



Pakistan School
Kingdom of Bahrain

Pakistan School, Kingdom of Bahrain.

Welcome to new class

Grade 11

Rules of the class

- 1) Be on time for all your classes.
- 2) Respect all the participants of the class.
- 3) Do not create any disturbance.
- 4) Pay attention to your teacher.
- 5) Raise hand if you have a question.
- 6) Enter into the class with your actual name and CPR number.

Chapter 1

Cell Structure and Function

OBJECTIVES:

At the end of this lesson students will be able to:

- Analyze the structure of Endoplasmic Reticulum (ER), Ribosomes and Golgi Complex.
- Explain their respective functions.

CELL ORGANELLES:

Def: Highly organized discrete structures specific for various cellular functions.

- They are usually membranous except ribosomes.

- Present in the cytoplasm.

- Examples:

- 1) Endoplasmic reticulum.

- 2) Ribosomes.

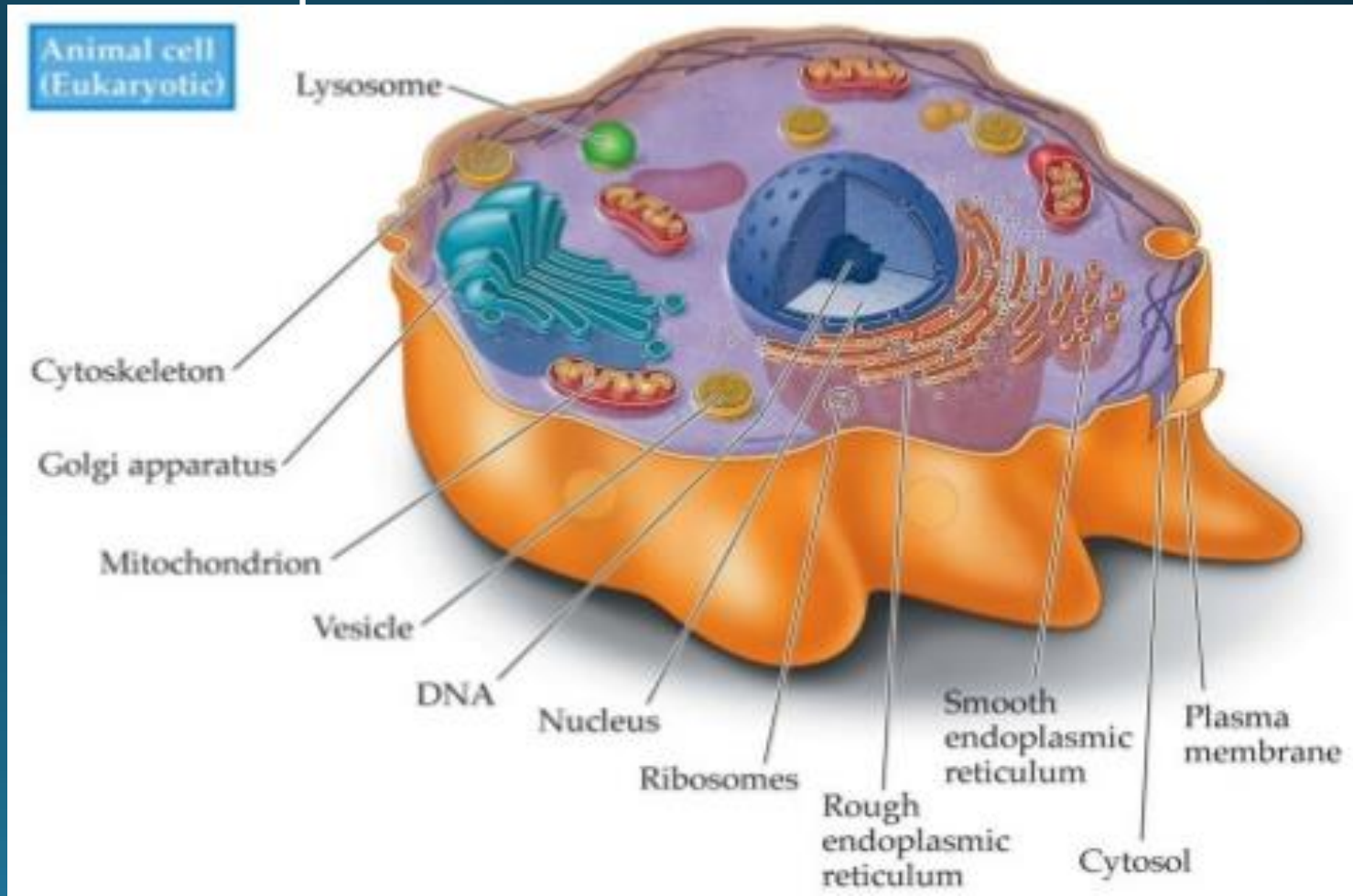
- 3) Golgi complex.

