
Kingdom of Bahrain
Ministry of Education
Pakistan School
Kingdom of Bahrain
بسم الله الرحمن الرحيم
madaniwallpaper

BIOLOGY

9

This Book has been selected and distributed by Government of Punjab for Academic year 2018-2019 as sole textbook for all Government Schools in Punjab.

Publisher:

PLD Publishers, Lahore

CHAPTER 4

CELLS AND TISSUES

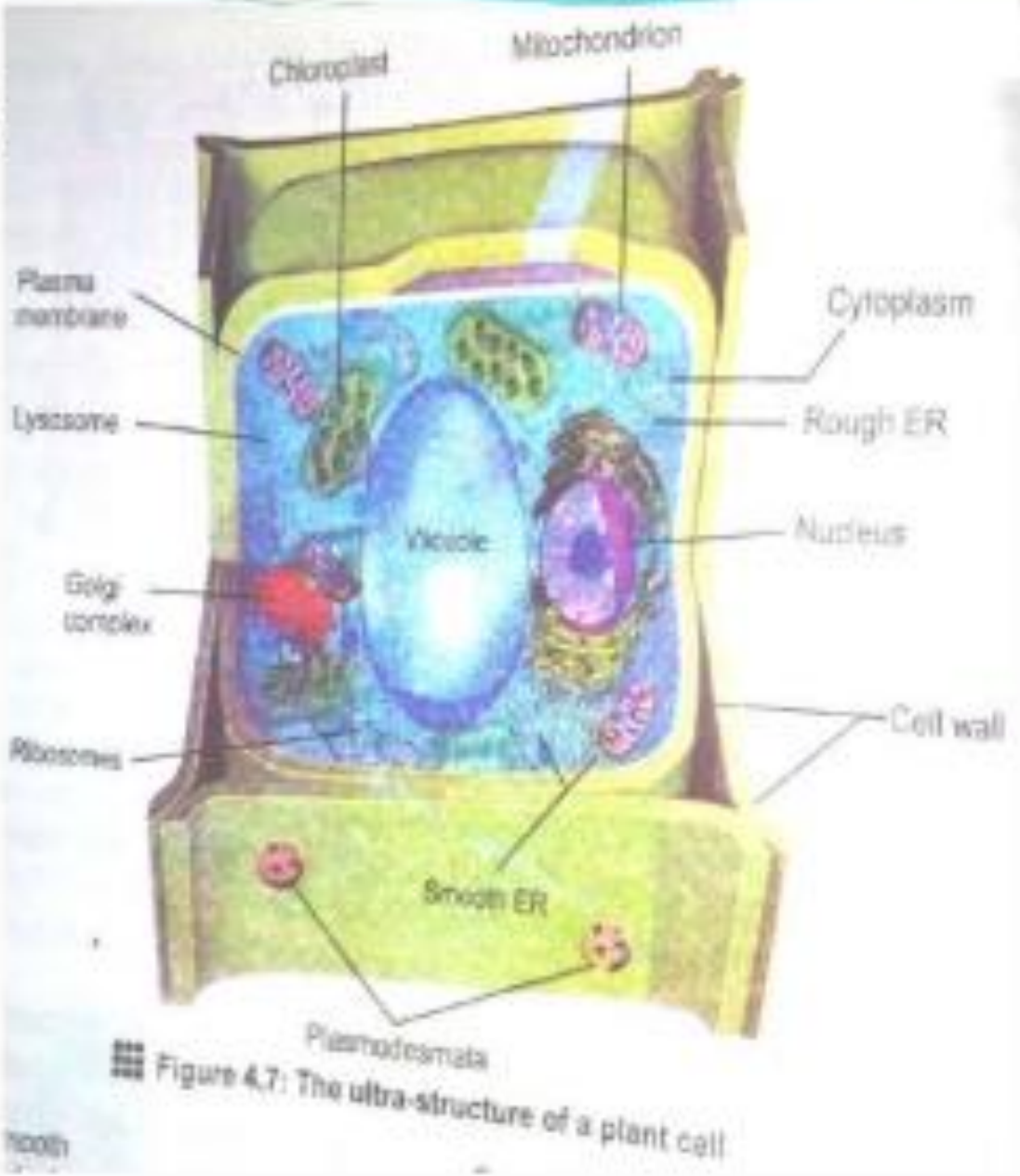
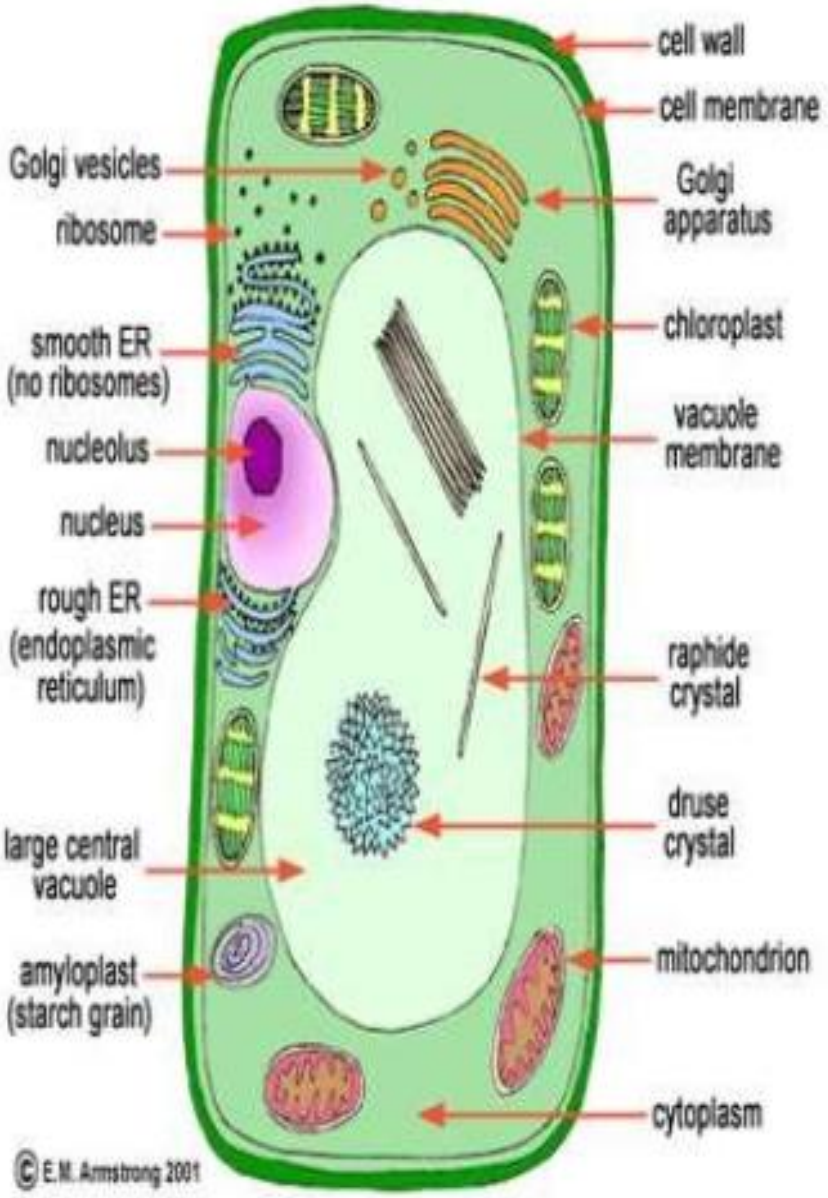
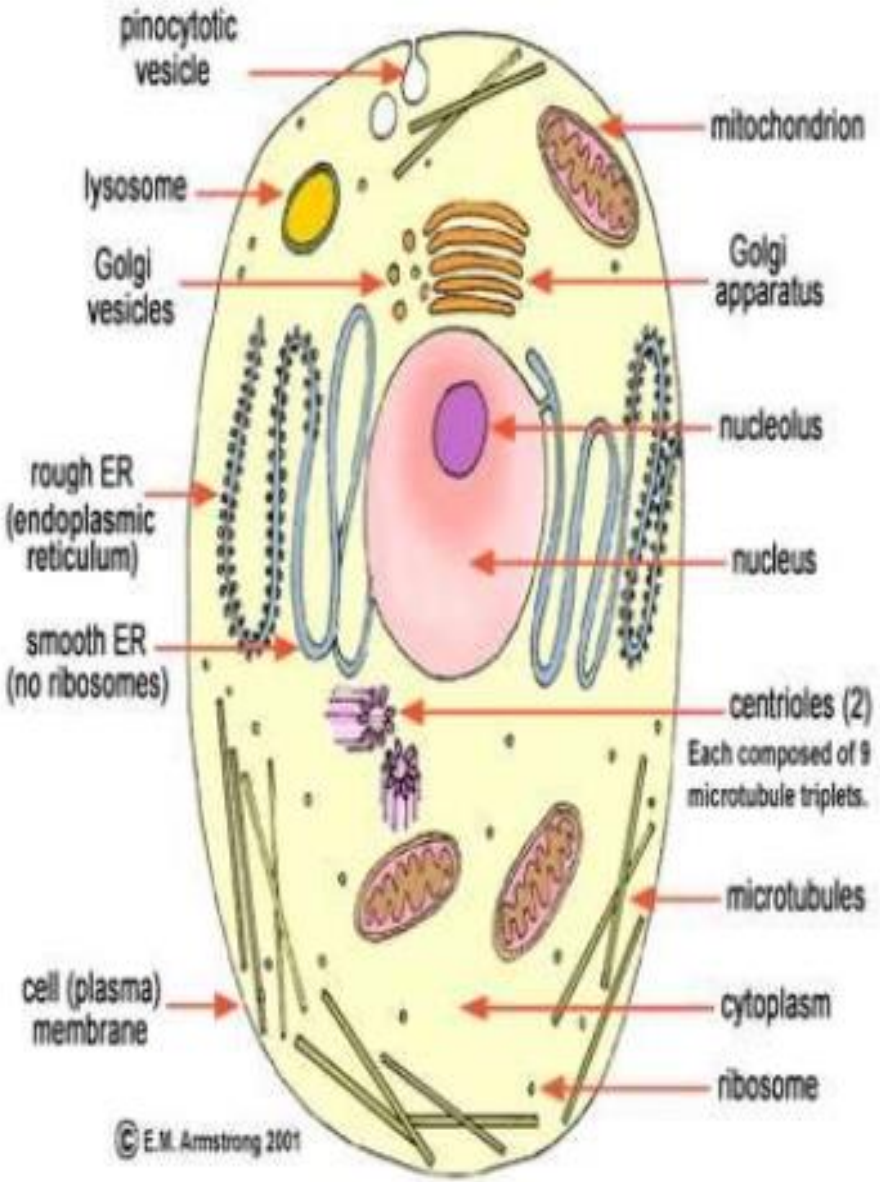


