

5a A&P:

Introduction to the Human Body - Cells





5a A&P:

Introduction to the Human Body - Cells Class Outline

5 minutes	Attendance, Breath of Arrival, and Reminders
10 minutes	Lecture: AOIs of the erectors
5 minutes	Active study skills for AOIs of new muscles
25 minutes	Lecture:
15 minutes	Active study skills:
60 minutes	Total

5a A&P:

Introduction to the Human Body - Cells Class Reminders

Assignments:

- 5a ABMP Exam Coach
- 7a Review Questions (A: 119-130)

Quizzes and Written Exams:

- 5b Kinesiology Quiz (A: 73, and 75-80) **Quiz given at the start of the B class!!**
 - AOIs of deltoid, traps, lats, teres major, triceps, rhomboids, and erectors
 - Also definitions on A-51: anterior, posterior, lateral, medial, belly, tendon, action, origin, and insertion

Preparation for upcoming classes:

- 6a A&P: Introduction to the Human Body - Tissues
 - Trail Guide: gluteals
 - Salvo: pages 391-398
 - Packet E: 7-10
 - RQ Packet A-129
- 6b Swedish: Technique Review and Practice - Posterior Upper Body
 - Packet F: 29-30



Classroom Rules

Punctuality - everybody's time is precious

- Be ready to learn at the start of class; we'll have you out of here on time
- Tardiness: arriving late, returning late after breaks, leaving during class, leaving early

The following are not allowed:

- Bare feet
- Side talking
- Lying down
- Inappropriate clothing
- Food or drink except water
- Phones that are visible in the classroom, bathrooms, or internship

You will receive one verbal warning, then you'll have to leave the room.

Classroom Rules

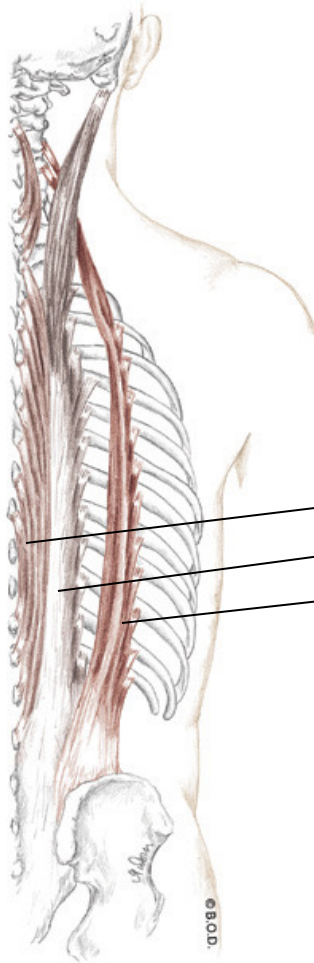
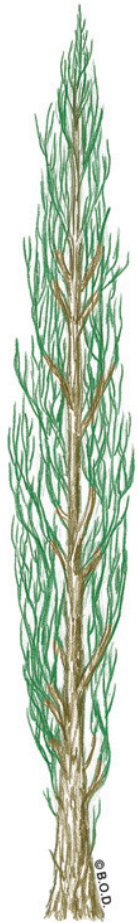
Cell Phones – Turn it off!



And put it away!

Erector Spinae Group

Trail Guide, Page 196



The erector spinae group runs from the sacrum to the occiput.

Erectors have a dense, layered arrangement similar to that of a poplar tree.

The erector group consists of the:

- Spinalis
- Longissimus
- Iliocostalis

When do you use your erectors?

Posterior View

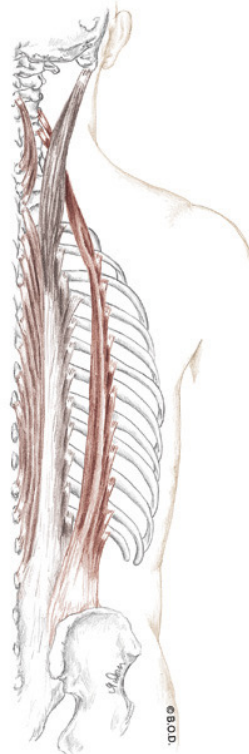
Actions of the erector spinae group



Lateral flexion of the vertebral column to the same side



Extension of the vertebral column



Erector spinae group
Posterior View

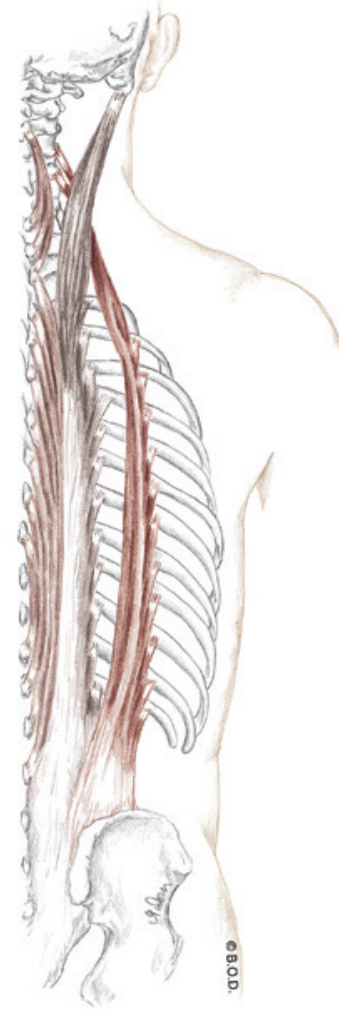
Spinalis, page 197

A *Unilaterally:*
Laterally flex vertebral column to the same side

Bilaterally:
Extend the vertebral column

O Spinous processes of:
C7 vertebrae
Upper lumbar vertebrae
Lower thoracic vertebrae
Ligamentum nuchae

