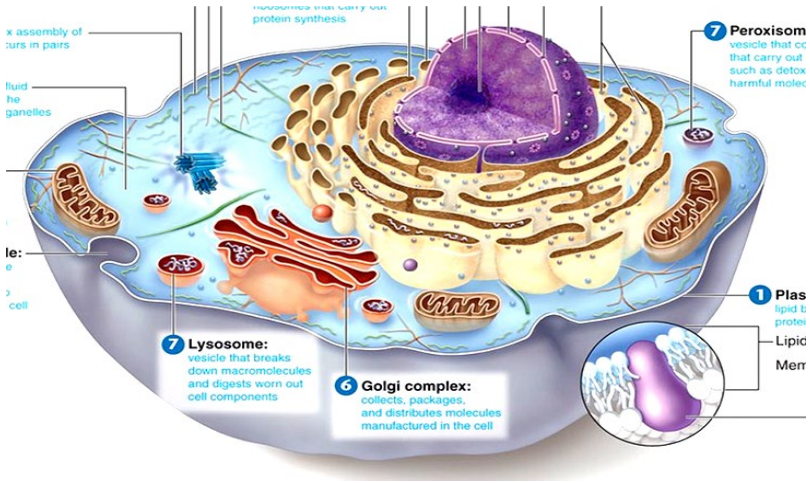
សាកលវិទ្យាល័យ ពុទ្ធិសាស្ត្រ
UNIVERSITY OF PUTHISASTRA
គោរពខ្លួនឯង Honor Self
គោរពអ្នកដទៃ Respect Others
អភិវឌ្ឍសង្គម Develop Society

Introduction

Anatomy & Physiology of Cell, Tissue, Fluid and Electrolyte



អាសយដ្ឋាន: អគារលេខ ៥៥
ផ្លូវលេខ ១៨០ និង១៨៤
ជាប់មជ្ឈមណ្ឌលវប្បធម៌ចាក់ង
សង្កាត់ បឹងកាំង
ខណ្ឌ ដូនពេញ
ក្រុង ភ្នំពេញ

Outline

- Objective
- Expected Output
- Learning Activities
- Course Evaluation
- Examination Method
- Homework /Assignment Model
- Reference

គោលបំណង

នៅចុងបញ្ចប់នៃការបណ្តុះបណ្តាលនេះនិស្សិតនឹងអាចពិព៌ណនាបានអំពី:

- កាយវិភាគវិទ្យា និងសរីរៈវិទ្យានៃកោសិកា ជាលិកា
- រចនាសម្ព័ន្ធ និង មុខងារនៃជាលិកានិមួយៗ
- សរីរៈវិទ្យានៃសារធាតុរាវ និងអេឡិចត្រូលីត្រ
- ស្ថានភាពអាស៊ីត បាសនៅក្នុងខ្លួនមនុស្ស

លទ្ធផលរំពឹងទុក

Expected Output

…???

សប្តាហ៍ Week	កាលបរិច្ឆេទ Date	Content (Write a full description of each weeks lesson below)	ចំនួនម៉ោង Hours	Related LO `s
ទី1		Introduction of Anatomy & Physiology of Cell, Tissue and Fluid & Electrolyte	1:30H	1,5
ទី2		Anatomy of Cell	1:30H	1,5,6
ទី3		Physiology of Cell	1:30H	1,5,6
ទី4		Cell Reproductive (Mitosis and Meiosis)	1:30H	2,5,6
ទី5		Anatomy & Physiology of Epithelial and Membrane Tissues	1:30H	2,5,6
ទី6		Anatomy & Physiology of Connective Tissue	1:30H	2,5,6
ទី7		Anatomy & Physiology of Muscle Tissue	1:30H	3,5,6
ទី8		Anatomy & Physiology of Nervous Tissue	1:30H	3,5,6
ទី9		Anatomy & Physiology of Fluid & Electrolyte	1:30H	3,5,6
ទី10		Fluid & Electrolyte Balance in Human	1:30H	4,5,6,7

សូមបិទសម្លេងទូរស័ព្ទពេលកំពុងរៀន!

Thank You!