Figure 4.7: The ultra-structure of a plant cell

ENGAGING STARTER





Chapter 4

Objectives

- At the end of the lesson, students will be able to;
- **Explain** the relationship between cell structure and cell function.
- **Describe** the four basic parts of a cell and their functions.

Chapter 4. CELLS AND TISSUES

Topic: Cells structures and Functions

Page- 57-60

Cellular structures and functions

A cell is made by the assemblage of organelles. There are some structures in the cell that are not organelles. These structures are cell wall, cell membrane, cytoplasm and cytoskeleton.

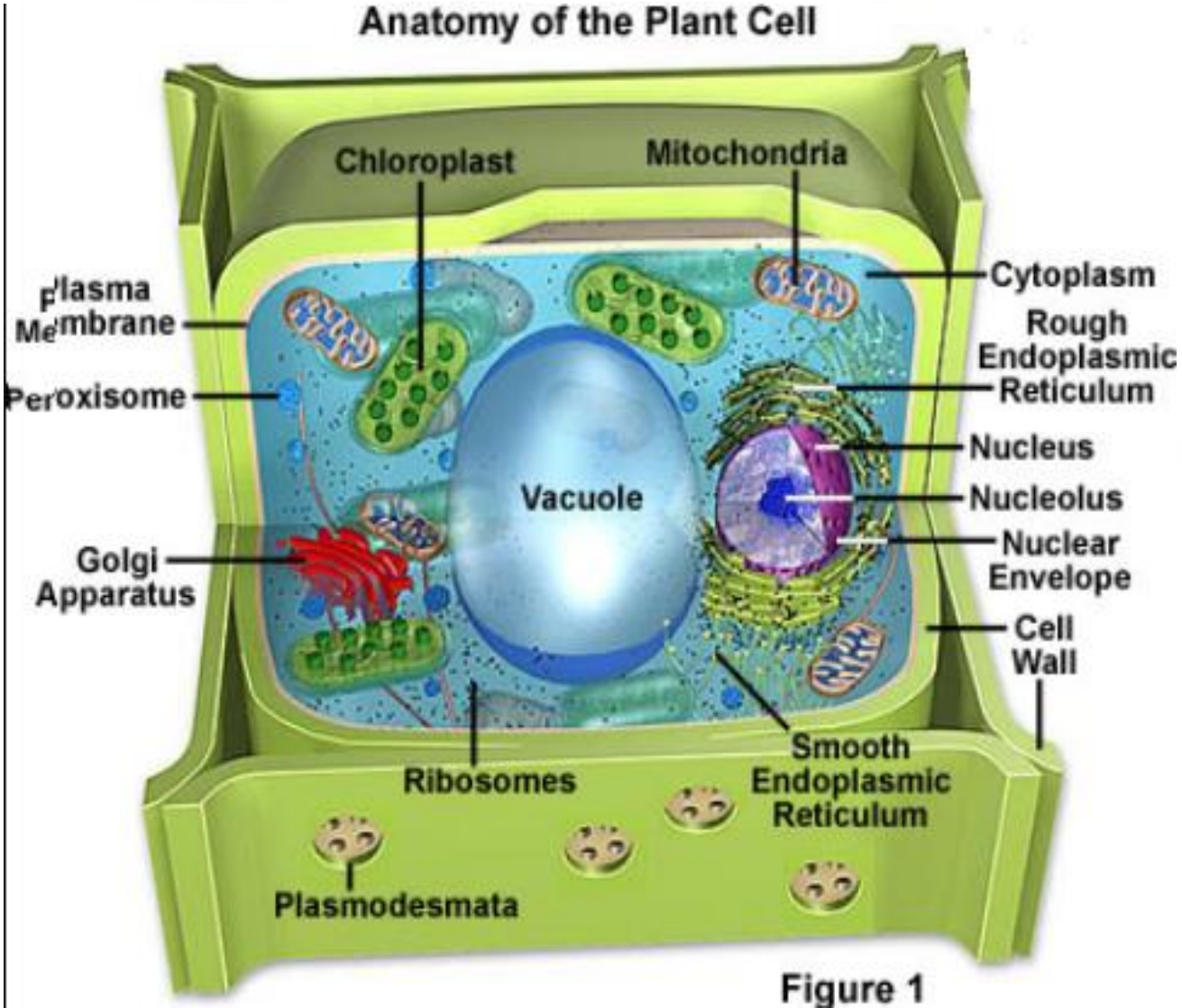


Figure 1

STRUCTURE OF AN ANIMAL CELL

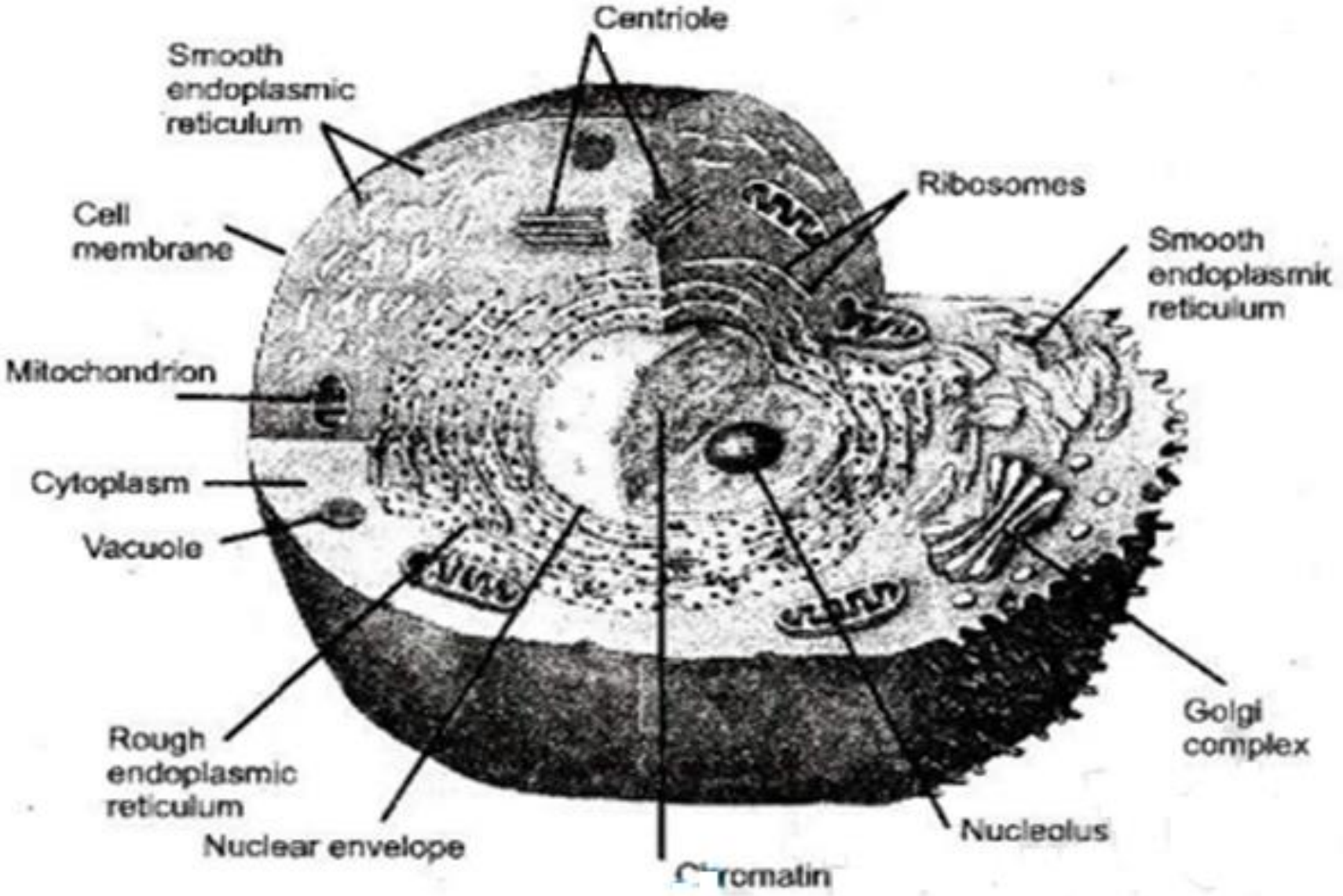


Figure 4.8: The ultra- structure of an animal cell

CELL WALL LAYERS

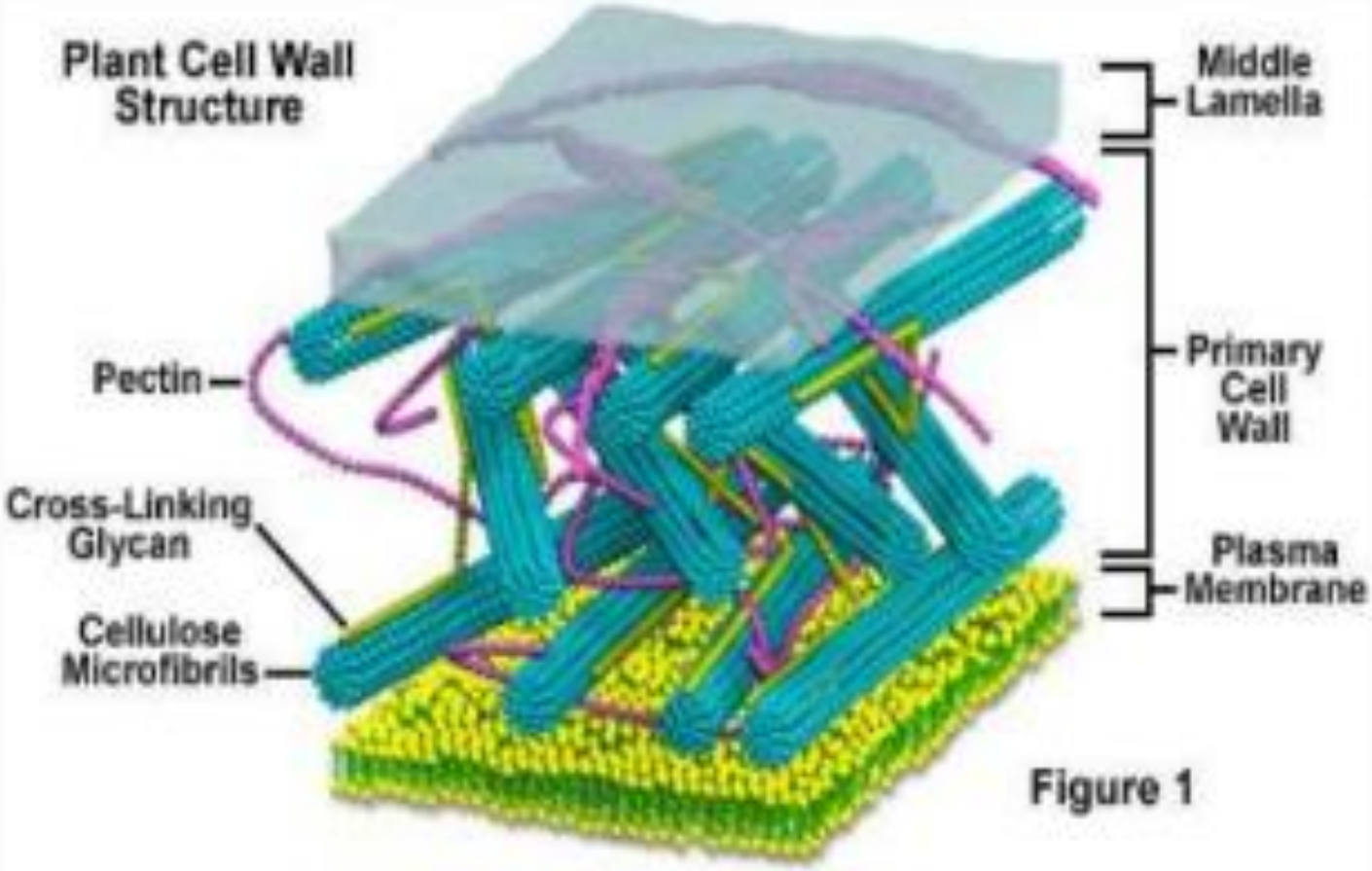


Figure 1

Cell Wall

Introduction

The cell wall is a non living strong component of the cell and it is located outside the plasma membrane. Not all living organisms have cell walls around their cells e.g., animals and many animal like protists.