I Spinous processes of:
Upper thoracic vertebrae
Cervical vertebrae



Posterior View

Spinalis, page 197

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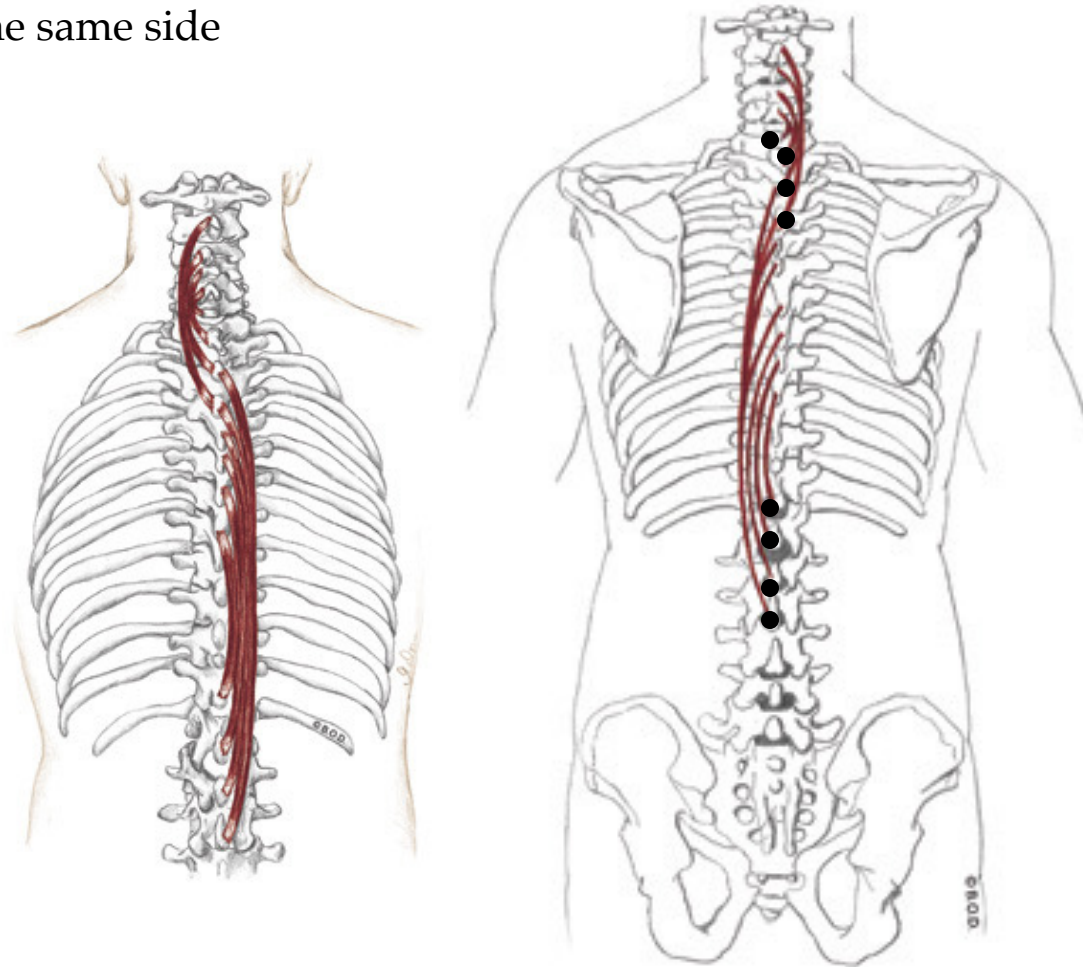
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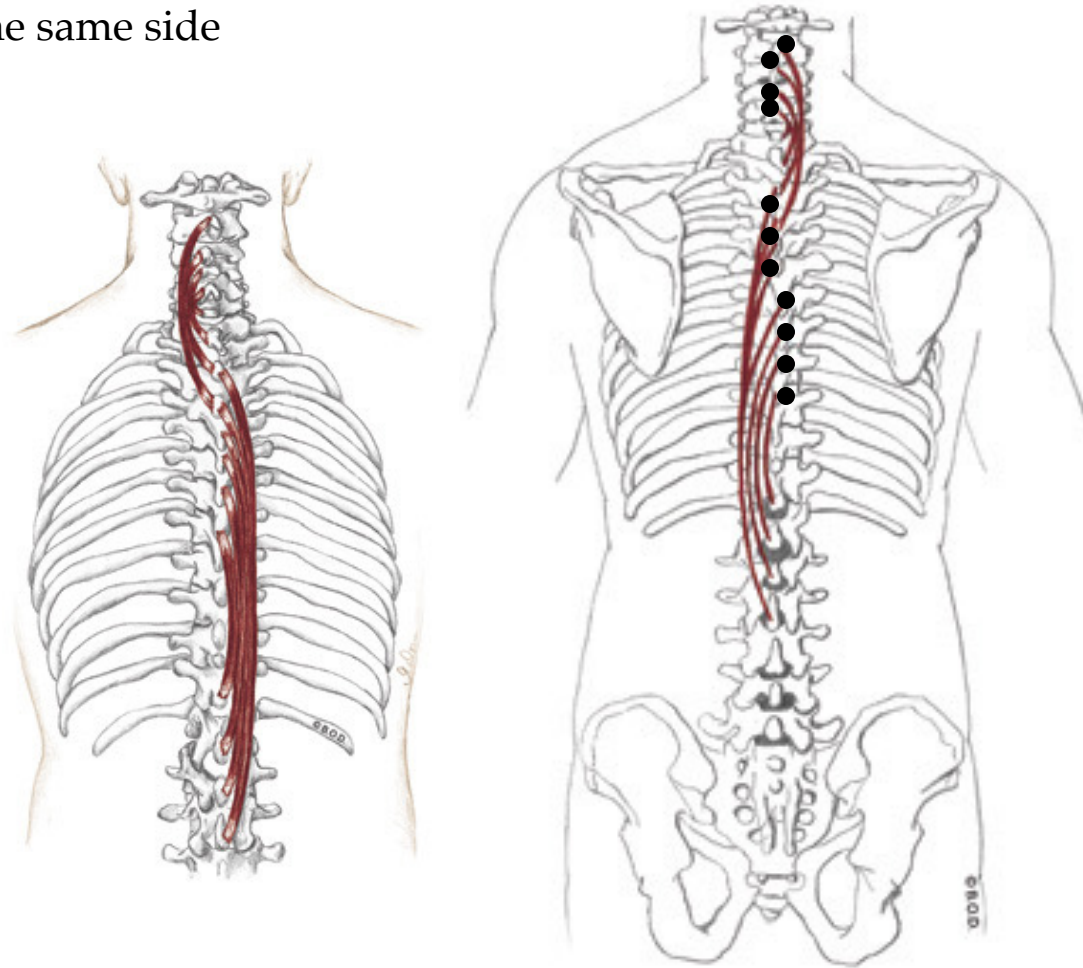
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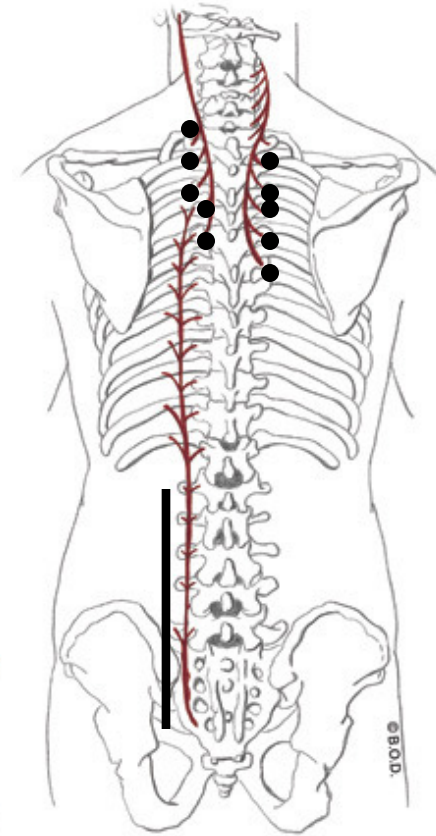
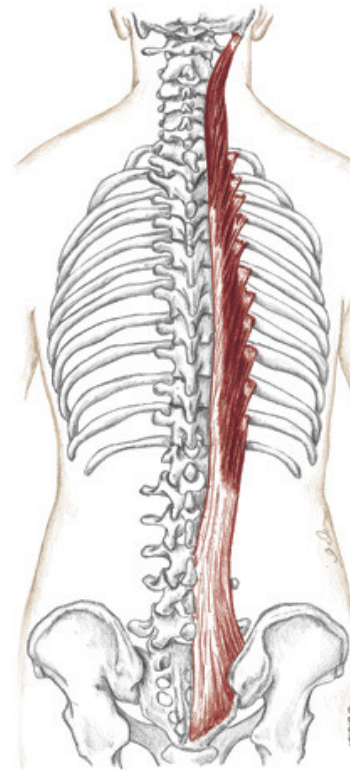
Longissimus, page 198

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Bilaterally:
Extend the vertebral column

O Common tendon (thoracis)
Transverse processes of upper five thoracic
vertebrae (cervicis and capitis)

I Lower nine thoracic ribs (thoracis)
Lower nine thoracic transverse processes (thoracis)
Cervical transverse processes (cervicis)
Mastoid process of temporal bone (capitis)



Posterior View

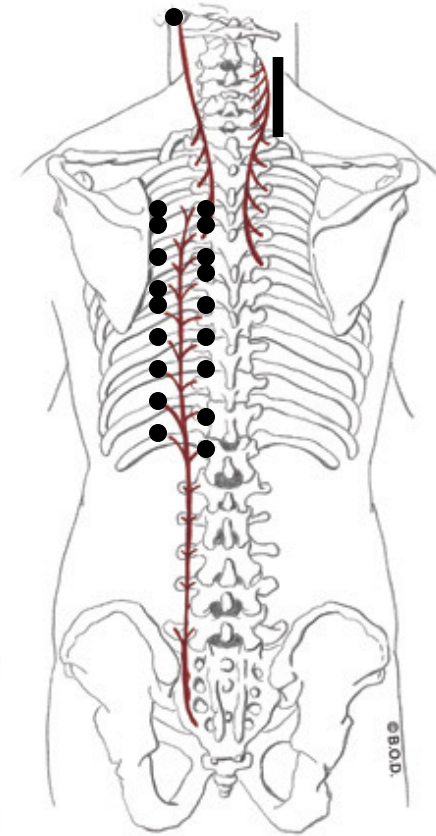
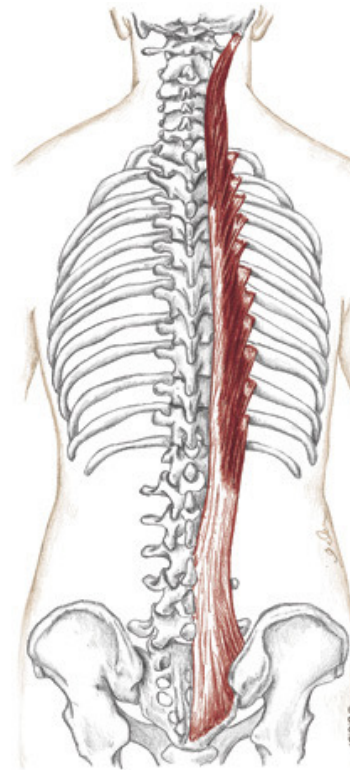
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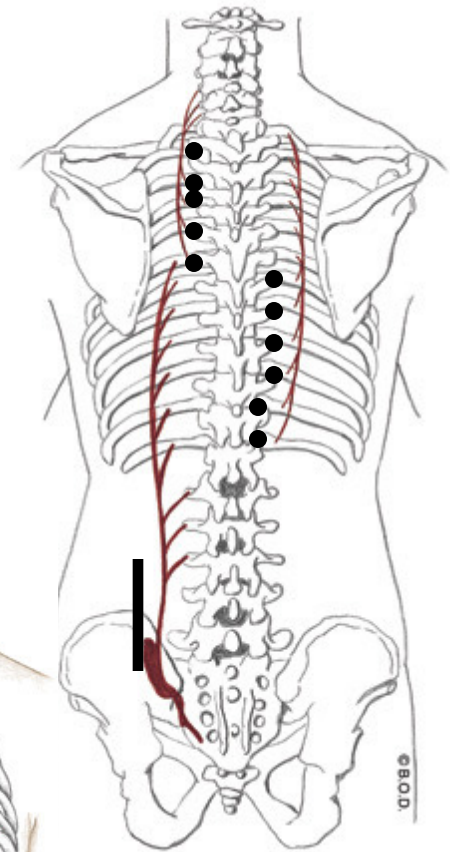
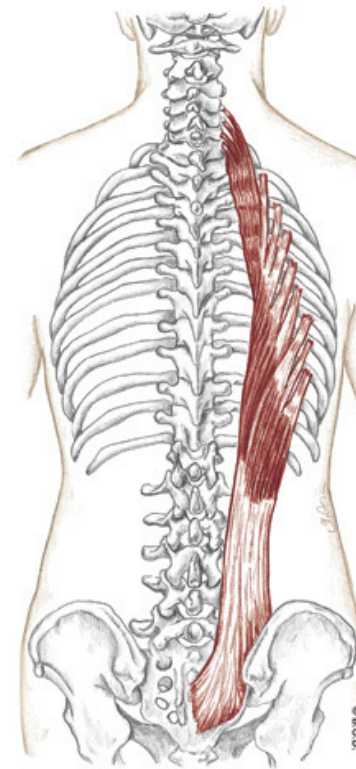
Iliocostalis, page 198