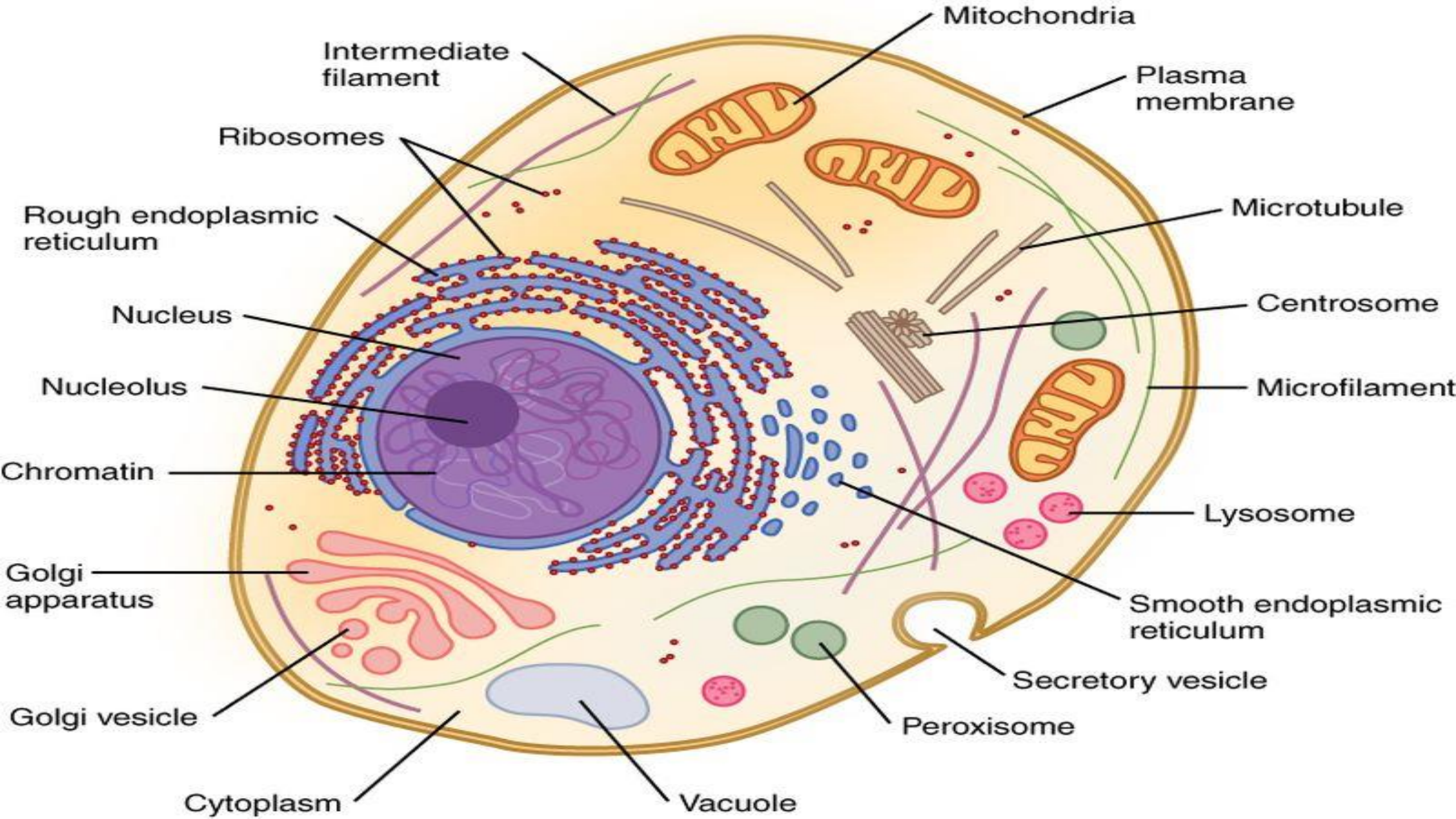
- 4) Lysosomes.

- 5) Peroxisomes.

- 6) Mitochondria.

- 7) Chloroplasts.





CYTOPLASMIC INCLUSIONS:

Def:

Non-living non-membranous granules for storage or waste of the cell that do not possess metabolic activity.

