Part 3 Nucleus and Organelles

Name:

Part 3 Lesson 1 Nucleus

Cellular Organelles: A membrane-bound compartment or _____ in a cell that performs a special _____.

The Big / Roles / Jobs of Cellular Organelles. They…

Examples / Organelles or process where this happens.	Examples / Organelles or process where this happens	Examples / Organelles or process where this happens	Examples / Organelles or process where this happens	Examples / Organelles or process where this happens

The Nucleus

_____ organelle in the cell (dark spot)
Contains _____ information (DNA)
_____ transcription to _____ Translation to _____
Chromosomes / Chromatin
Composed of _____
Thicken for cellular _____.
Set number per species.
Humans have _____ chromosomes (23 pairs).

Nucleolus

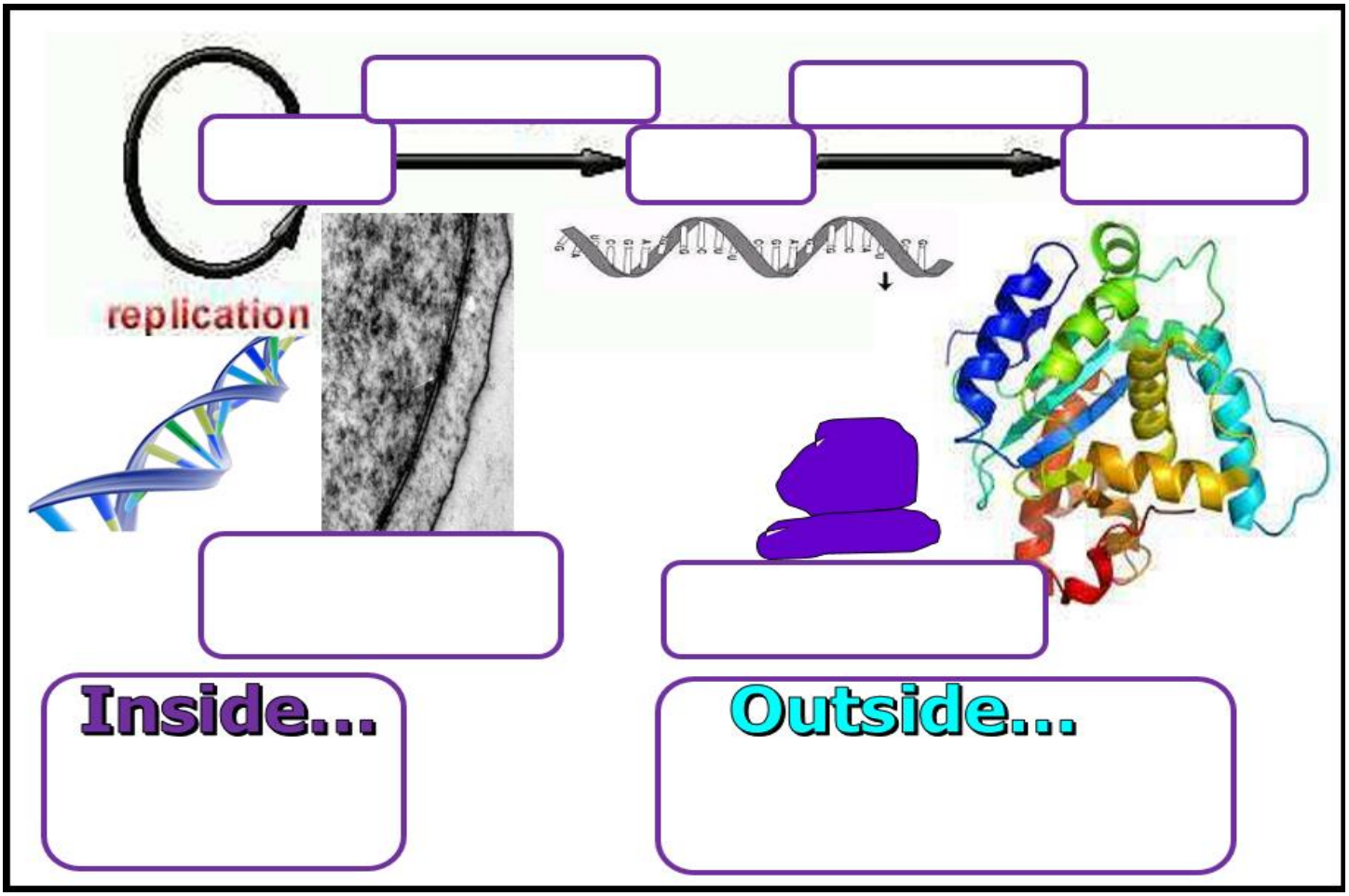
Round dark spot shape in _____.
Only visible when cell is not _____.
Contains _____ for protein manufacturing.
Makes _____that travel out of nucleus