A *Unilaterally:*
Laterally flex vertebral column to the same side

Bilaterally:
Extend the vertebral column

O Common tendon (lumborum)
Posterior surface of ribs 1-12 (thoracis and cervicis)

I Transverse processes of lumbar vertebrae 1-3
(thoracis)
Posterior surface of ribs 6-12 (lumborum)
Posterior surface of ribs 1-6 (thoracis)
Transverse processes of lower cervicals (cervicis)



Posterior View

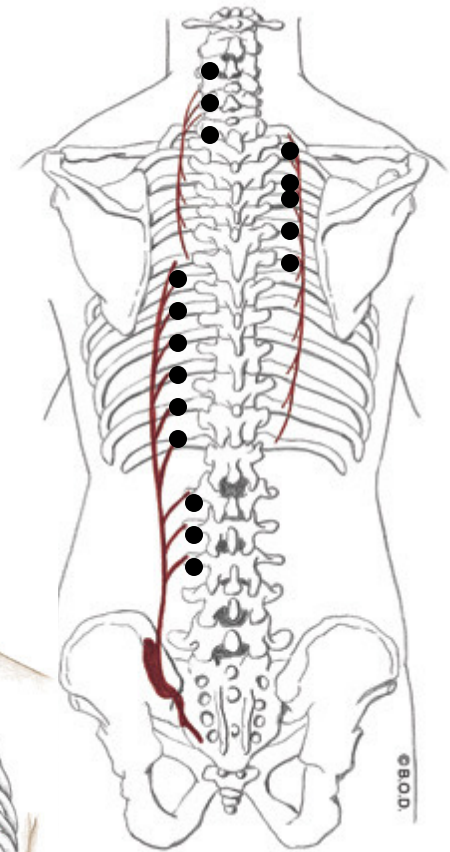
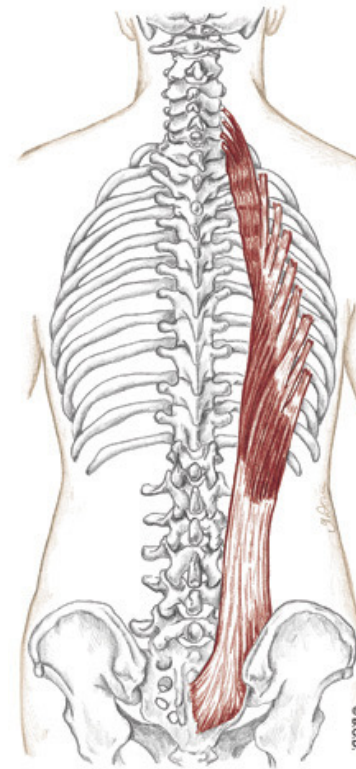
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Posterior View



More Knowledgeable Other

MKO A person who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. Examples: instructors, assistant instructors, and classmates!

Possible subjects

- Anatomy & Physiology
- Business
- Massage
- Et cetera . . .

5a A&P:
Introduction to the Human Body - Cells
E-3

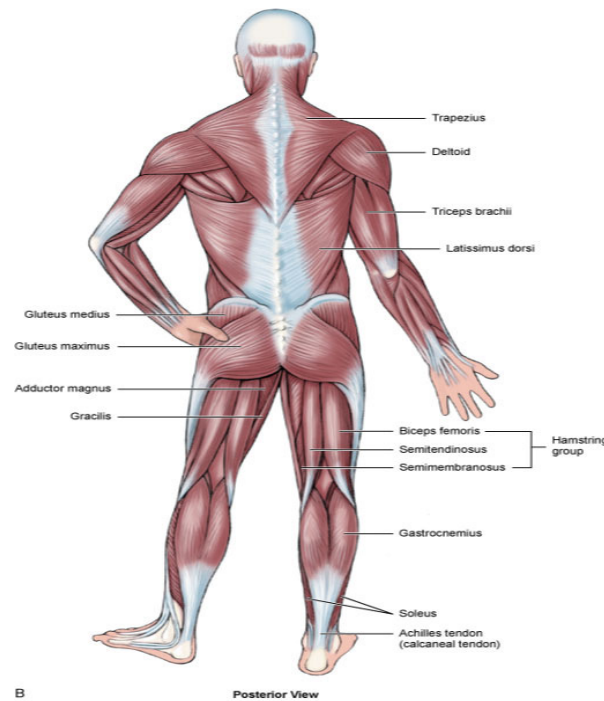




Anatomy and Physiology

Anatomy and Physiology

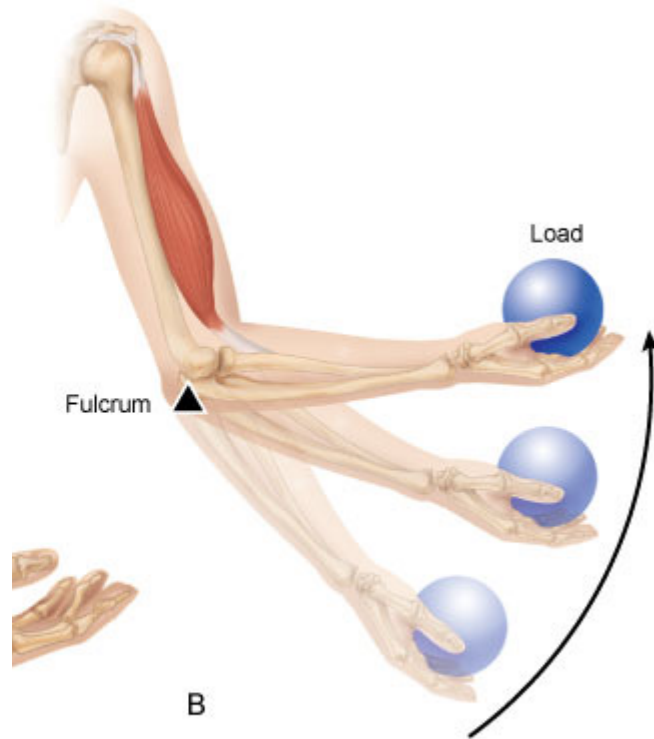
Anatomy The study of the structures of the human body and their positional relationship to one another.



B
Posterior View
From Herlihy B: *The human body in health and illness*, ed 4, St. Louis, 2011, Saunders.
Fig. 21-41. **cont'd.**

Anatomy and Physiology

Physiology The study of how the body and its individual parts function in normal body processes.





Anatomy and Physiology

Pathology (AKA: pathophysiology) The study of the process of disease.



Fill in the Blanks

1. Anatomy = _____.

2. Physiology = _____.

3. Pathology = _____.



Fill in the Blanks

1. Anatomy = structure.

2. Physiology = function.

3. Pathology = disease.



Terminology

Vocabulary Builder: Prefixes

<u>PREFIX</u>	<u>MEANING</u>	<u>EXAMPLE</u>
Cyto-	cell	cytoplasm
Endo-	within, inside	endocytosis
Trans-	across, over, beyond, through	transcytosis



Levels of Organization

Chemical level

Cellular level

Tissue level

Organ level

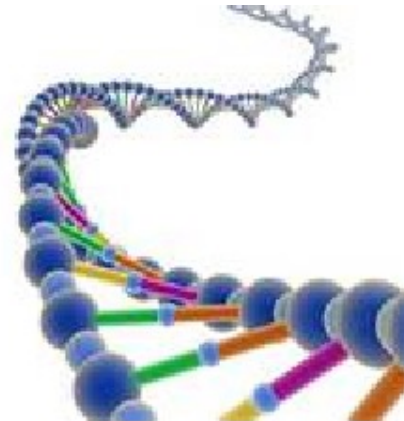
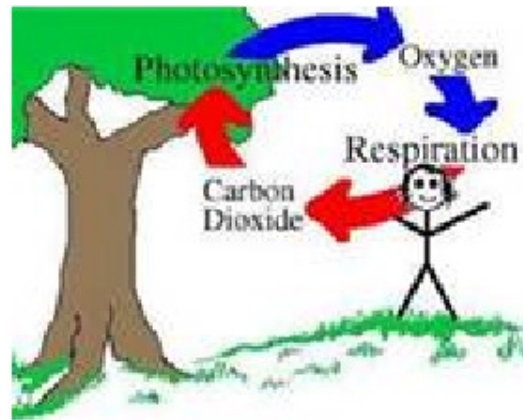
Organ System level

Organism level

Levels of Organization

Chemical level Chemical elements that make up the body.