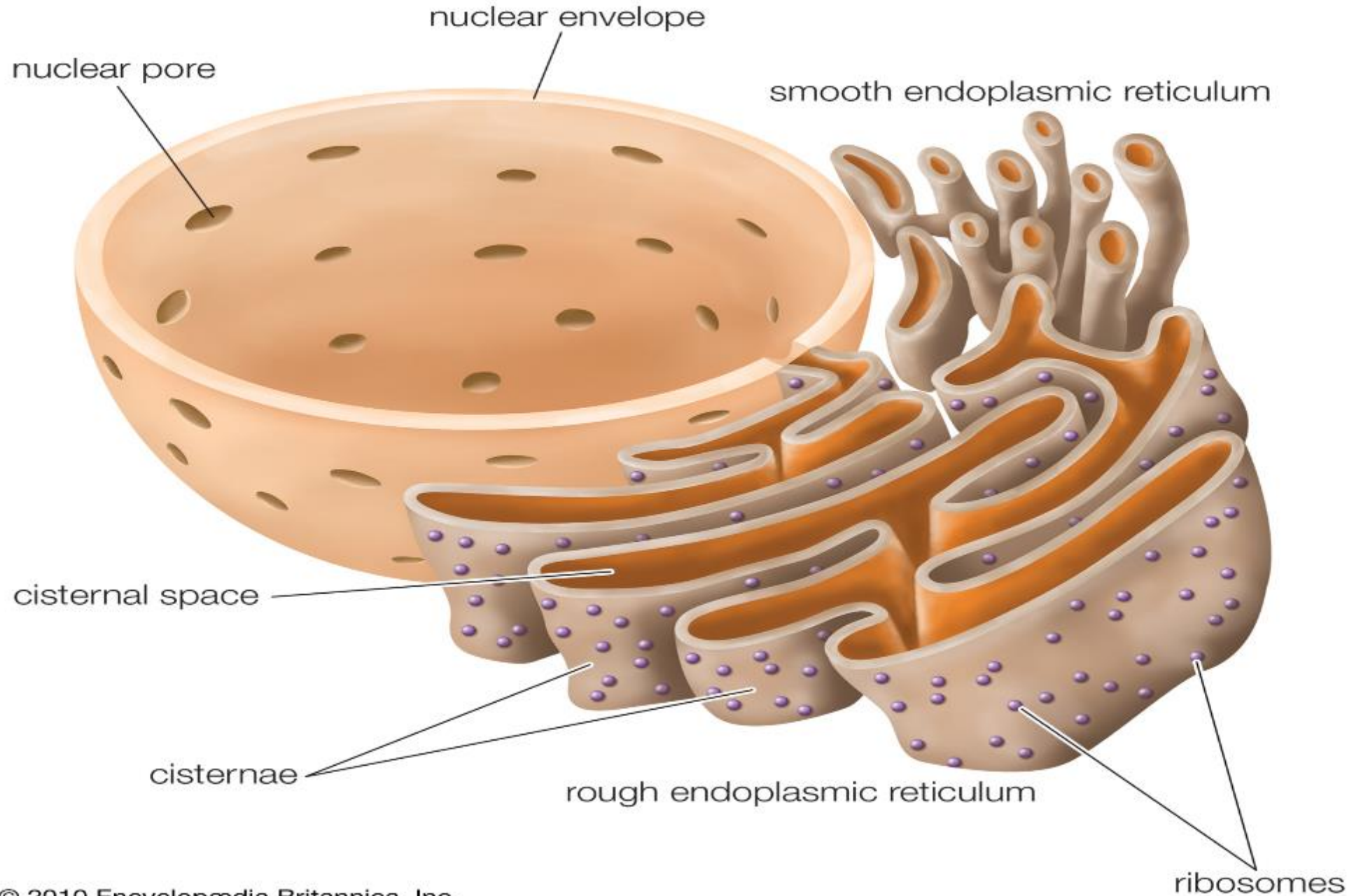
- Examples:

1. Glycogen.
2. Lipid droplets.
3. Crystals .
4. Pigments.

ENDOPLASMIC RETICULUM(ER):

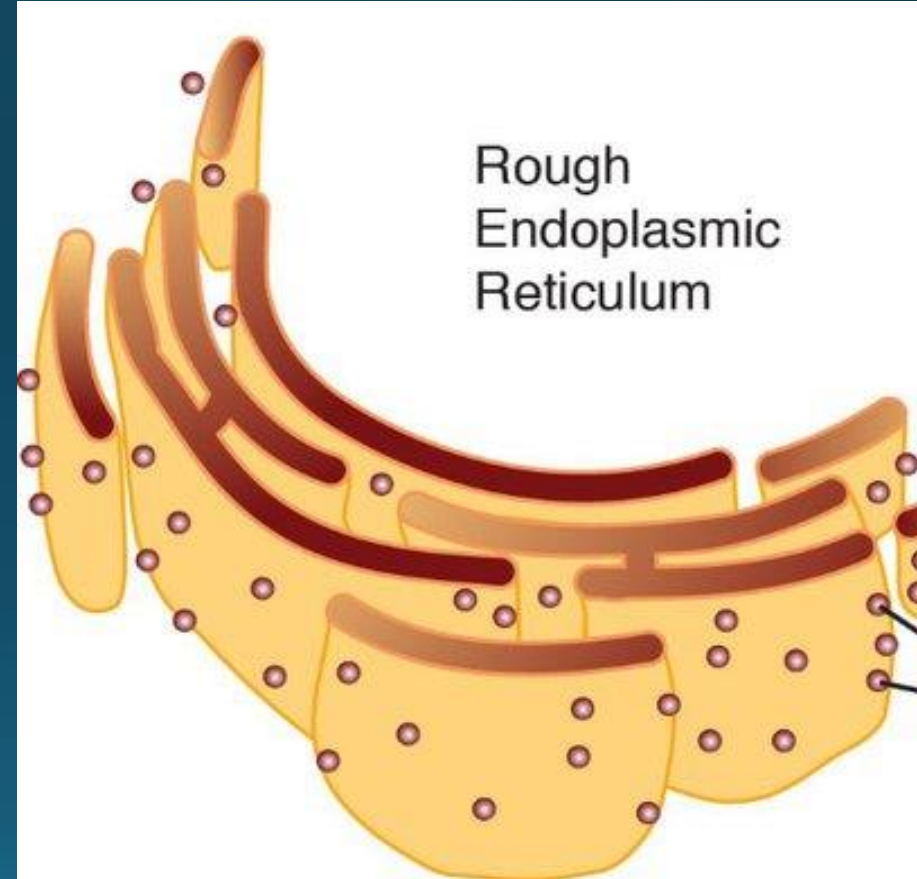
- It is an interconnecting network of cisternae.
- Present between nuclear membrane to plasma membrane within cytoplasm.
- Present in all eukaryotic cells.
- 2 types i.e;
 1. Smooth endoplasmic reticulum.
 2. Rough endoplasmic reticulum.
- When some cells (skeletal muscle cell) have more smooth ER then it is called **sarcoplasmic reticulum** .