Function

It provides shape, strength, protection and support to the inner living matter (protoplasm) of the cell.

Chemical composition

Plant cells have a variety of chemicals incorporated in their cell walls.

Types

Primary wall

The outer layer of the plant cell wall is known as primary wall and the cellulose is the most common chemical in it.

Secondary Wall

Some plant cells, for example xylem cells also have secondary walls on the inner side of the primary wall. It is much thicker and contains lignin and some other chemicals.

Plasmodesmata

There are pores in the cell walls of adjacent cells, through which their cytoplasm is connected. These pores are called plasmodesmata.

Cell wall of fungi

Fungi and many other protists have cell walls although they do not contain cellulose. Their cell walls are made of variety of chemicals. For example, chitin is present in the cell wall of fungi.

Cell wall of prokaryotes

Prokaryotes have a cell wall composed of peptidoglycan that is a complex of amino acids and sugar.

Cell Membrane

All prokaryotic and eukaryotic cells have a thin and elastic cell membrane covering the cytoplasm.

Function

Cell membrane functions as a semi permeable barrier, allowing a very few molecules across it while fencing the majority of chemicals inside the cell. In this way, tne membrane maintains the internal composition of cell. In addition to this vital role, cell membrane can also sense chemical messages and can identify other cells etc.

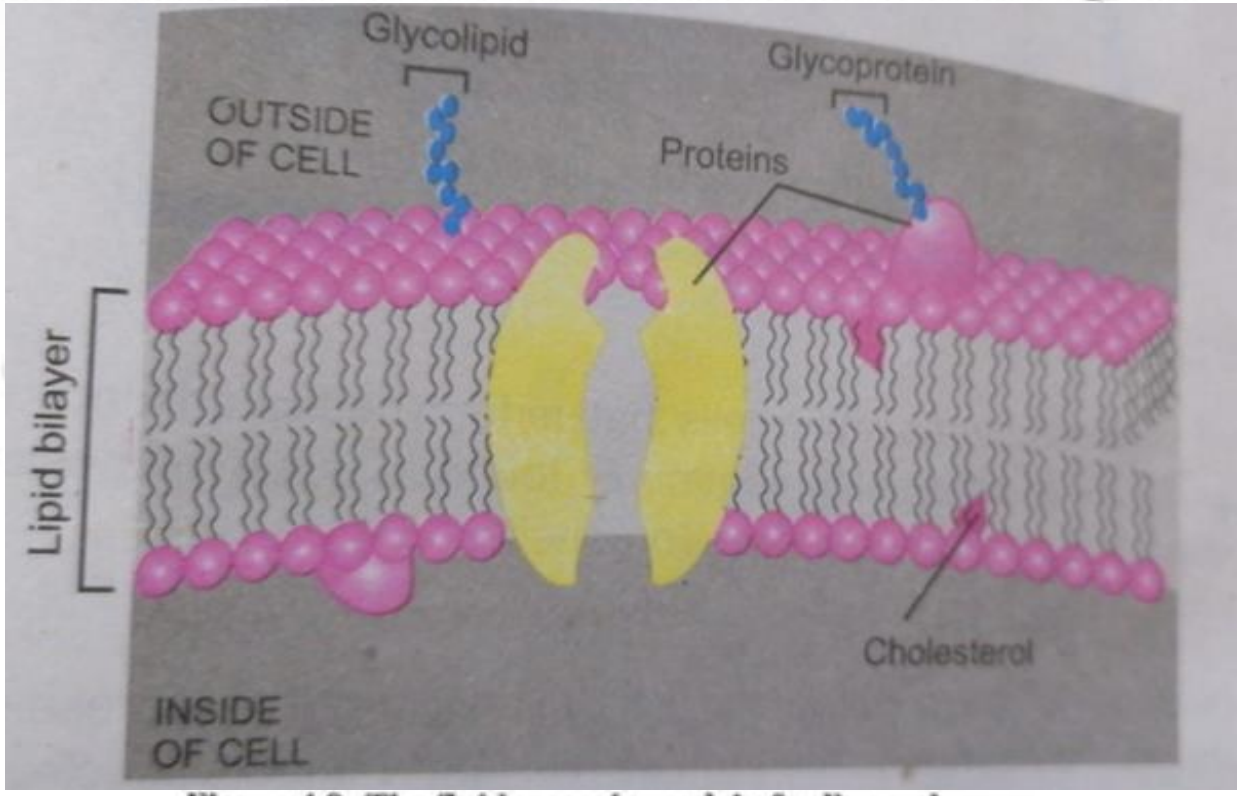
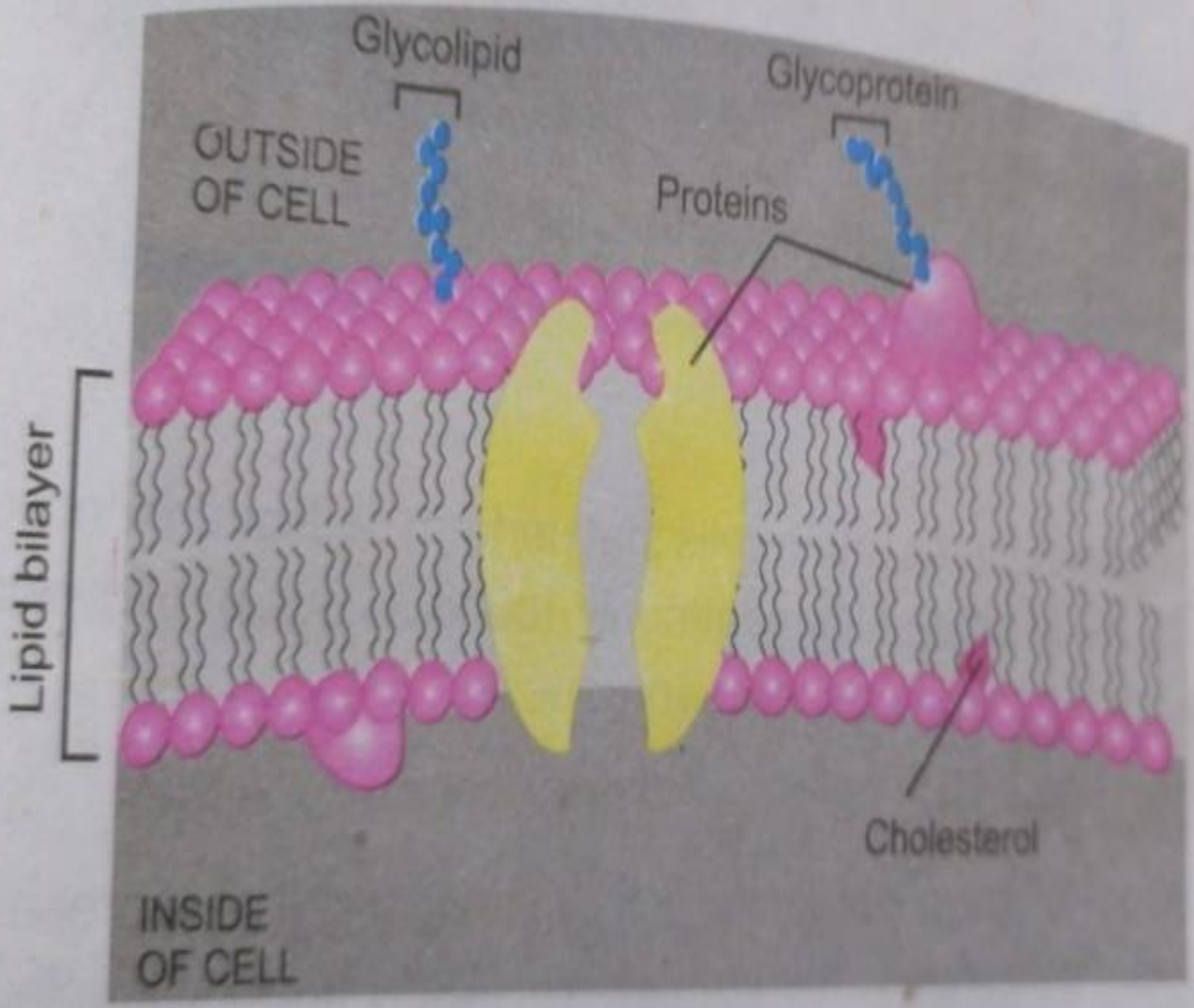