Examples: *water, oxygen, iron, and DNA.*



Levels of Organization

Cellular level Cells are composed of organelles. Perform functions vital to life.

Examples: skins cells, blood cells, muscle cells, and nerve cells.

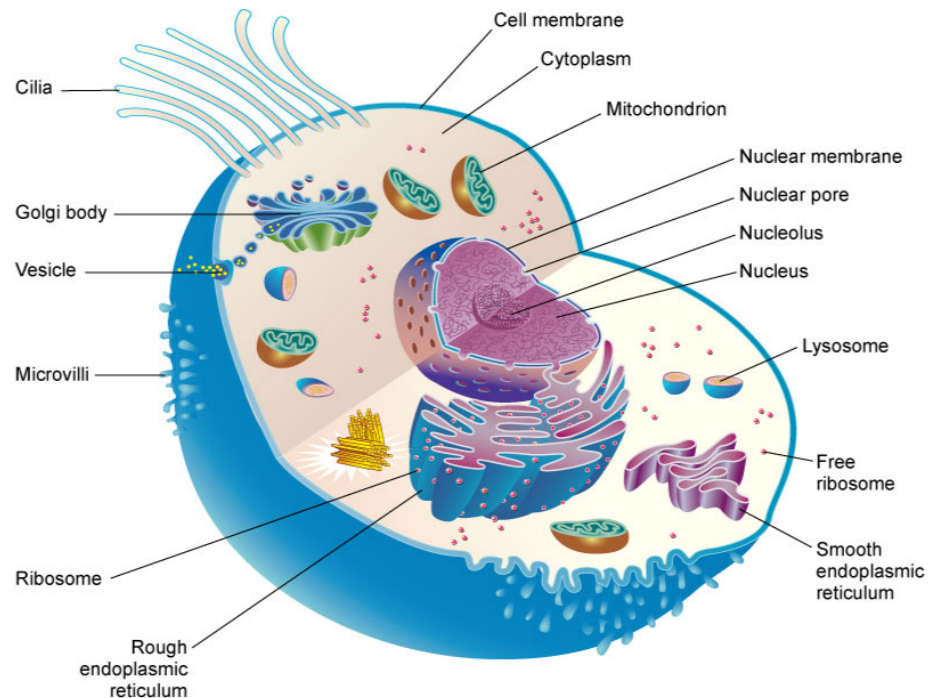
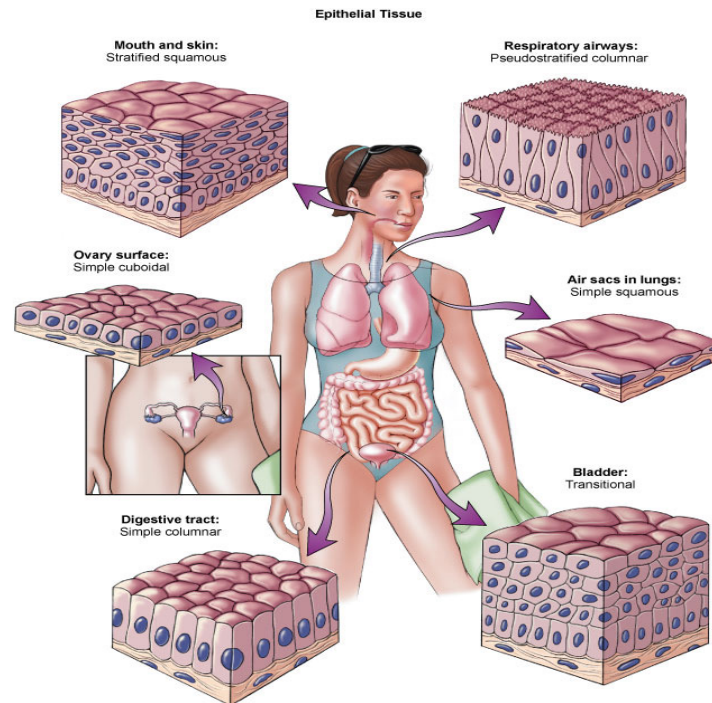


Fig. 18-2. A cell.

Levels of Organization

Tissue level Group of cells that perform specific functions.

Examples: *epithelial*, connective, muscle, and nervous.



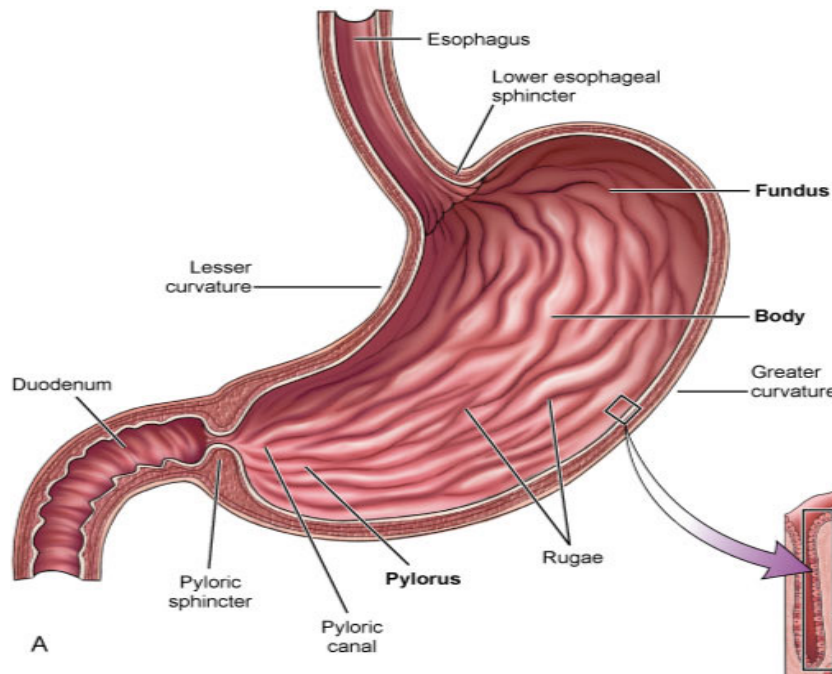
From Herlitz B: *The human body in health and illness*, ed 4, St. Louis, 2011, Mosby.

Fig. 18-9. Types of locations of epithelium.

Levels of Organization

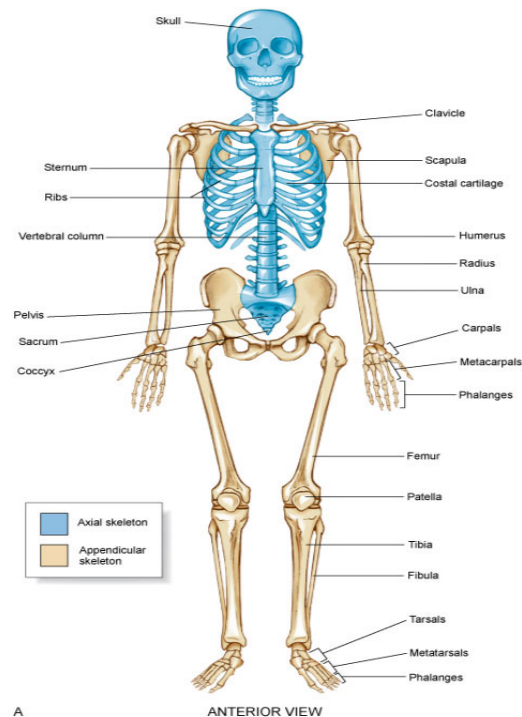
Organ level Two or more specialized groups of tissues, with specific functions.

Examples: *stomach*, brain, and lungs.