For Switching Off Your Phone

MD to PhD(14Y)

- BM,6y
- MD,8y
- Master,(2y), Specialist(4Y)
- Phd,4y
- Total: 14y, PhD

AND to PhD(10Y)

- ADN,3y+1y: BSN
- BSN=(ADN3y+1y),4y
- Master,2y
- Phd,4y
- Total: 10y, Dr.=PhD of Nursing

Learning activities

វិធីសាស្ត្រជាបន្តបន្ទាប់ខាងក្រោមនេះគឺរៀបចំឡើងសំរាប់វគ្គសិក្សានេះ :

The following methods are designed for the course as following:

- ការធ្វើបទឧទ្ទេសនាមនិងការពិភាក្សា (Lecture and discussion)
- តាមបែបចូលរួម (Participation)
- សំនួរ និងចំលើយ (Question and answer)
- ការប្រលងបញ្ចប់វគ្គ (Final exam)

Course evaluation

ការវាយតំលៃការសិក្សាគឺផ្អែកទៅលើ៖ Course

Evaluation will be based on the following activities:

1-Ongoing Assessment	:	20%
– Homework	:	10%
– Assignment	:	10%
2. Mid-term Exam	:	20%
3. Final Exam	:	60%
	Total:	**100%**

Examination method

ការប្រលងគឺចែកចេញជា:	Examination is divided into:
❖ ចំលើយដោយផ្ទាល់មាត់	Oral answers
❖ ចំលើយដោយការជ្រើសរើស	Multiple choice answers
❖ ការជ្រើសរើសចំលើយត្រូវឬខុស	True and fault answer
❖ ការសរសេរជាចំលើយខ្លី	Writing in short answer

How to be a good lecturer or Prof.

- ផ្តល់នូវអ្វីដែលសិស្សចង់បាន To serve what you want
- ធ្វើឱ្យមេរៀនមានលក្ខណៈងាយស្រួលយល់

  To make things easy to understand
- ឆ្លើយតបទៅនឹងសេចក្តីត្រូវការរបស់សិស្ស-និសិត្ស

  To response to the need of the student
- ត្រូវតែកែសំរួលមេរៀនឱ្យទាន់តាមភាពជឿនលឿនរបស់វិទ្យាសាស្ត្រ

  To have up-to-date and appropriate teaching materials and handouts for students
- ផ្តល់ការគាំទ្រដល់និស្សិតនៅរៀងរាល់ពេលដែលគេត្រូវការ

  To support student whenever needed

- គ្មានសំនួរណាមួយដែលមិនបានការឆ្លុះបង្ហាញនូវភាពអន់របស់សិស្សនោះទេផ្ទុយមកវិញការដែលរៀនហើយគ្មានសំនួរគឺជាការមួយដែលបង្ហាញពីភាពមិនយកចិត្តទុកដាក់

  No question is stupid question instead learning without question is stupid

- ត្រូវធានាថាសិស្សអាចបំពេញវិជ្ជាជីវៈបានក្រោយពីបានបញ្ចប់ការសិក្សា

  To make sure that you can do the job after the school

- ការប្រើល្បិចយកលុយសិស្សគឺជាអំពើថោកទាបបំផុតនៅក្នុងវិជ្ជាជីវៈជាគ្រូឬសាស្ត្រចារ្យ

  Using trick to take bride from student is the most shameful ac in professionl as lecturer of Prof.

I am very happy to answer you questions any time, any where

How to be a good student

- ដាក់ចិត្តដាក់កាយទៅក្នុងកម្មវិធីសិក្សា

  Putting yourself in a study program

- បរិច្ចាកលុយកាក់និងពេលវេលា

  To sacrifice your money, your time

- ត្រូវមកថ្នាក់រៀនឱ្យបានទៀងទាត់តាមកម្មវិធី

  To be in class as schedule

- ត្រូវសួរនូវសំនួរគ្រប់ប្រភេទដែលអ្នកមិនយល់

  To ask, ask, and ask questions

- អ្នកអាចភរអំពីលុយកាក់ឬសញ្ញាបត្រដែលអ្នកមាន តែអ្នកមិនអាចភរពីចំណេះដឹងបានទេ

  You can lie about your money, your degree or diploma but you could not lie your knowledge