Endoplasmic reticulum



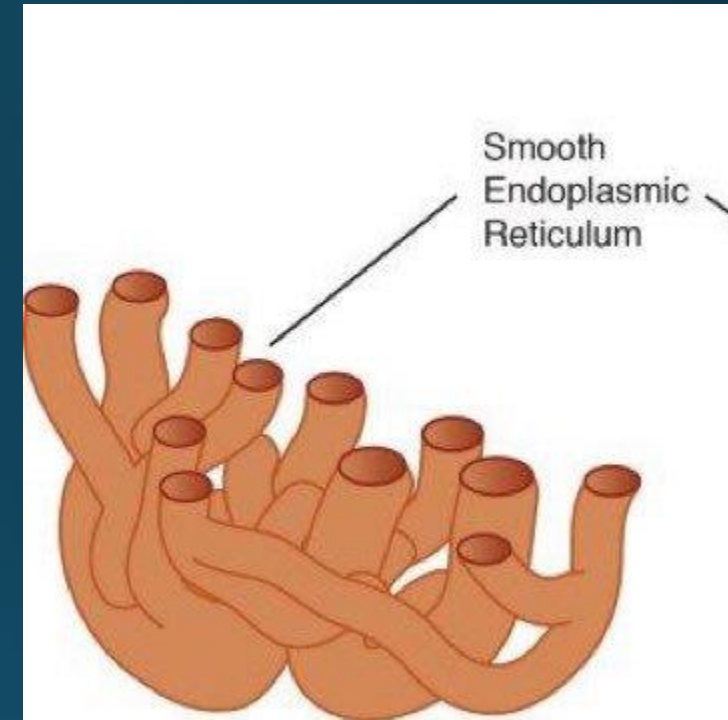
ROUGH ER:

- Have a rough appearance under electron microscope due to the ribosomes attached to the sides facing the cytoplasm.
- **2 functions:**
 1. Protein synthesis (translation) due to ribosomes.
 2. Provides mechanical support to the cell.
- Ribosomes synthesize protein.



SMOOTH ER:

- Since no ribosomes attached hence have smooth appearance.
- **Functions:**
 1. Various metabolic processes e.g., metabolism of carbohydrates.
 2. Detoxification in liver cells.
 3. Synthesis of lipids, oils, phospholipids and steroid.
 4. Stores calcium ions for trigger contraction of muscles.
 5. Transports various cellular products within and out of the cell. For example:
 - ✓ Proteins from RER to Golgi complex through SER.
 6. Provides mechanical support to the cell.



RIBOSOMES:

Structure: Roughly spherical, dense granular, non-membranous bodies

- In both eukaryotic + prokaryotic cells
- Seen only under electron microscope
- Have equal amount of RNA + protein = **ribonucleoprotein**
- Formed in nucleolus
- Transported to cytoplasm through nuclear pore
- Several ribosome attached to mRNA = **polysome / polyribosomes**

Function :

- Protein synthesis (translation)

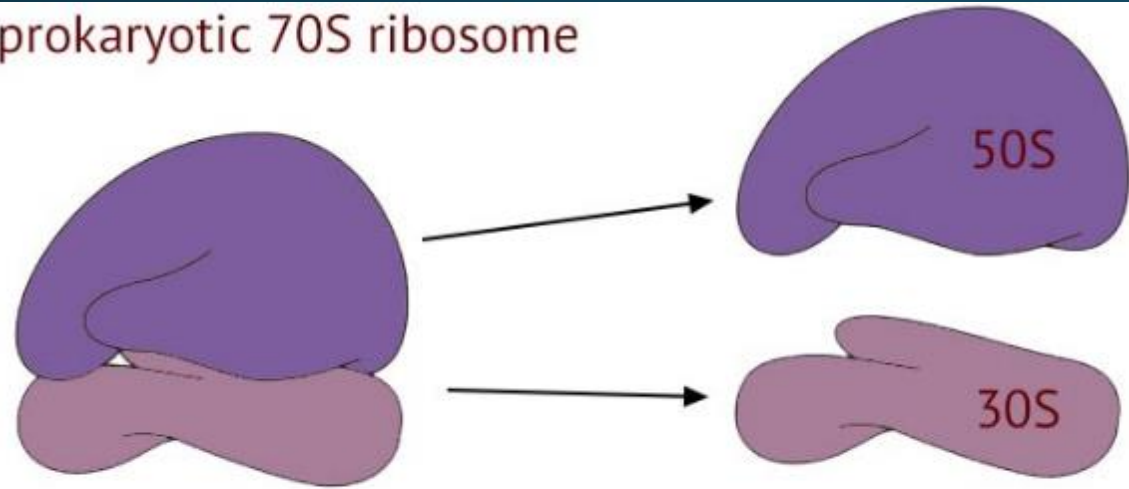
S. No.	Eukaryotic Ribosome	Prokaryotic Ribosome
1	Larger , 80 S	Smaller , 70 S
2	Attached with RER or freely dispersed in cytoplasm	Found in mitochondrial matrix or stroma of chloroplast
3	Compose of 2 different sized subunits (larger 60 S + smaller 40 S)	Compose of 2 different sized subunits (larger 50 S + smaller 30 S)