Figure 4.9: The fluid- mosaic model of cell membrane


Glycolipid
Glycoprotein
OUTSIDE
OF CELL
Proteins
Lipid bilayer
Cholesterol
INSIDE
OF CELL

Chemical composition

Chemical analysis reveals that cell membrane is mainly composed of proteins and lipids with small quantities of carbohydrates. Electron microscopic examinations of cell membranes have led to the development of the fluid mosaic model of cell membrane.

Fluid mosaic model

According to this model:

(i) Lipids

There is a Lipid bilayer in which the protein molecules are embedded. The lipid bilayer gives fluidity and elasticity to membrane.

(ii) Carbohydrates

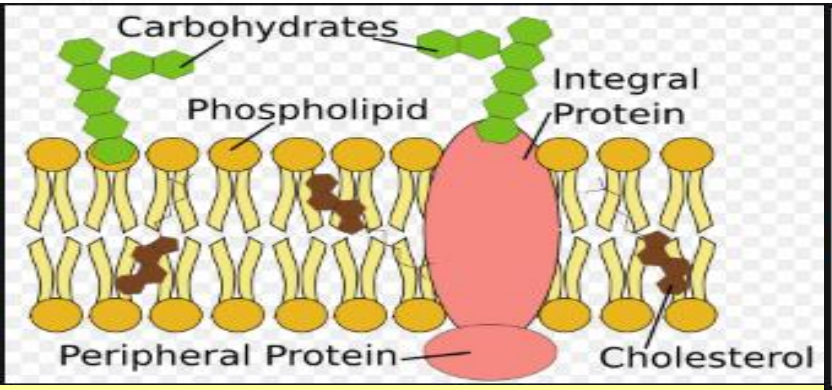
Small amounts of carbohydrates are also found in cell membranes. These are joined with proteins or lipids of membrane.