- អ្នកមិនត្រូវភូតភរនៅក្នុងការសិក្សាទេ Do not cheat in study

- ប្រើប្រាស់នូវចំណេះដឹងរបស់អ្នកផ្ទាល់ក្នុងការប្រលង

  Use your own knowledge to do assignment, exam

- ការប្រើលុយសូកគ្រូឬទិញពិន្ទុគឺជាអំពើថោកទាបបំផុតនៅក្នុងជីវិតជានិស្សិត

  Using money to bribe lecturer or Prof. is the most shameful in student's life

I am very happy to ask you questions any time, any where

Outline

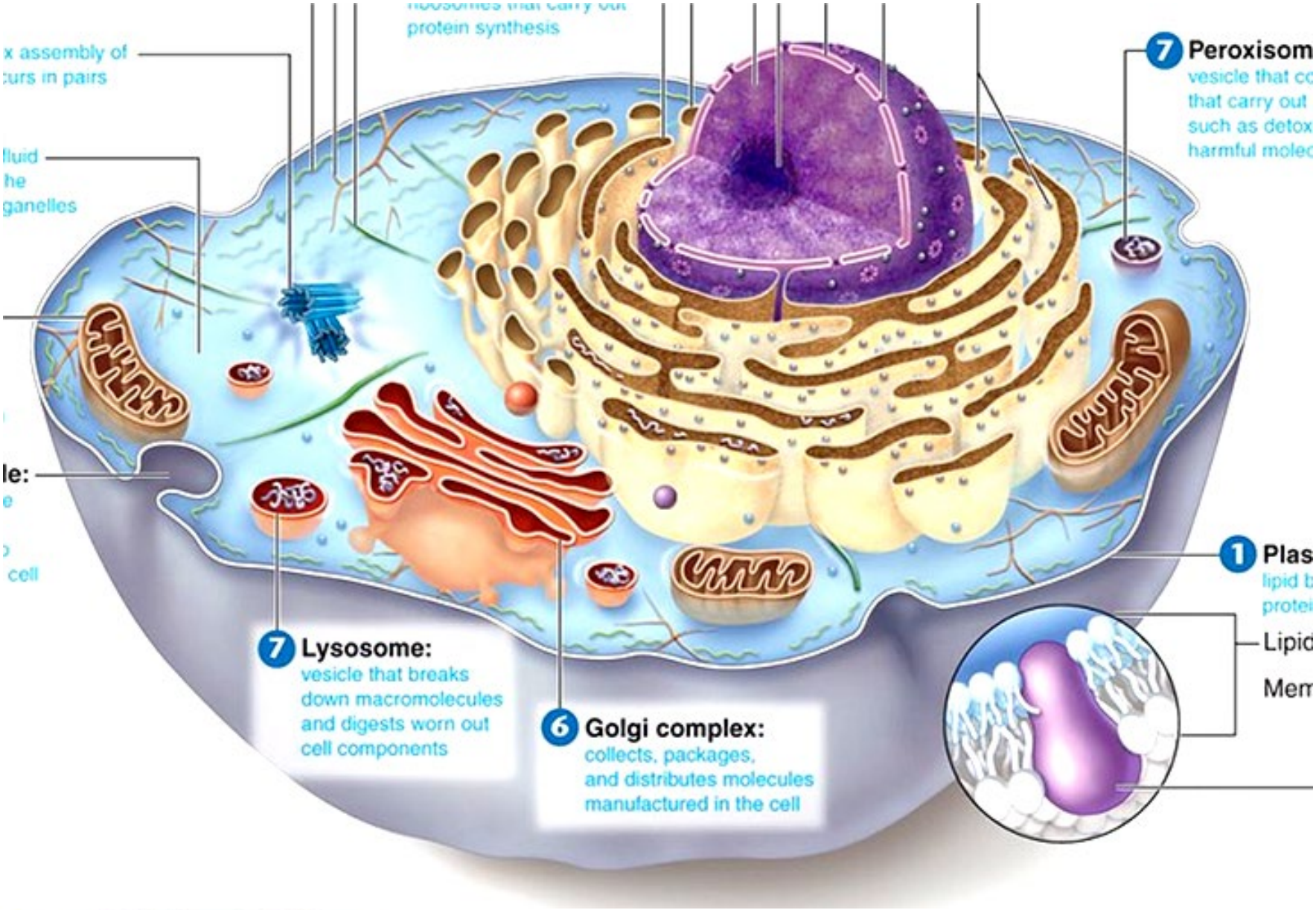
- Introduction of Anatomy & Physiology of Cell, Tissue and Fluid & Electrolyte
- Anatomy of Cell
- Physiology of Cell
- Cell Reproductive
- Anatomy & Physiology of Tissues
- Anatomy & Physiology of Fluid and Electrolyte
- Fluid and Electrolyte Balance in Human