Attachment of ribosomal subunits controlled by

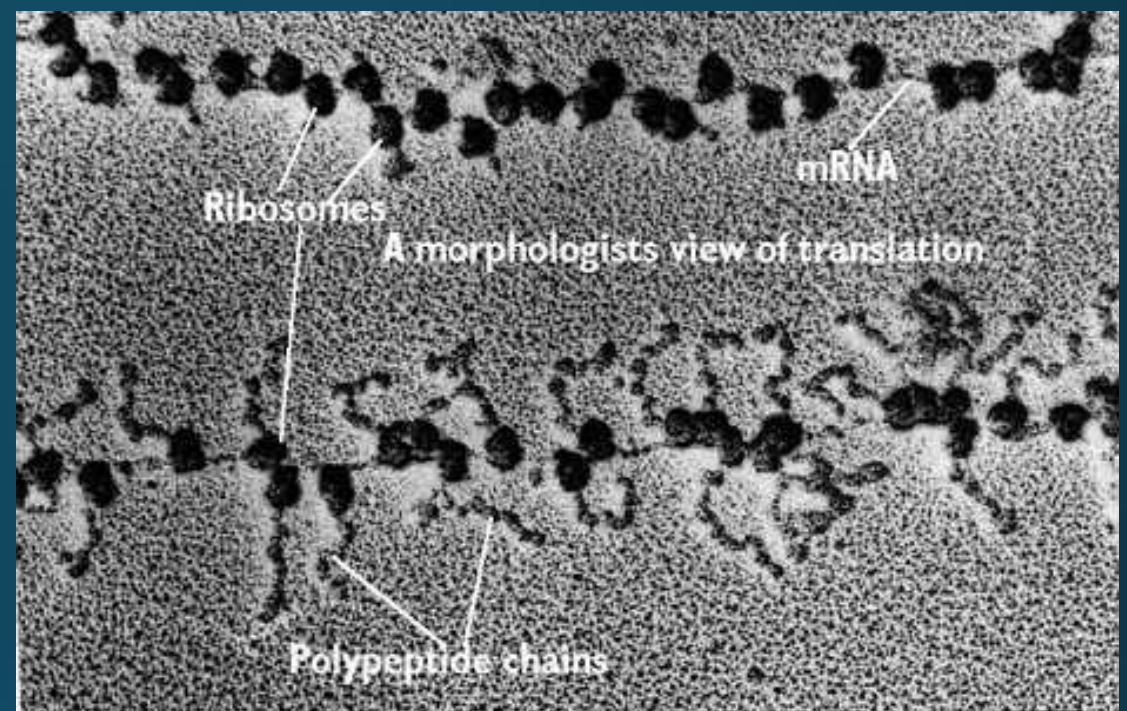
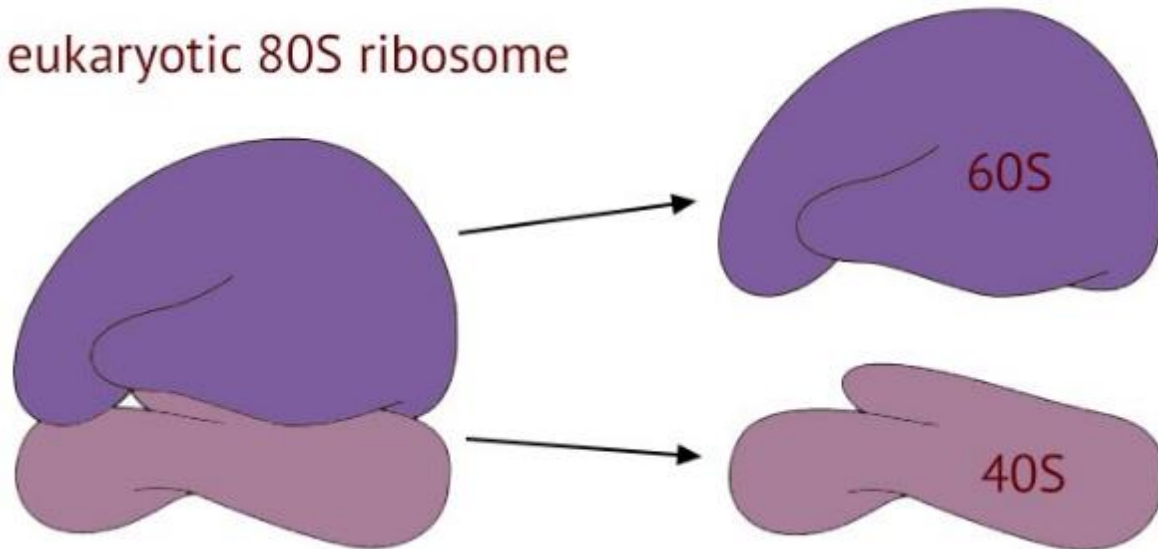
- Mg ions conc.
- Forming salt bonds b/w phosphate group of RNA and amino group of amino acid
- Both