Levels of Organization

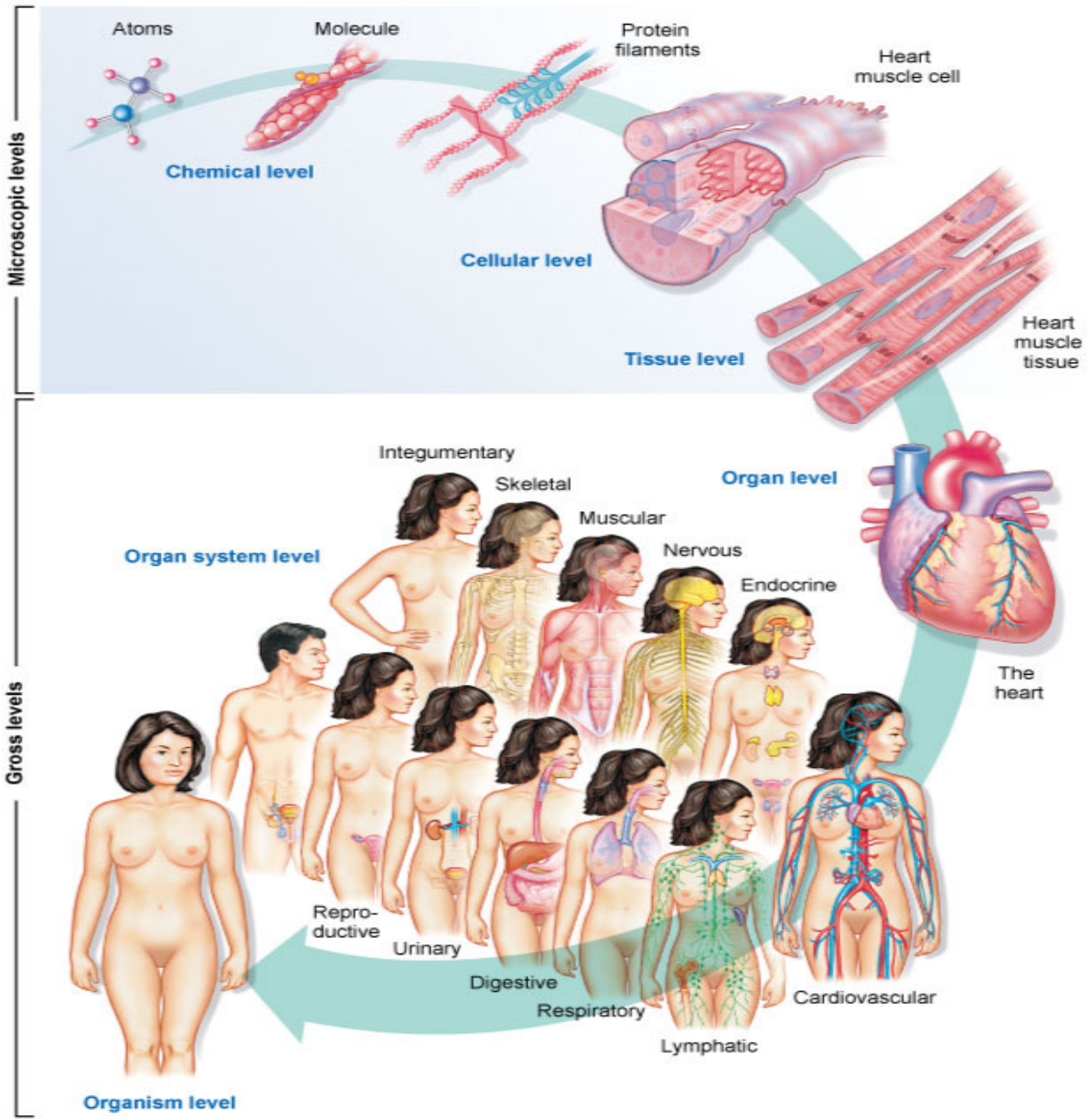
Organ system level Related organs with complementary functions arrange themselves into organ systems that can perform certain necessary tasks. Examples: skeletal, muscular, cardiovascular, and lymphatic.





Levels of Organization

Organism level Highest level of organization, representing living entities composed of several organ systems. The total of all structures and functions is a living individual.



Response Moment



House (organism level)

Response Moment

Rooms (organ system level)

House (organism level)



Response Moment

Walls (organ level)

Rooms (organ system level)

House (organism level)



Response Moment

Wood and nails (tissue level)

Walls (organ level)

Rooms (organ system level)

House (organism level)



Response Moment

Cellulose and steel (cellular level)

Wood and nails (tissue level)

Walls (organ level)

Rooms (organ system level)

House (organism level)



Response Moment

Carbon, hydrogen, oxygen, and iron
(chemical level)

Cellulose and steel (cellular level)

Wood and nails (tissue level)

Walls (organ level)

Rooms (organ system level)

House (organism level)





Fill in the Blanks

1. Chemical elements = _____ level
2. Perform functions vital to life = _____ level
3. Groups of cells = _____ level
4. Groups of tissues = _____ level
5. Related organs = organ _____ level
6. Highest level of organization = _____ level



Fill in the Blanks

1. Chemical elements = chemical level
2. Perform functions vital to life = cellular level
3. Groups of cells = tissue level
4. Groups of tissues = organ level
5. Related organs = organ system level
6. Highest level of organization = organism level



Cell Anatomy

Cell

Cell membrane

Cytoplasm

Organelle

Cell Anatomy

Cell Fundamental unit of all living organisms and the simplest form of life, that can exist as a self-sustaining unit.

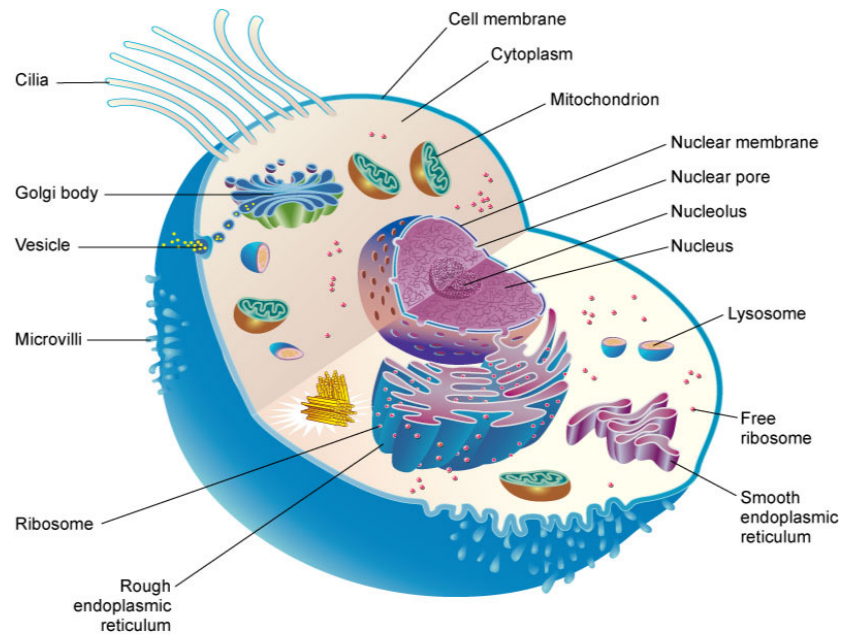


Fig. 18-2. A cell.

Cell Anatomy

Cell membrane Semi-permeable membrane that separates cytoplasm from the surrounding external environment. Governs exchange of nutrients and waste materials.

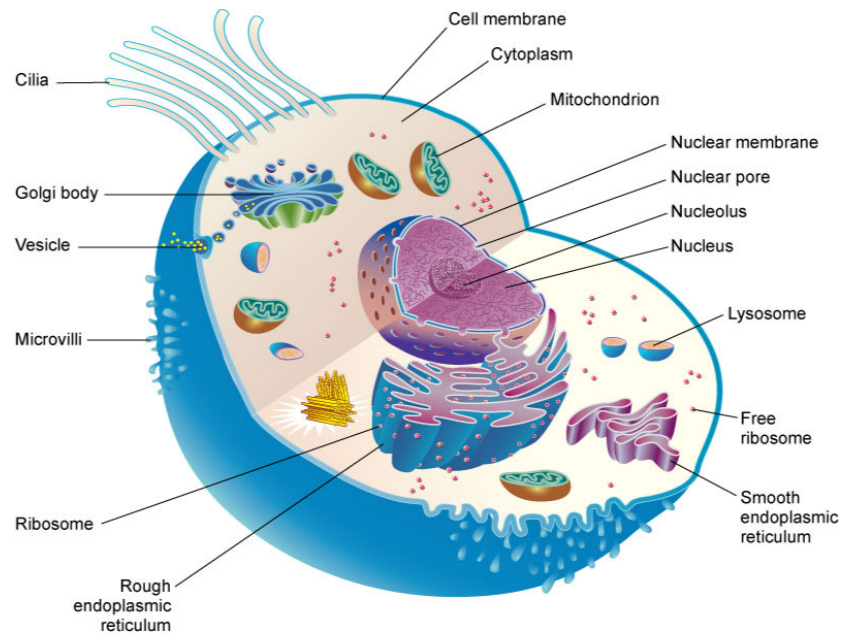


Fig. 18-2. A cell.

Cell Anatomy

Cytoplasm Gel-like fluid within the cell membrane in which organelles float.

Provides cellular nutrition and supports organelles.

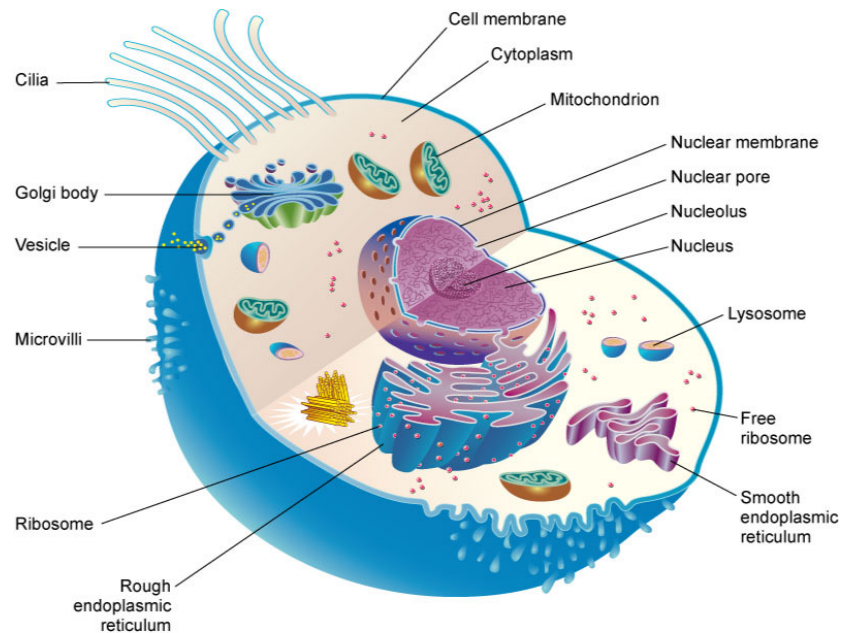


Fig. 18-2. A cell.