Introduction of Anatomy & Physiology of Cell

- A **cell** is the basic structural and functional unit of life.
- It is the smallest unit capable of carrying out all life processes.
- Cells can exist as independent organisms (like bacteria) or as part of multicellular organisms (like humans, plants, and animals).

តើកោសិកាជាអ្វី?

- កោសិកាជាភាវៈរស និងជារចនាសម្ព័ន្ធគ្រឹះមួយនៃខ្លួនមនុស្ស
- កោសិកាជាបំណែកតូចៗបំផុត និងមានរូបរាង
- កោសិកាមានតែមួយហៅថា ឯកកោសិកា
- កោសិកាមានច្រើនហៅថា ពហុកោសិកា
- កោសិកាអាចមើលឃើញដោយមីក្រូទស្សន៍ៈ
  - មីក្រូទស្សន៍អុបទិក
  - មីក្រូទស្សន៍អេឡិចត្រូនិក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7 Lysosome:
vesicle that breaks down macromolecules and digests worn out cell components
6 Golgi complex:
collects, packages, and distributes molecules manufactured in the cell

Major Substances in Cells

Cells contain a variety of substances that are essential for their structure and function. Here are some key components:

Major Substances in Cells

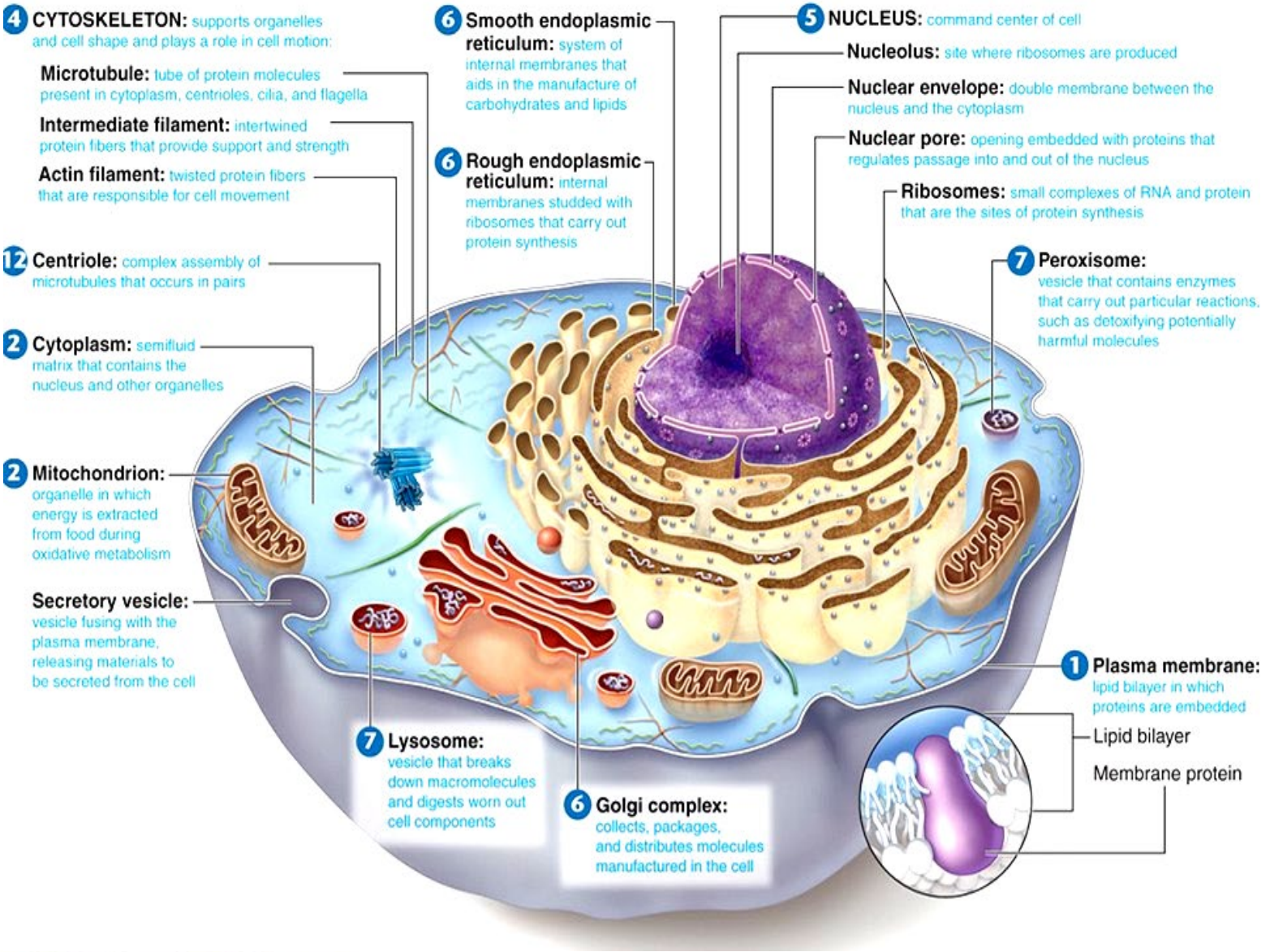
1. **Water** – Makes up about 70% of a cell's composition and is crucial for biochemical reactions.
2. **Proteins** – Serve as enzymes, structural components, and signaling molecules.
3. **Lipids** – Form the cell membrane and store energy.
4. **Carbohydrates** – Provide energy and structural support.
5. **Nucleic Acids (DNA & RNA)** – Carry genetic information and help in protein synthesis.
6. **Ions & Minerals** – Include sodium, potassium, calcium, and magnesium, which regulate cellular processes.