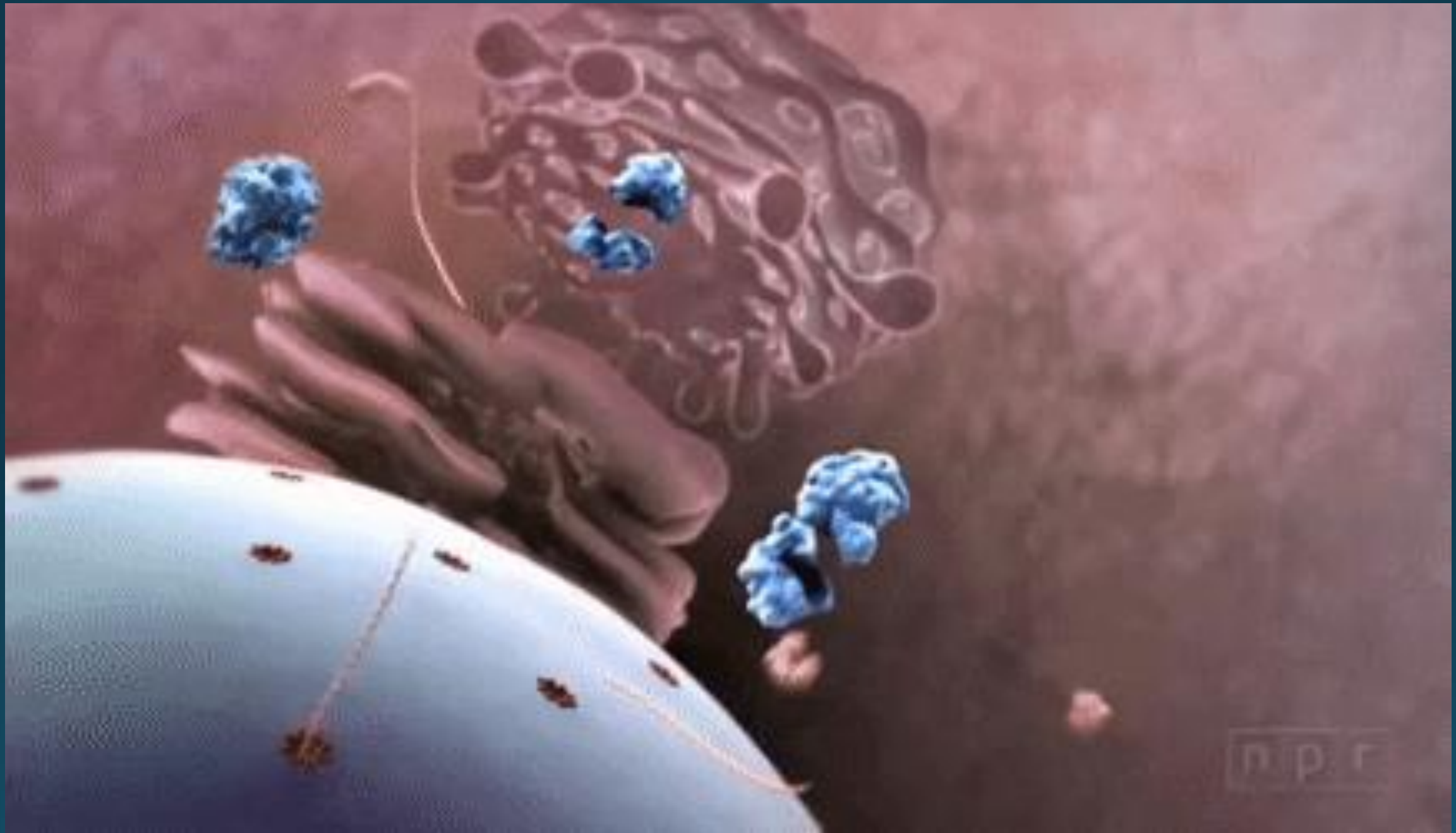
Subunits attached together at time of function.