Part 3 Lesson 2 Nuclear Membrane

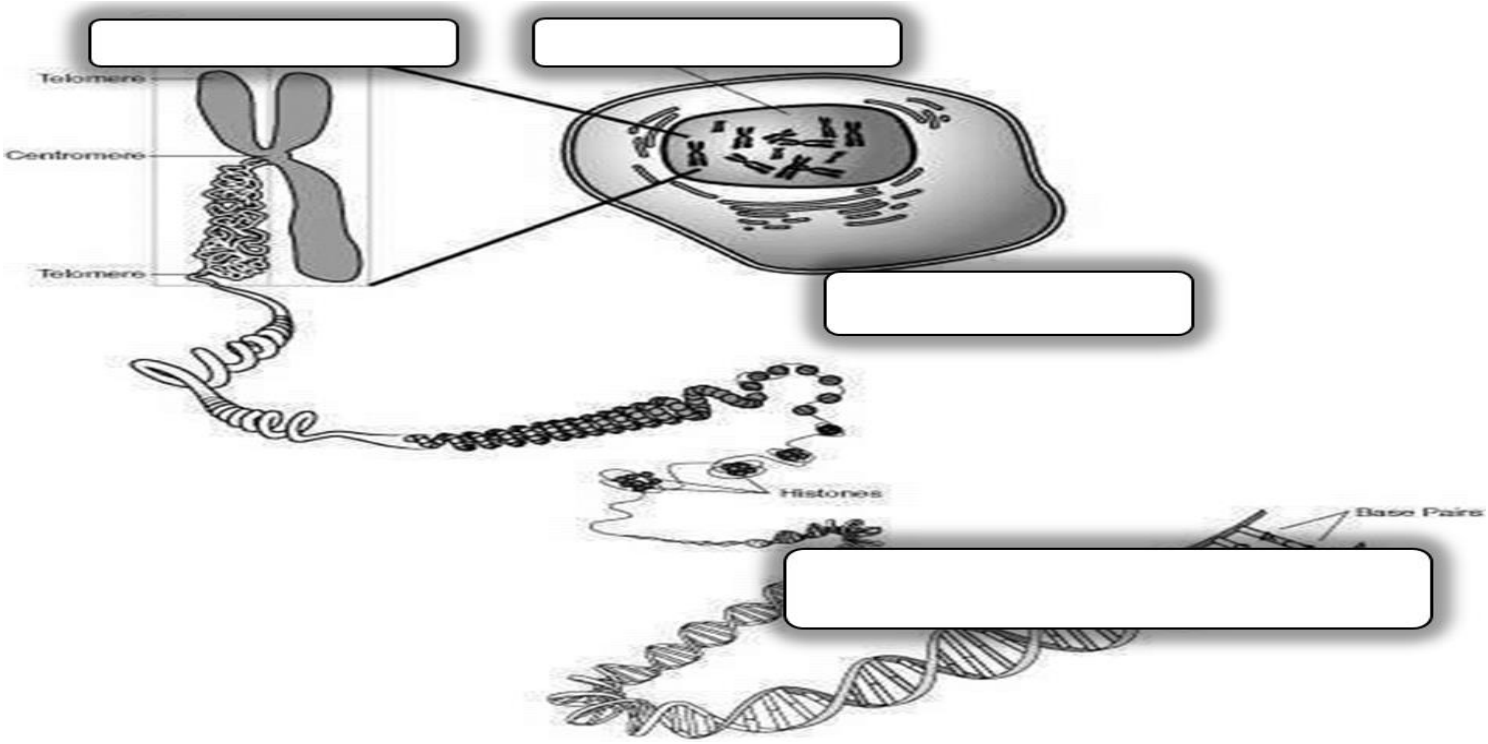
Nuclear Membrane

Surrounds nucleus.
Composed of _____ layers
Numerous _____ for nuclear traffic.