Cell Anatomy

Organelle Cellular structures that possess distinct structures and functions.
The organs of a cell.

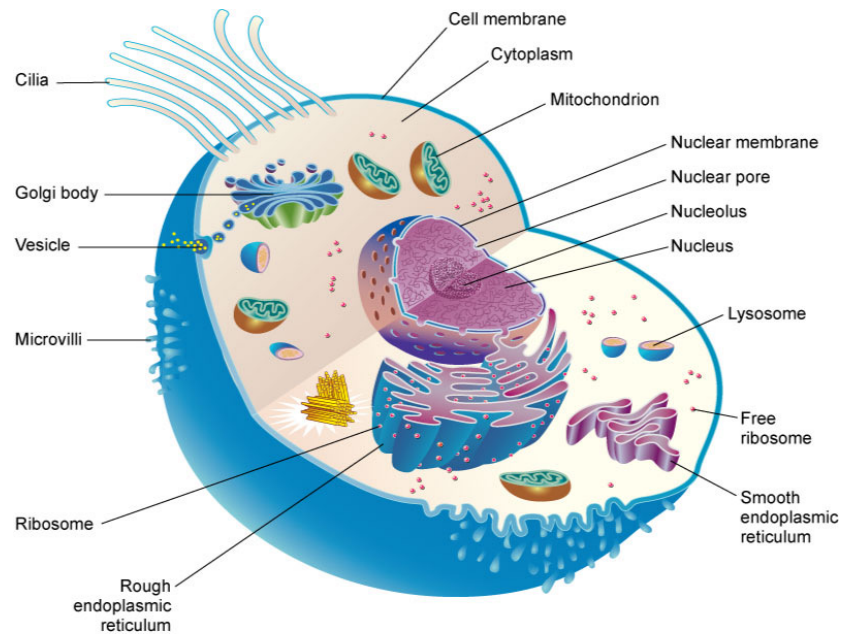


Fig. 18-2. A cell.

Let's draw what we know!

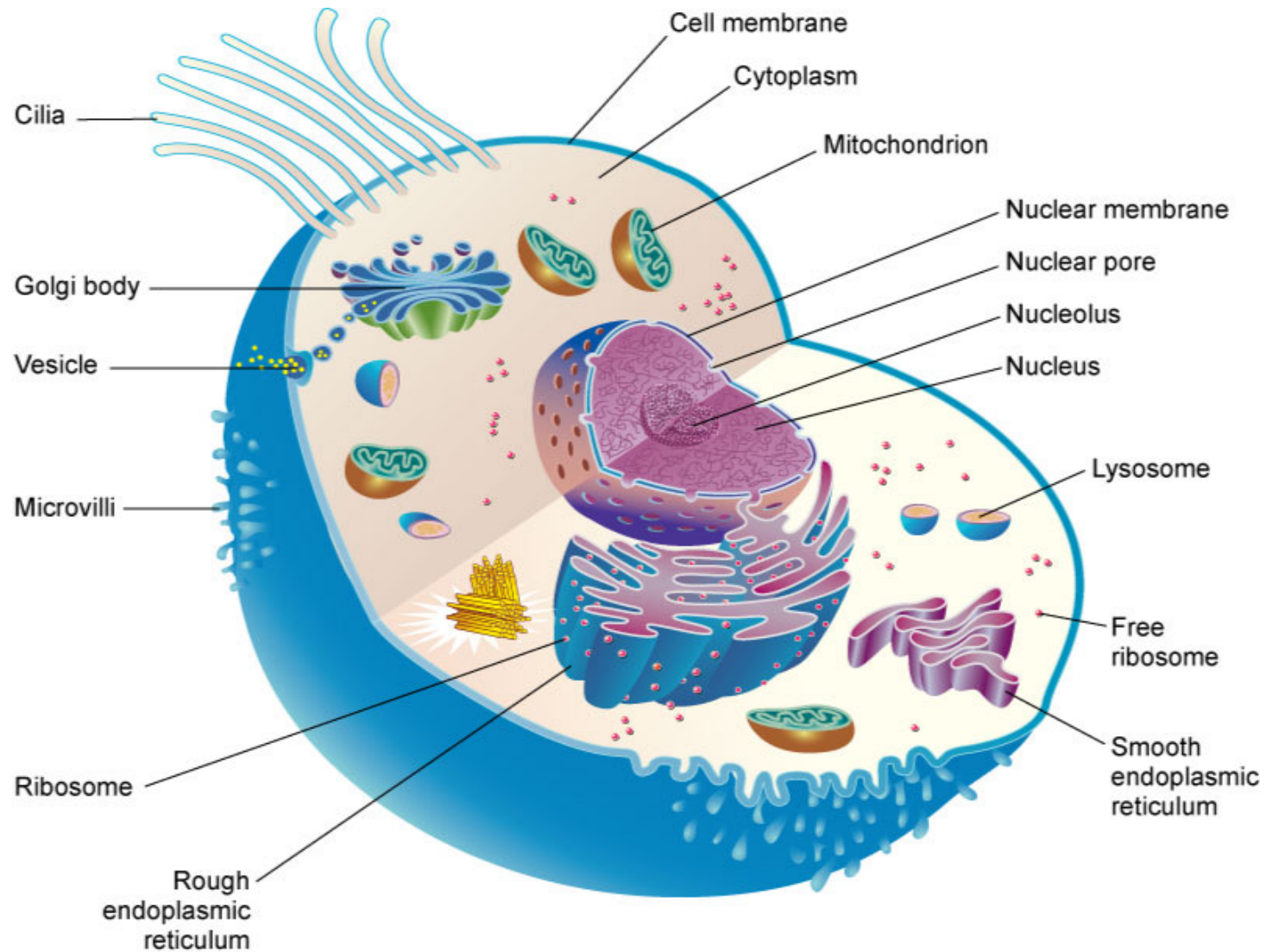


Fig. 18-2. A cell.



Cell Anatomy

Nucleus Control center of the cell. Directs nearly all metabolic activities. Contains DNA and RNA.



Cell Anatomy

Ribosome Synthesizes proteins.



Cell Anatomy

Mitochondrion (p. mitochondria) “Power plant” of the cell.

Responsible for cellular respiration. Provides most of the cell's ATP.



Cell Anatomy

Lysosome Engulfs and digests bacteria, cellular debris and other organelles.