prokaryotic 70S ribosome



eukaryotic 80S ribosome





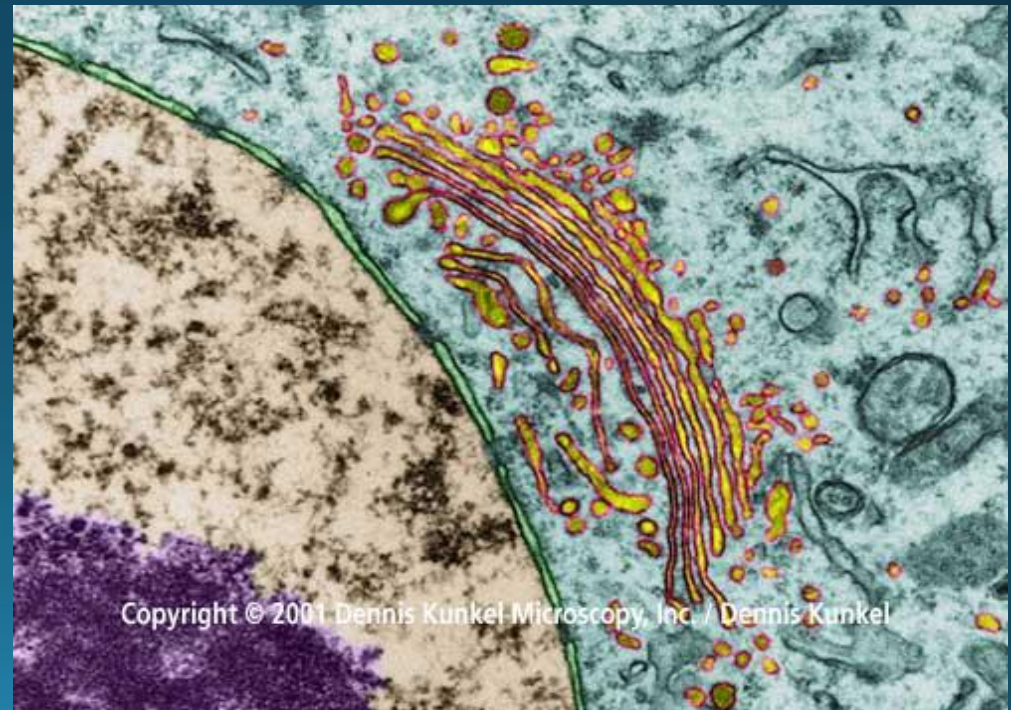
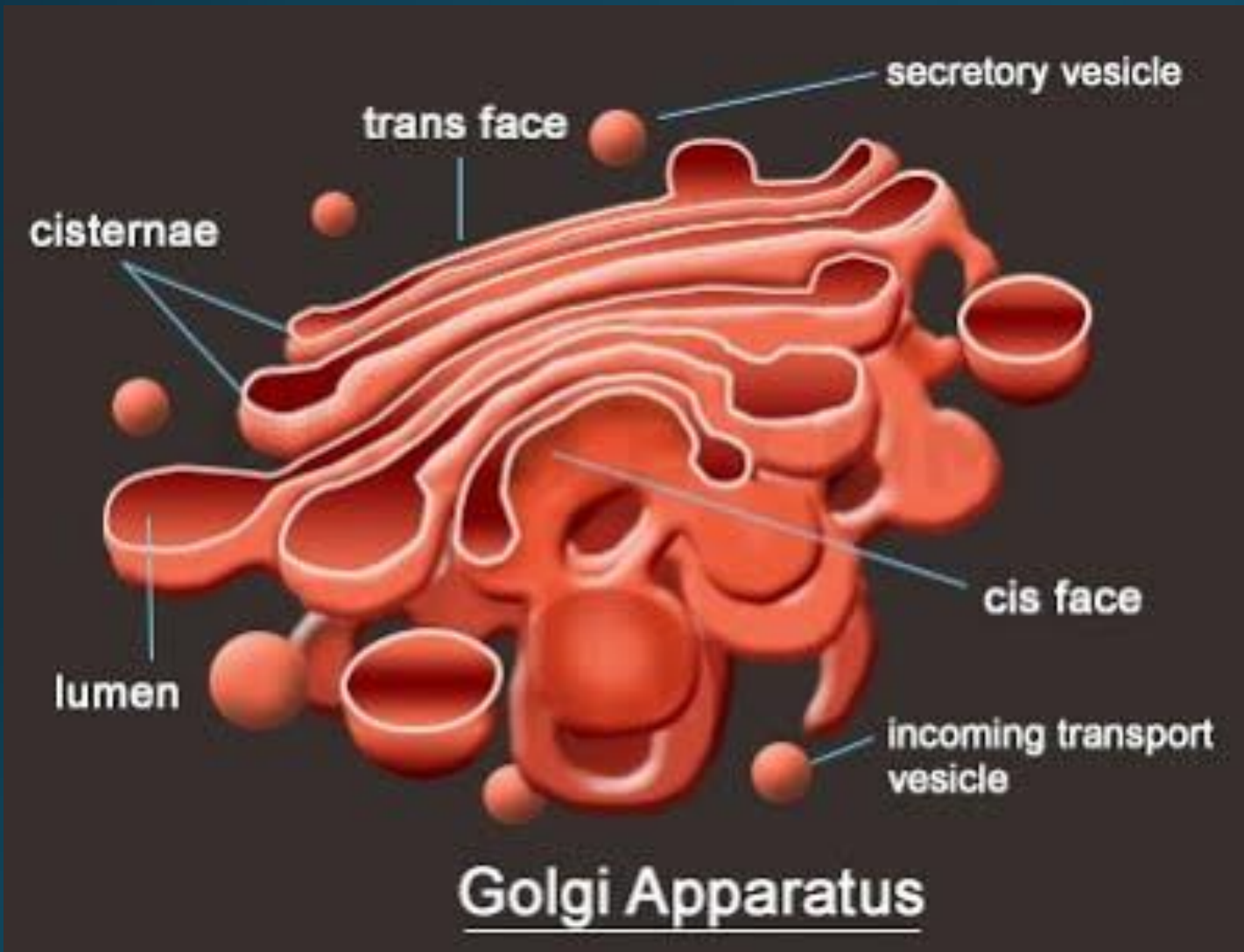
GOLGI COMPLEX:

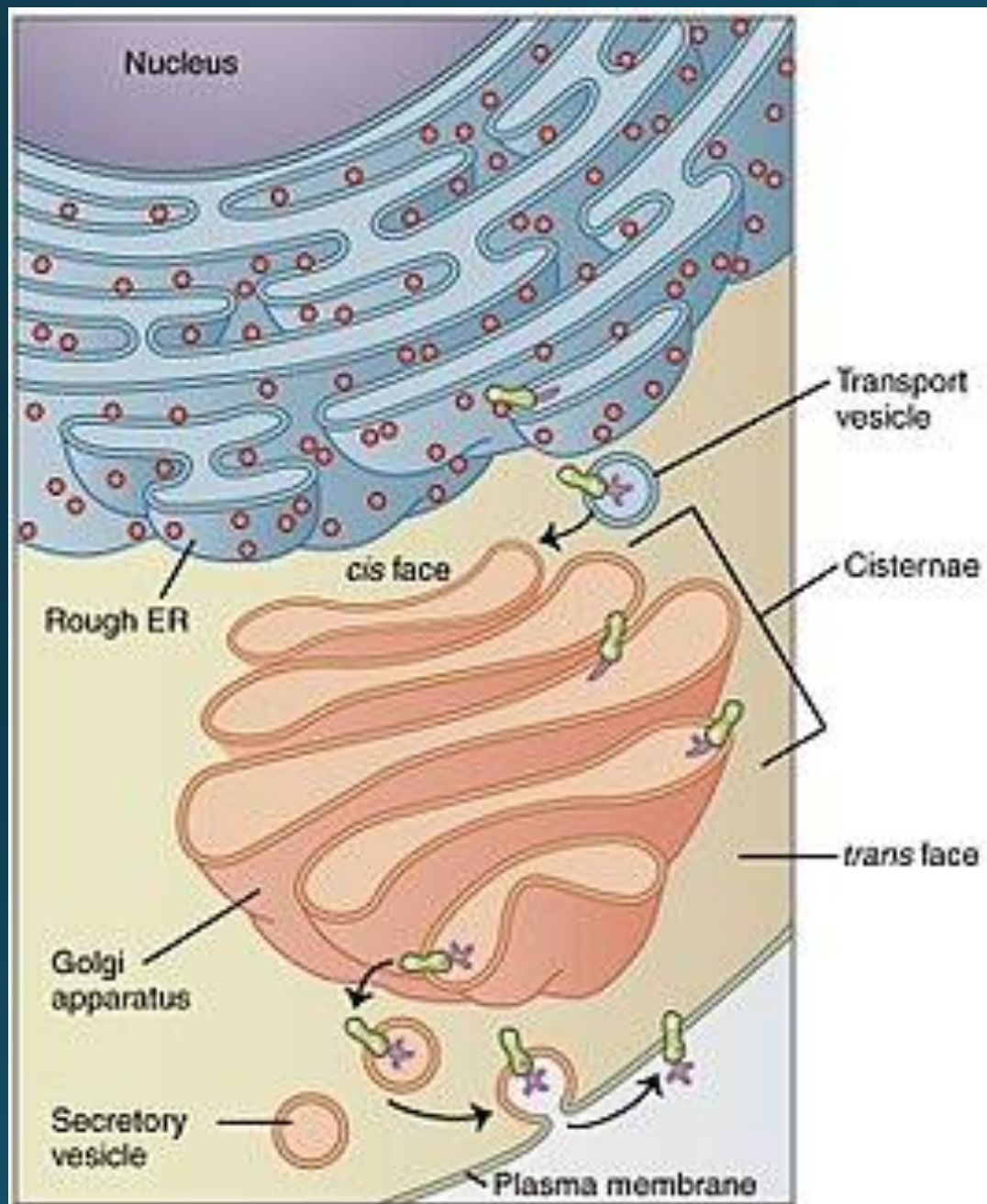
- *Def:* Stack of flattened, membrane bound sacs called cisternae, together with system of associated vesicles (*Golgi vesicles*)
- Found in eukaryotic cells
- Has complex system of interconnected tubules around central stack
- Outer / cis / forming face (convex): End of the stack where new cisternae are constantly formed by fusion of vesicles from smooth ER.
- Inner / trans / maturing face (concave): End of the stack where cisternae breakup into vesicles again

Function :

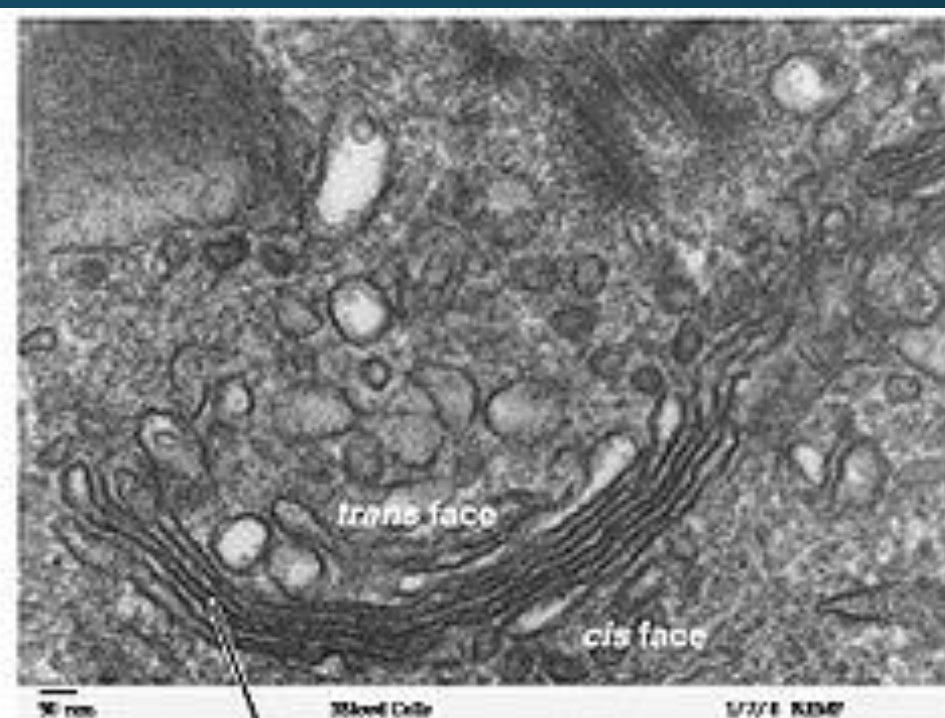
Abundant in secretory (glandular) cells

- Processing of cell secretions (usually proteins)
- Collects proteins from RER through SER
- Modifies the to perform specific function
- Transports modified products in form of vesicles (e.g. lysosomes, peroxisomes, glyoxysomes)
- Formation of conjugated molecules (glycoprotein, lipoprotein)
- In plants : forms *phragmoplasts*. (?)





(a)



Golgi apparatus

(b)

PLENARY:

1. A gland has to release its secretion. Trace the path of this process.
2. Differentiate between prokaryotic and eukaryotic ribosomes.
3. Cell inclusions are the sites for metabolic activity

True / False



STAY
HOME

STAY SAFE

Allah

Hafiz