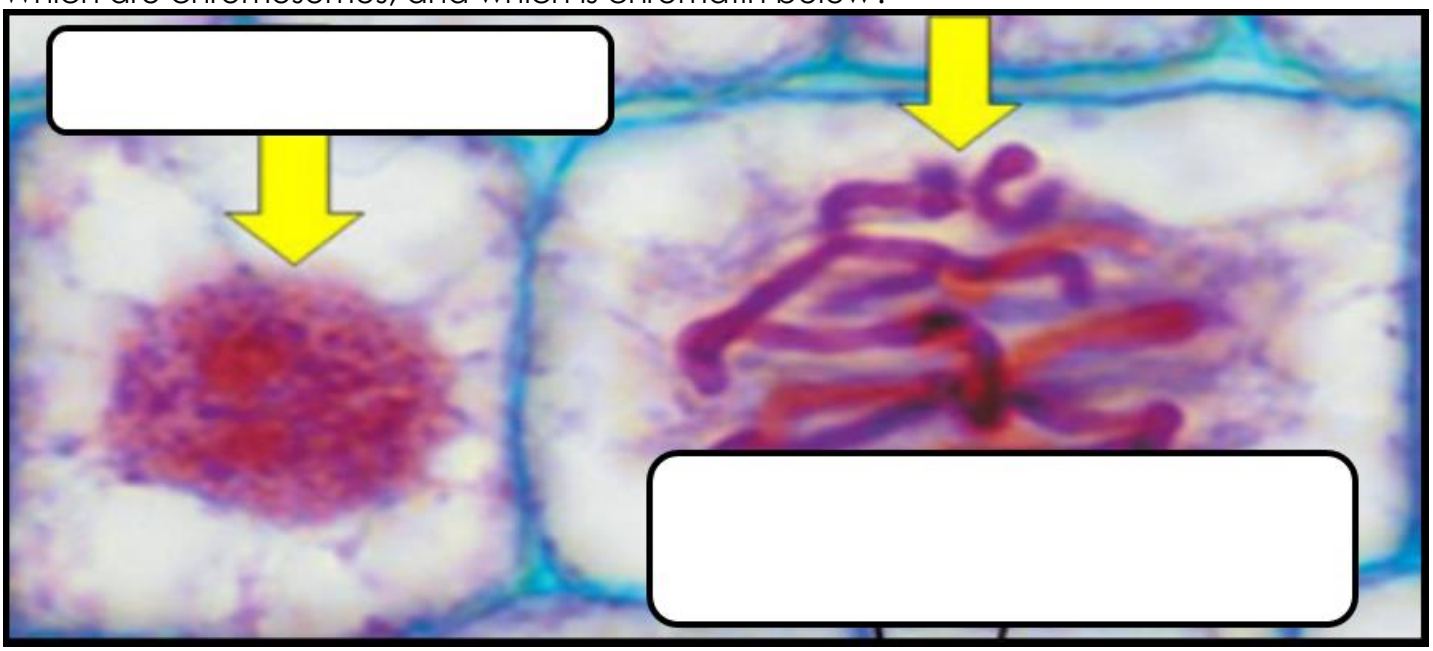
Please fill-in the spaces with the correct term as described in the lesson. Word Bank; the Nucleus, in the Cytoplasm / ER, DNA, Proteins, RNA, Translation, Ribosomes, Transcription, Nuclear Membrane