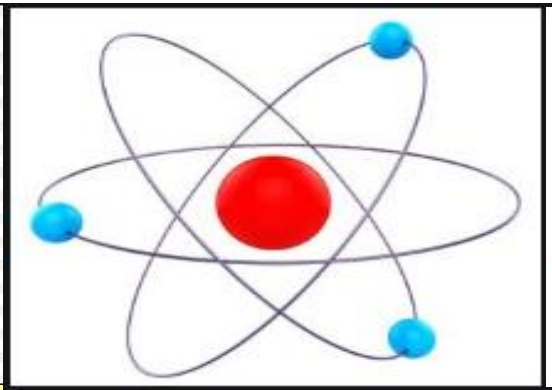
(iii) Cholesterol

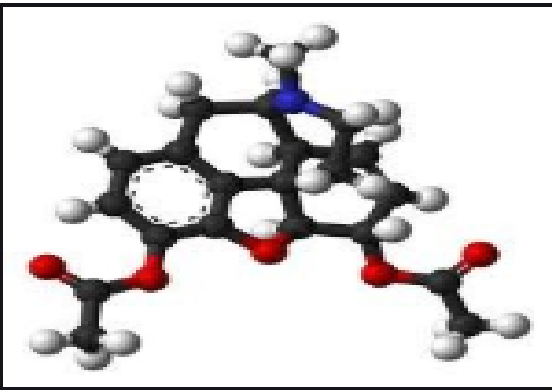
In eukaryotic cells, cholesterol is also present in lipid bilayer.

Eukaryotic cell

In eukaryotic cell, many organelles e.g. mitochondria, chloroplasts, golgi apparatus and endoplasmic reticulum are also bounded by cell membrane.







Cytoplasm

Cytoplasm is defined as the material between the plasma membrane (cell membrane) and the nuclear envelope. It is a semi-viscous and semi-transparent substance.

Chemical composition

The chemical analysis of cytoplasm reveals that it contains water which consists of;

(i) Organic molecules

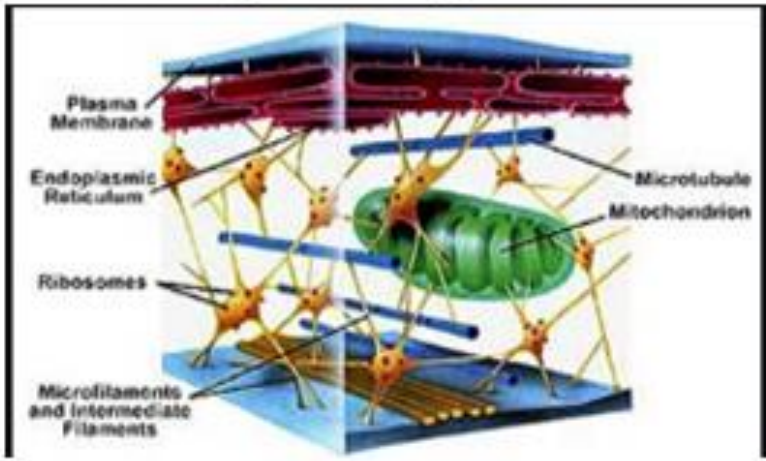
Such as proteins, carbohydrates and lipids.

(ii) Inorganic salts

Inorganic salts are completely or partially dissolved.

Functions

The cytoplasm of the cell provides space for the proper functioning of the organelles and also acts as the site for various biochemical (metabolic) reactions. For example, Glycolysis (breakdown of glucose during cellular respiration) occurs in cytoplasm.



Cytoskeleton

Structure

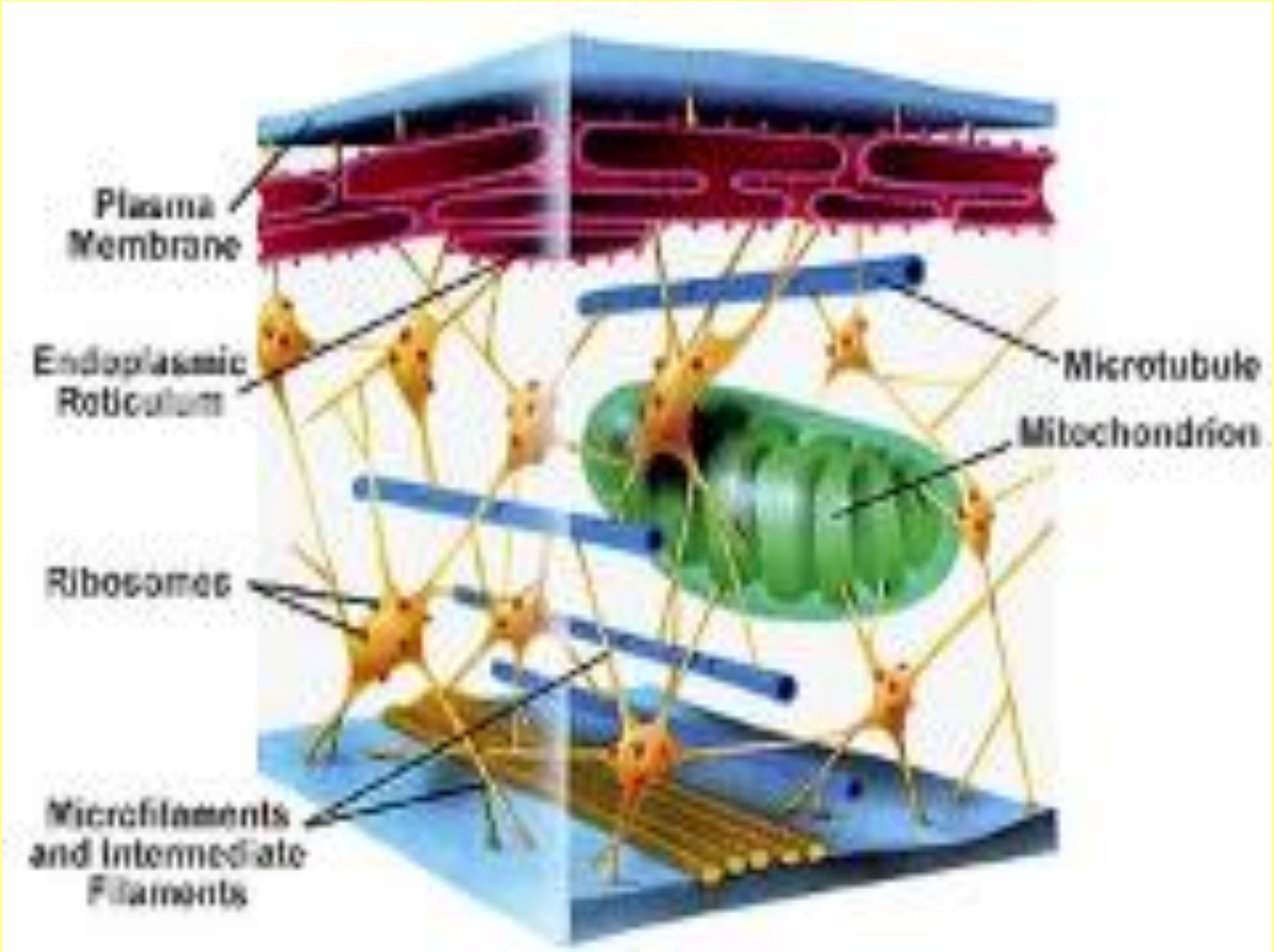
Cytoskeleton is a network of microfilaments and microtubules.