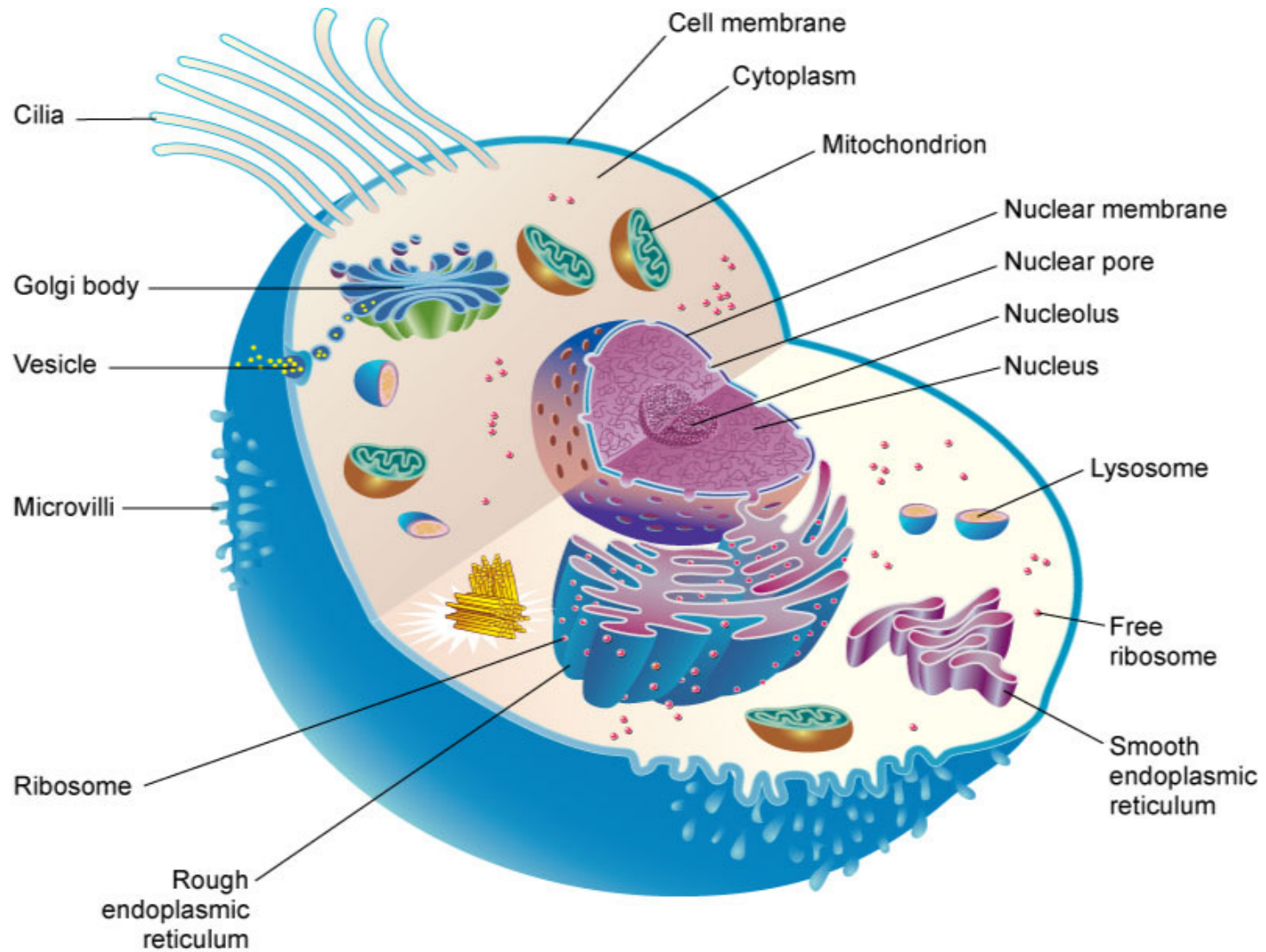


Fig. 18-2. A cell.



Fill in the Blanks

1. Nucleus = _____center
2. Ribosome = synthesizes _____.
3. Mitochondrion = _____plant
4. Lysosome = engulf and _____.



Fill in the Blanks

1. Nucleus = control center
2. Ribosome = synthesizes proteins.
3. Mitochondrion = power plant
4. Lysosome = engulf and digest.



Cell Physiology

Adenosine triphosphate

Passive cell process

Active cell process



Cell Physiology

Adenosine triphosphate (AKA: ATP) The body's energy storage molecule.



Cell Physiology

Passive cell process

- Diffusion

- Filtration

- Osmosis

Active cell process

- Active transport pumps

- Active transport vesicles

Cell Physiology

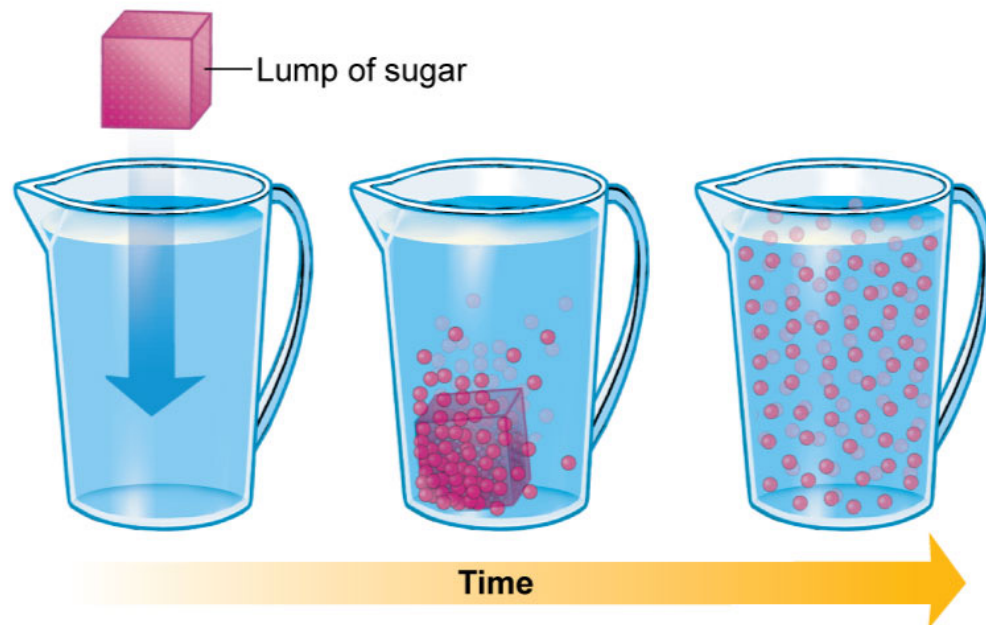
Passive cell process Movement of substances across the cell membrane by means of pressure and concentration without the expenditure of ATP.

Types: diffusion, filtration, and osmosis.



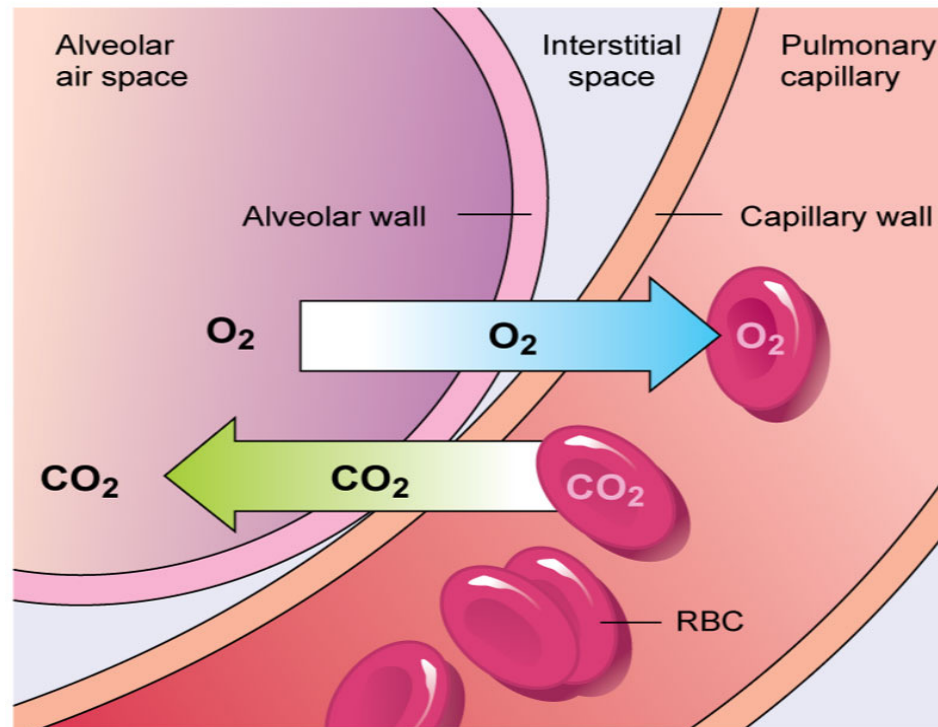
Cell Physiology

Diffusion Movement of molecules from an area of higher concentration to an area of lower concentration, a process that continues until the distribution of particulates is equal in all areas.



