Responsible for the movement of the limbs, head They are cylindrical bounded by sarcolemma contain large number of nuclei without partitions	show fainter striations. characterized by their rhythmic contractions producing heart beats. connect together forming a network structure, bounded by sarcolemma

* Nervous tissue

* Characteristics :

- ① Ectodermal in origin
- ② Their cells are adapted to receive and transmit stimuli
- ③ Their mature cells are ~~adapted~~ do not divide again.
- ④ Constitute what is called as nervous system
- ⑤ Structurally, nerve cells and glial cells (several types)

* Neurons :

* the functional and specialized cells of the NS

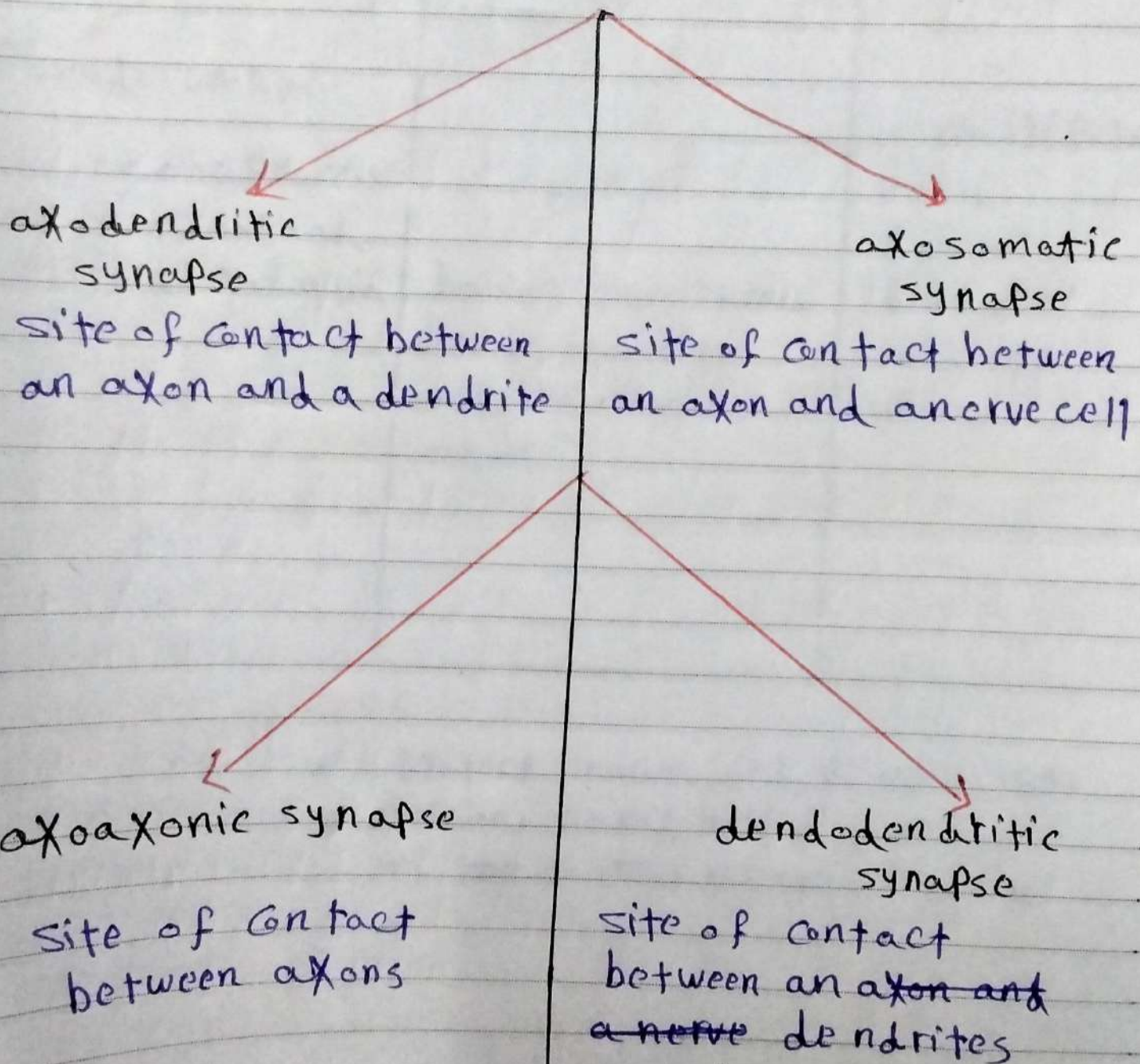
* A neuron structure: is formed of : cell body and processes