Cell morphology

- **Cell morphology** refers to the shape, size, and structure of cells, which can vary widely depending on the type of organism and its function. Here are some common types of cell morphology:
- **Spherical (Coccus)** – Found in bacteria like *Streptococcus*.
- **Rod-shaped (Bacillus)** – Seen in bacteria like *Escherichia coli*.
- **Spiral (Spirillum or Spirochete)** – Found in bacteria like *Treponema pallidum*.
- **Squamous (Flat and thin)** – Common in epithelial cells.
- **Cuboidal (Cube-shaped)** – Found in kidney tubules.
- **Columnar (Tall and elongated)** – Seen in the lining of the intestines.
- **Stellate (Star-shaped)** – Found in neurons.
- **Fusiform (Spindle-shaped)** – Seen in smooth muscle cells.

Structure of Cell

- **Cell Membrane** – Protects the cell and regulates what enters and exits.
- **Cytoplasm** – Gel-like substance where cellular activities occur.
- **Nucleus** – Contains DNA and controls cell functions.
- **Organelles** – Specialized structures like mitochondria (energy production), ribosomes (protein synthesis), and Golgi apparatus (protein packaging).


4 CYTOSKELETON: supports organelles and cell shape and plays a role in cell motion:
Microtubule: tube of protein molecules present in cytoplasm, centrioles, cilia, and flagella
Intermediate filament: intertwined protein fibers that provide support and strength
Actin filament: twisted protein fibers that are responsible for cell movement
12 Centriole: complex assembly of microtubules that occurs in pairs
2 Cytoplasm: semifluid matrix that contains the nucleus and other organelles
2 Mitochondrion: organelle in which energy is extracted from food during oxidative metabolism
Secretory vesicle: vesicle fusing with the plasma membrane, releasing materials to be secreted from the cell
6 Smooth endoplasmic reticulum: system of internal membranes that aids in the manufacture of carbohydrates and lipids
6 Rough endoplasmic reticulum: internal membranes studded with ribosomes that carry out protein synthesis
5 NUCLEUS: command center of cell
Nucleolus: site where ribosomes are produced
Nuclear envelope: double membrane between the nucleus and the cytoplasm
Nuclear pore: opening embedded with proteins that regulates passage into and out of the nucleus
Ribosomes: small complexes of RNA and protein that are the sites of protein synthesis
7 Peroxisome: vesicle that contains enzymes that carry out particular reactions, such as detoxifying potentially harmful molecules
7 Lysosome: vesicle that breaks down macromolecules and digests worn out cell components
6 Golgi complex: collects, packages, and distributes molecules manufactured in the cell
1 Plasma membrane: lipid bilayer in which proteins are embedded
Lipid bilayer
Membrane protein