Microtubules

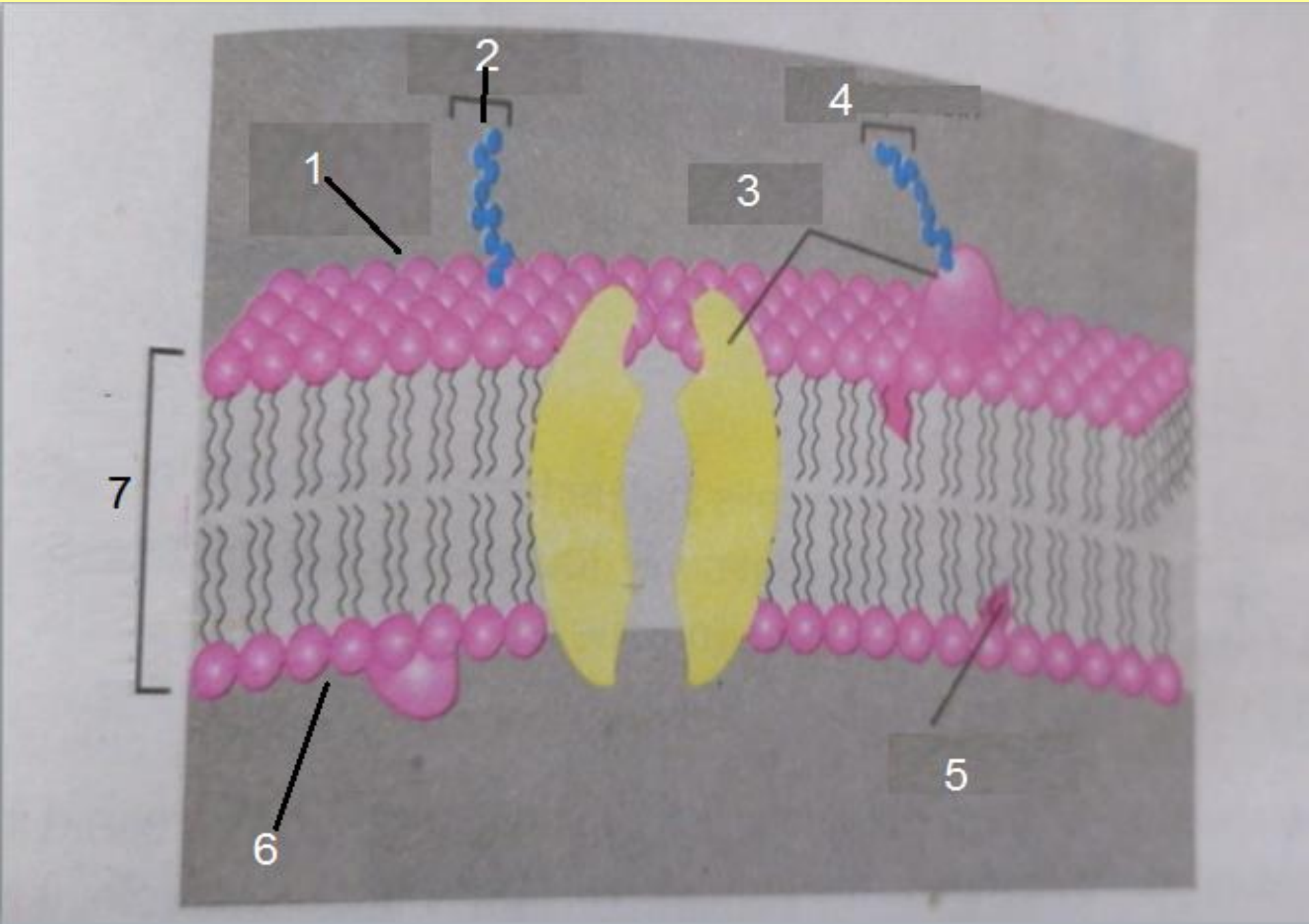
Microtubules are made of tubulin protein and are used by cells to hold their shape. Microtubules are also major components of cilia and flagella.

Microfilaments

Microfilaments are made of actin protein. They help cells to change their shapes.


Plasma Membrane
Endoplasmic Reticulum
Ribosomes
Microfilaments and Intermediate Filaments
Microtubule
Mitochondrion

Worksheet:01



PLENARY ACTIVITY

Answer the following questions;

Today we have done the topics _____

Q1. Define cell wall and its functions.

Q2. What is the structure of primary and secondary cell wall?

Q3. What are plasmodesmata?

Q4. Write the structure of cell wall of fungi and prokaryotes.

Q5. Write the structure and function of cytoplasm.

Q6. What do you know about cytoskeleton.


Any
Questions?


Thank You!
Prepared By
Shahnaz Riasat