* **cell body** → contains the cell's nucleus

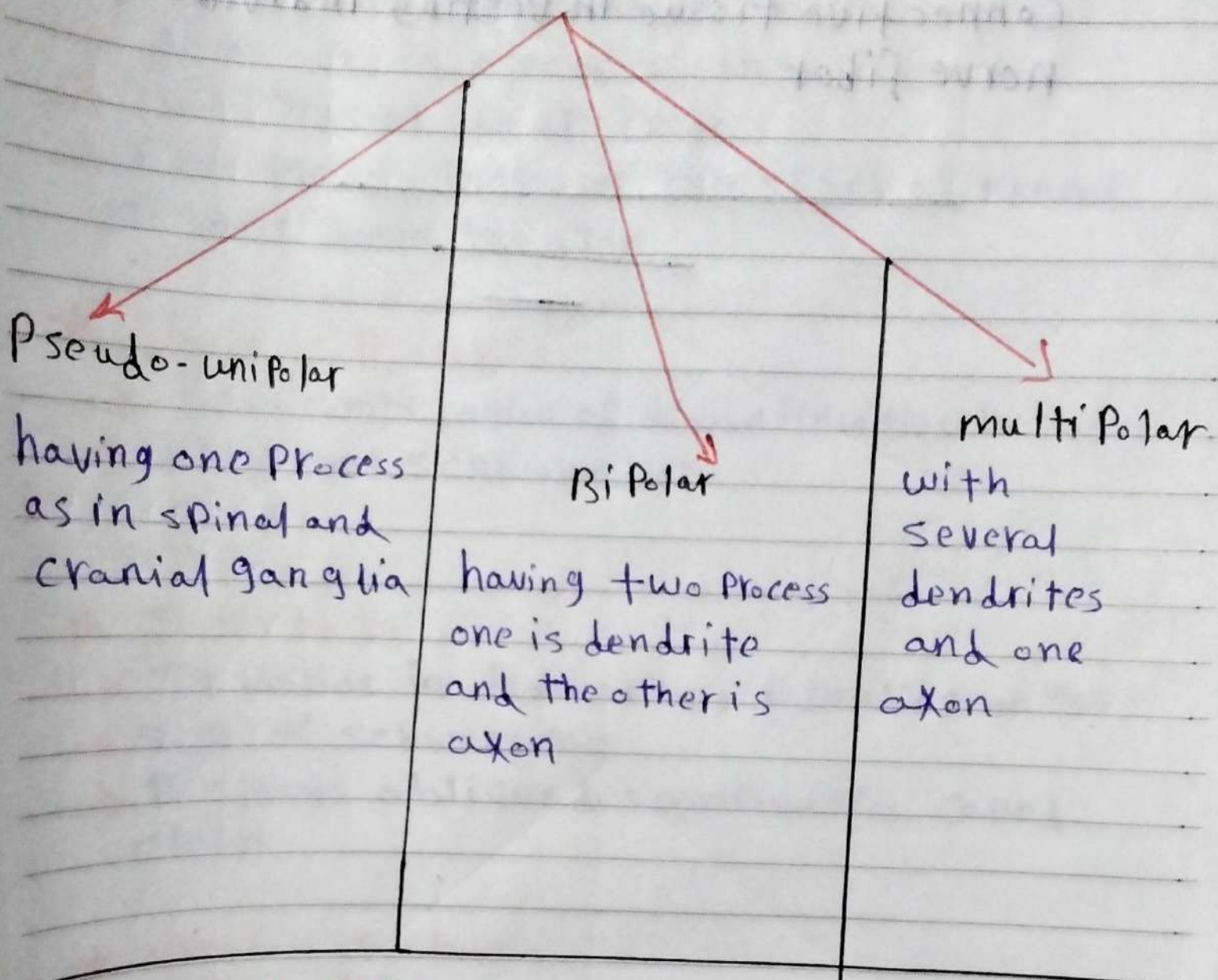
- ⇒ contains DNA
- ⇒ Control Protein
- ⇒ contains Nissle granules
- ⇒ No centrioles

- ★ **Axons:** the cell's output structure
 - one axon per cell, 2 distinct parts
 - ⇒ branches at end.

★ **Synapse:** axon terminals contain small storage sacs called synaptic vesicles



* **Types of neurons:** according to the number of cell Processes



* **Glial Cells:**

Support and protect neurons and Participate
in neural nutrition, neural activity and
dense Process of the central nervous system

* Myelin sheath

- ⇒ white fatty coating on axon
- ⇒ Acts as an electrical insulator
- ⇒ Not present on all cells
- ⇒ when present increases the speed of neural signals down the axon

* Node of Ranvier

- ⇒ Represents region of discontinuities between
- ⇒ adjacent Schwann cells

* Internode

- ⇒ It varies in dimension, depending on the
- ⇒ size of Schwann cell
- ⇒ Displays oblique discontinuities called clefts

* Nerve structure:

- [1] Epineurium: the outer layer of dense connective tissue surrounding bundles of nerve fibers.
- [2] Perineurium: consists of layers of epithelial cells that are joined by tight junctions
function: as a barrier to most macromolecules

3 Endoneurium: A thin layer of
Connective tissue investing individual
nerve fiber