Cell membrane

- The **cell membrane**, also known as the **plasma membrane**, is a thin, flexible barrier that surrounds the cell, separating its internal environment from the outside world.
- It plays a crucial role in maintaining homeostasis by regulating what enters and exits the cell.

Structure of Cell membrane

The cell membrane is primarily composed of a **phospholipid bilayer**, which consists of:

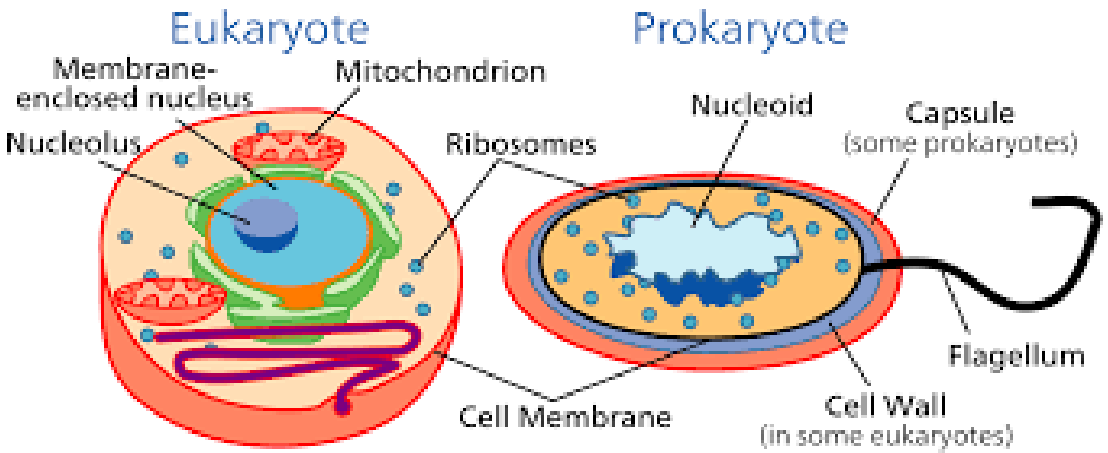
- **Phospholipids** – These molecules have hydrophilic (water-loving) heads and hydrophobic (water-fearing) tails, forming a double-layered structure.
- **Proteins** – Embedded within the membrane, these proteins help transport substances, facilitate communication, and provide structural support.
- **Cholesterol** – Helps maintain membrane fluidity and stability.
- **Carbohydrates** – Often attached to proteins or lipids, they play a role in cell recognition and signaling.

Functions of Cell membrane

- **Selective Permeability** – Controls the movement of substances in and out of the cell.
- **Communication** – Contains receptors that allow cells to receive signals from their environment.
- **Structural Support** – Maintains the shape of the cell and anchors the cytoskeleton.
- **Cell Recognition** – Helps the immune system distinguish between self and foreign cells.

Types of Cell

1. **Prokaryotic Cells** – Simple cells without a nucleus (e.g., bacteria).
2. **Eukaryotic Cells** – Complex cells with a nucleus and organelles (e.g., plant and animal cells).



Key components of Cell

- **Endoplasmic Reticulum (ER)** – A network of membranes involved in protein and lipid synthesis.
- **Golgi Apparatus** – Modifies, sorts, and packages proteins for transport.
- **Lysosomes** – Contain digestive enzymes to break down waste and cellular debris.
- **Ribosomes** – Sites of protein synthesis, found floating in the cytoplasm or attached to the ER.
- **Cytoskeleton** – Provides structural support and helps with cell movement.

Key organelles

- Nucleus
- Mitochondria
- Endoplasmic Reticulum (ER)
- Golgi Apparatus
- Lysosomes
- Ribosomes
- Cytoskeleton

Key components of Nucleus

1. Nuclear Envelope

- A **double membrane** that surrounds the nucleus, separating it from the cytoplasm.
- Contains **nuclear pores** that allow selective exchange of molecules like RNA and proteins.