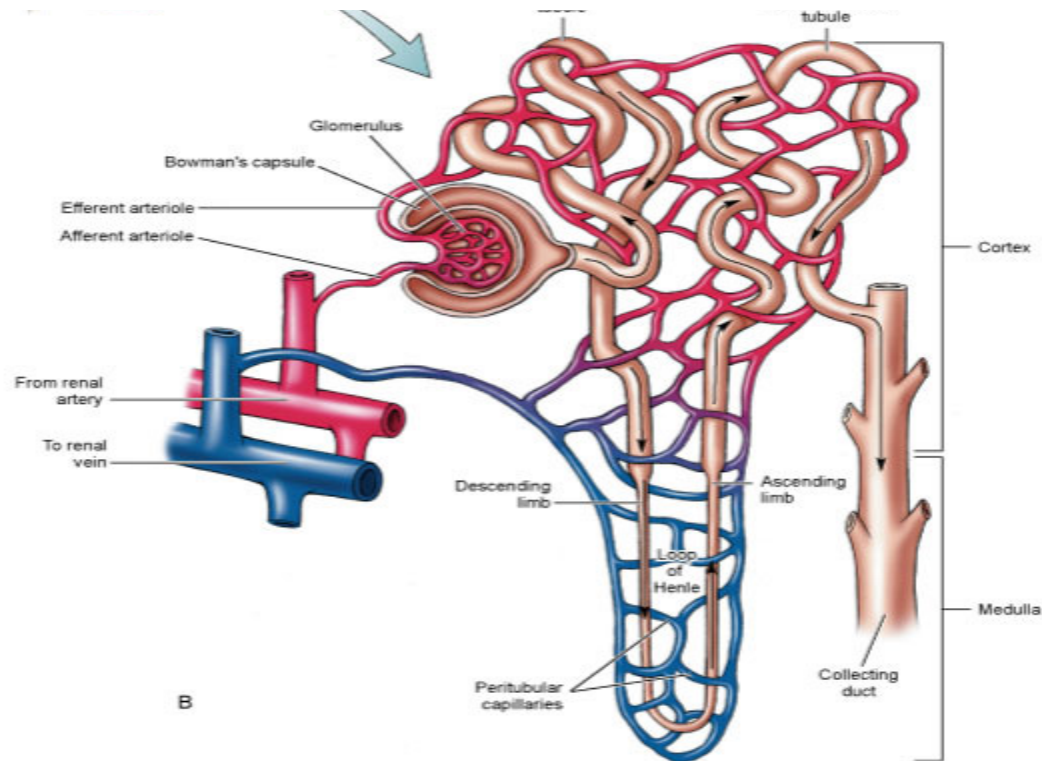
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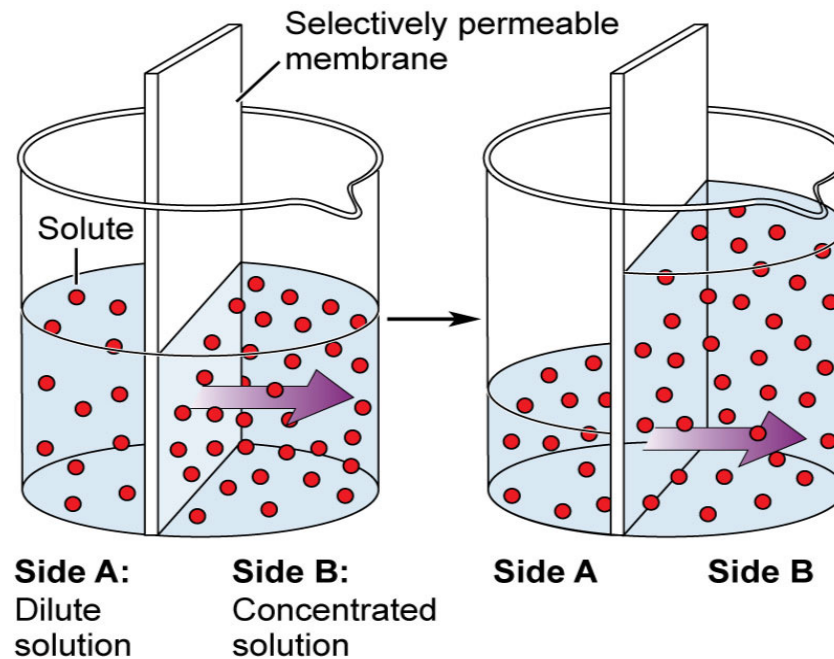
Cell Physiology

Filtration Movement of particulates across the cellular membrane as a result of pressure.



Cell Physiology

Osmosis Movement of a pure solvent such as water from an area of low concentration (most dilute) to an area of high concentration (least dilute). Movement continues until the two concentrations are equal.





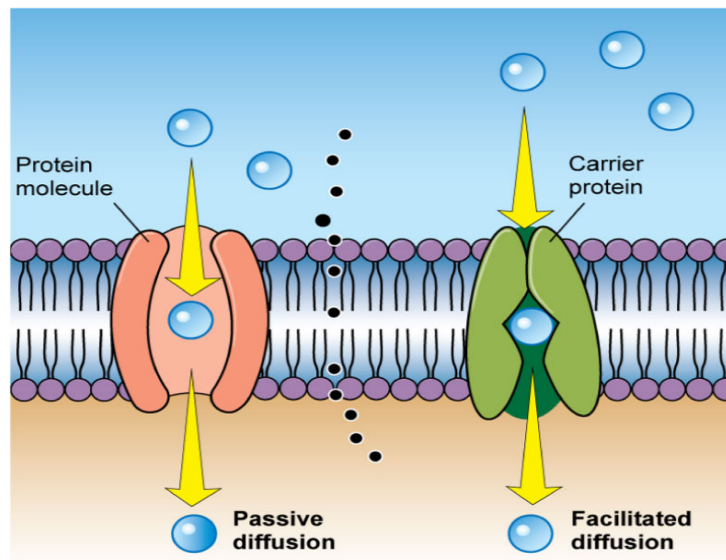
Cell Physiology

Active cell process Movement of substances across the cell membrane that requires the expenditure of ATP.



Cell Physiology

Active transport pumps Carrier proteins that are part of a cell membrane attract charged particles (ions) and move them from one side of the cell membrane to the other. Example: sodium-potassium pump used during nerve conduction.





Cell Physiology

Active transport vesicles Small spherical sacs that transport various substances within a cell, as well as import and export materials into and out of the cell.



Cell Physiology

Phagocytosis Process by which specialized cells ingest harmful microorganisms and cellular debris, break them down, and expel the harmless remains back into the body.

Pinocytosis Process by which specialized cells engulf liquids and draw them into the cell.



Compare and Contrast

Passive Cell Process

- Movement across cell membrane
- Free
- Diffusion
- Filtration
- Osmosis

Active Cell Process

- Movement across cell membrane
- Costs ATP
- Phagocytosis
- Pinocytosis



Cellular Metabolism

Metabolism

Anabolism

Catabolism



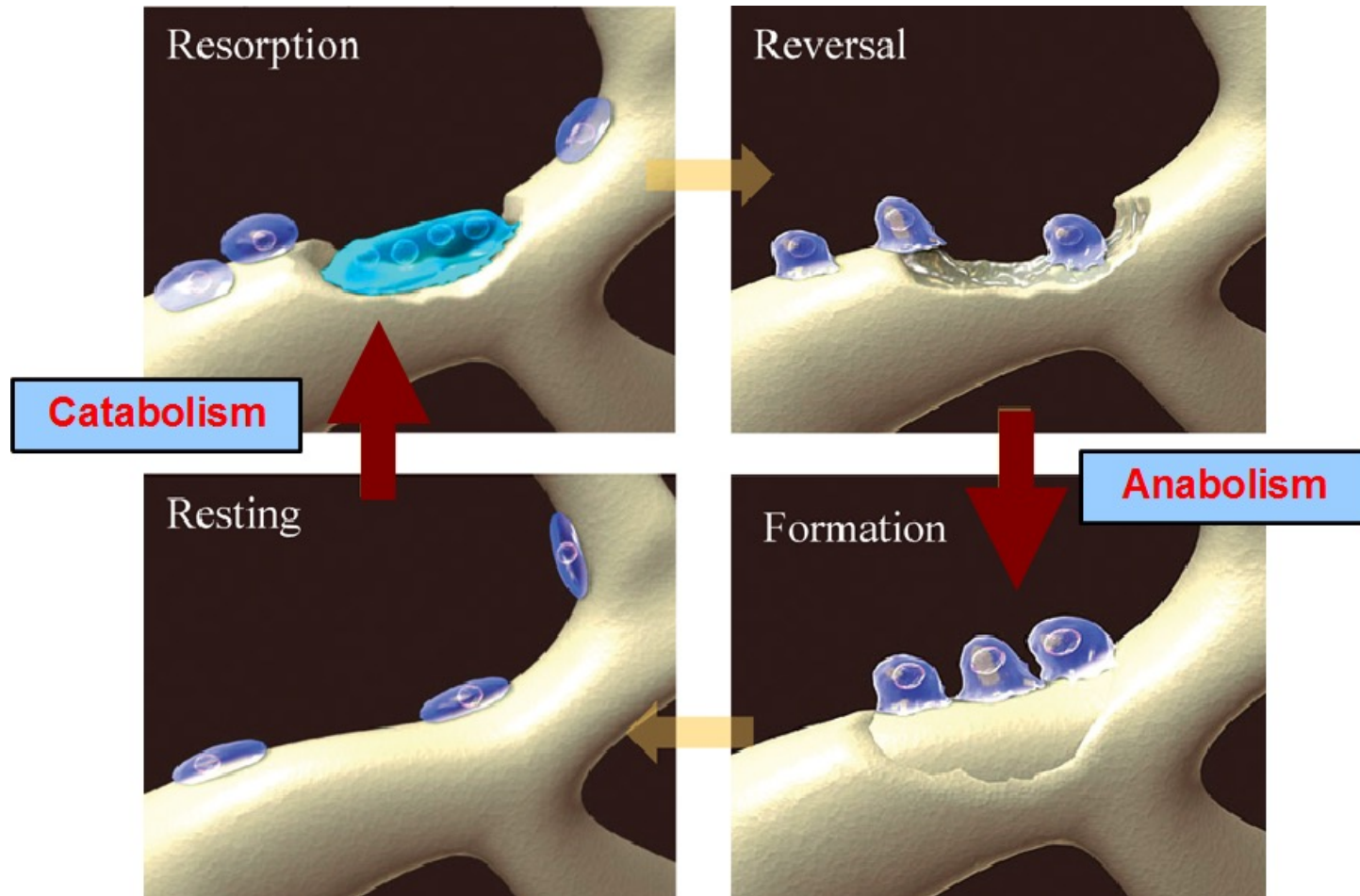
Cellular Metabolism

Metabolism The total of all physical and chemical processes that occur in an organism. Examples:

Anabolism The constructive phase of metabolism in which smaller, simpler molecules are built up into larger molecules.

Catabolism The destructive phase of metabolism in which larger, more complex molecules are converted to smaller, simpler molecules.

Anabolism is constructive
Catabolism is destructive



Catapults are destructive and so is Catabolism



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