2. Nucleoplasm

- A gel-like substance inside the nucleus that provides structural support.
- Contains essential molecules like enzymes, nucleotides, and ions.

3. Nucleolus

- A dense, membrane-less structure within the nucleus.
- Responsible for **ribosome production** by assembling ribosomal RNA (rRNA).

Key components of Nucleus

4. Chromatin

- A complex of **DNA and proteins** (mainly histones) that forms chromosomes.
- Exists in two forms: **euchromatin** (loosely packed, active genes) and **heterochromatin** (tightly packed, inactive genes).

5. Nuclear Pores

- Openings in the nuclear envelope that regulate the movement of molecules between the nucleus and cytoplasm.
- Essential for **RNA export** and **protein import**.

Function of Cell

- Growth and reproduction (mitosis and meiosis).
- Energy production (cellular respiration).
- Communication and signaling.
- Transport of nutrients and waste.

Physiology of Cell

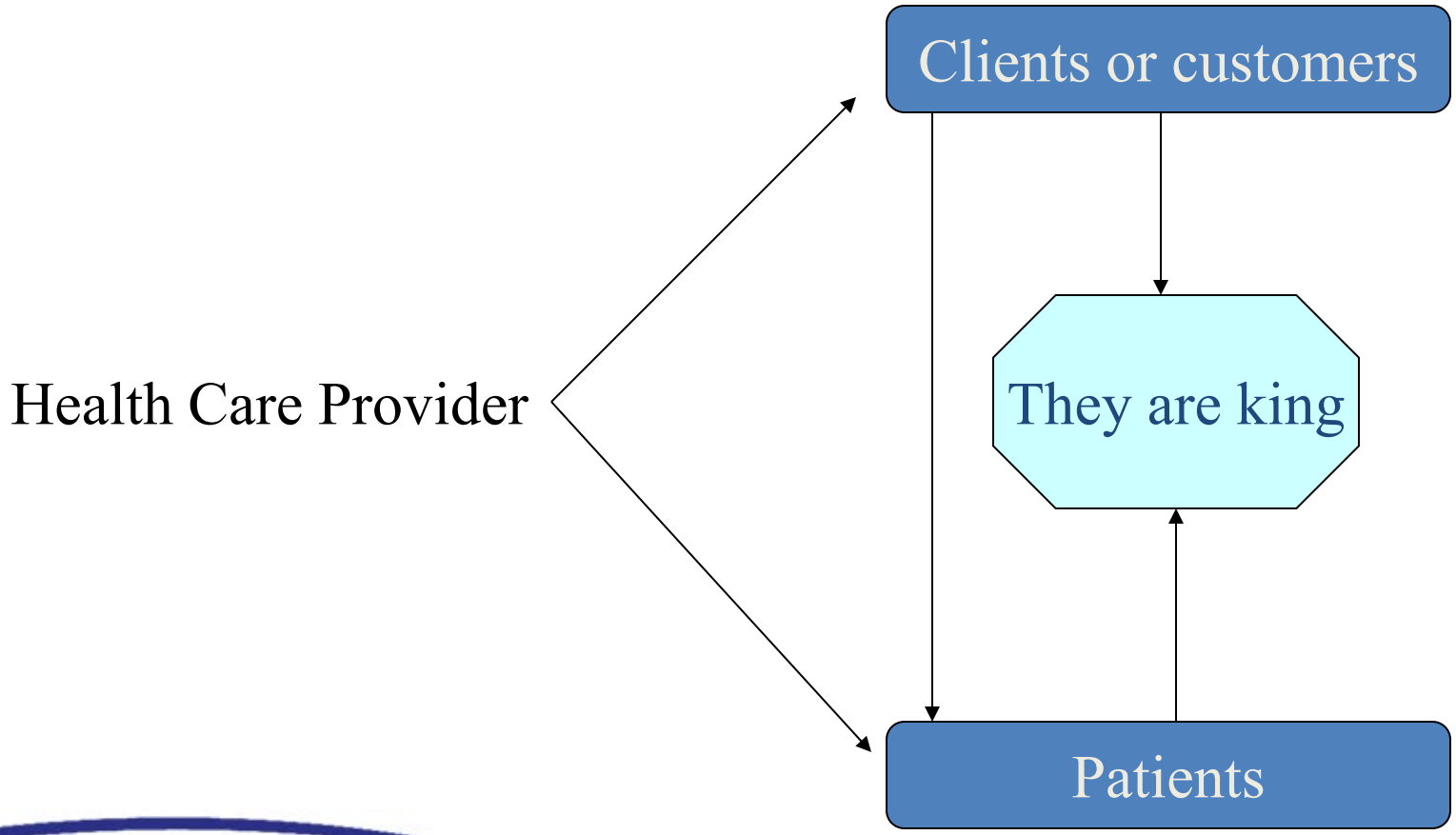
- Cell physiology is the study of how cells function to maintain life.
- It involves various processes that ensure cellular survival, communication, and energy production.

Physiology of Cell

- **Cell physiology** is the study of how cells function to maintain life.
- It involves various processes that ensure cellular survival, communication, and energy production.

- ជាការសិក្សាអំពីមុខងារ និងដំណើរការផ្សេងៗនៅក្នុងកោសិកា។ វាជាផ្នែកមួយនៃសរីរវិទ្យាដែលផ្តោតលើរបៀបដែលកោសិកាមានជីវិត ធ្វើការប្តូរធាតុ អភិវឌ្ឍន៍ និងឆ្លើយតបនឹងបរិស្ថាន។

What is health care provider and clients



ប្លង់កិច្ចការផ្ទះHomework Plan

១. និយមន័យ ឬទស្សន:ទូទៅ Definition/General view
២. មូលហេតុ Etiology/Cause
៣. សញ្ញា និងរោគសញ្ញា Sign and Symptom
៤. តេស្តមន្ទីរពិសោធន៍ Laboratory Test
៥. ការថែទាំជំងឺ Nursing Care
៦ . ការគ្រប់គ្រងការព្យាបាល Treatment
៧. វិធានការការពារ Prevention
៨. ឯកសារយោង References

❖ Score

1. Content (40pt)
   - A- Definition of the disease (5pt)
   - B- Epidermiology and Dignosis (5pt)
   - C- Sign and symptoms (Mechanism of disease) (5pt)
   - D- Management/ Treatment option (5pt)
   - E- Prognosis and Prevention (5pt)
   - F- Education (5pt)
   - G- Reference and citation (5pt)
   - H- Technology such as video usage (3 pt), quality of slides (2

2. Oral Presentation (10pt)
   - A- Time management - 10mn (1pt)
   - B- Organization of the presentation (2pt)
   - C- Able to deliver message to explain the audiences correctly
   - D- Presentation skills and engagment of audiences (2pt)
   - E- Team work (every member must present) (2pt)

3. Question and Answer (50pt)
   - A- able to answer the questions from classmates and teacher
   (5 questions from the classmates = 20pt, 1 question = 4pt)
   - B- 2 Easy questions from the lecturer, 1 question = 5pt (Cover
the disease or epidermiology of disease or signs and symptoms of th
   - C- 2 difficult questions from lecturer, 1 question = 10pt (cover
the disease mechanism or the treatment options with rationale or hea
the diseases)

Reference

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•Barbara KOZIER et al.(2004). Fundamental of Nursing, Concepts Process and Practice 7th Edition Pearson Education LTD New Jersey.

•Essential of Anatomy and Physiology, 4th edition, 2002, by Rod R..Seeley, Trent D. Stephens, and Philip Tate, page 519-549

•Shier, Butler and Lewis, 11th edition, Hole's Human, Anatomy and Physiology,The McGraw-Hill Companies, Inc.

•Elaine N. MARIES Guy Laurendeau ANATOMIE ET PHYSIOLOGIE HUMAINE

•Dr. M. LACOMBE Précis d'Anatomie et Physiologie humaine

•B. SEGUY Atlas d'anatomie et de physiologie

•Website: WWW.Who.Int

•www.Slideshare.net

•Medically reviewed by Debra Sullivan, Ph.D., MSN, R.N., CNE, COI, Written by Diana Wells, Updated on October 6, 2018


Thank
you