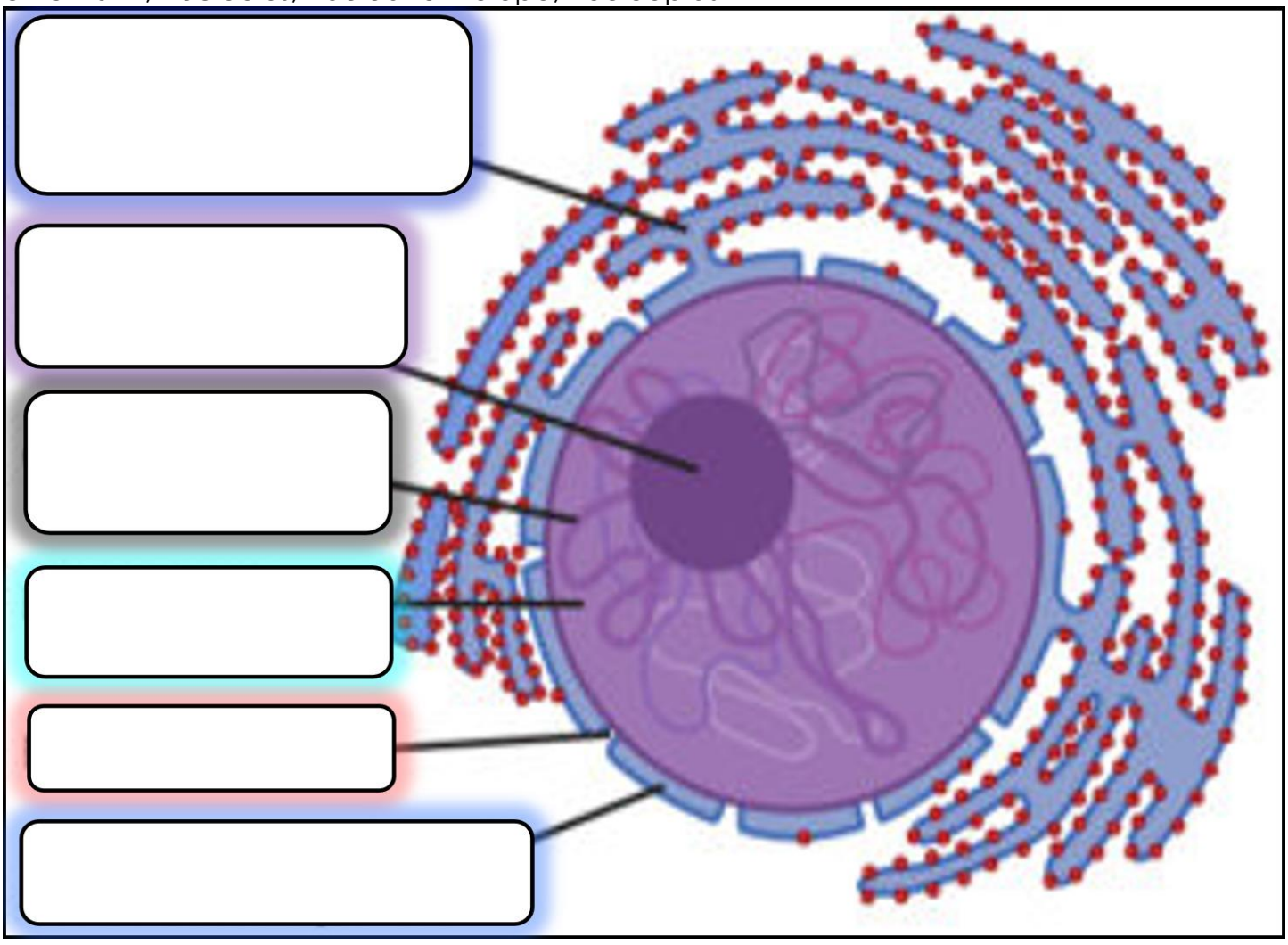
Please label the boxes. Word Bank: Cell, Nucleus, Chromosome, DNA



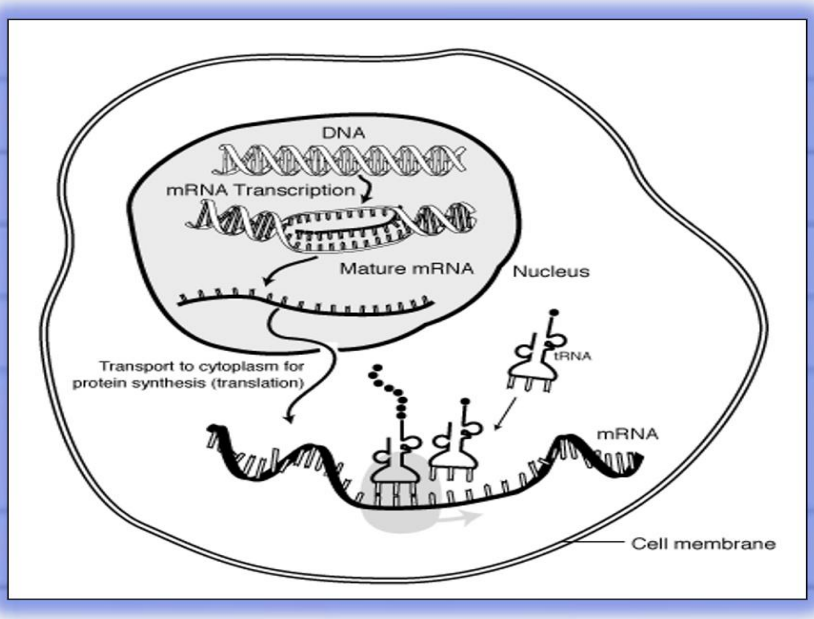
Which are chromosomes, and which is chromatin below?



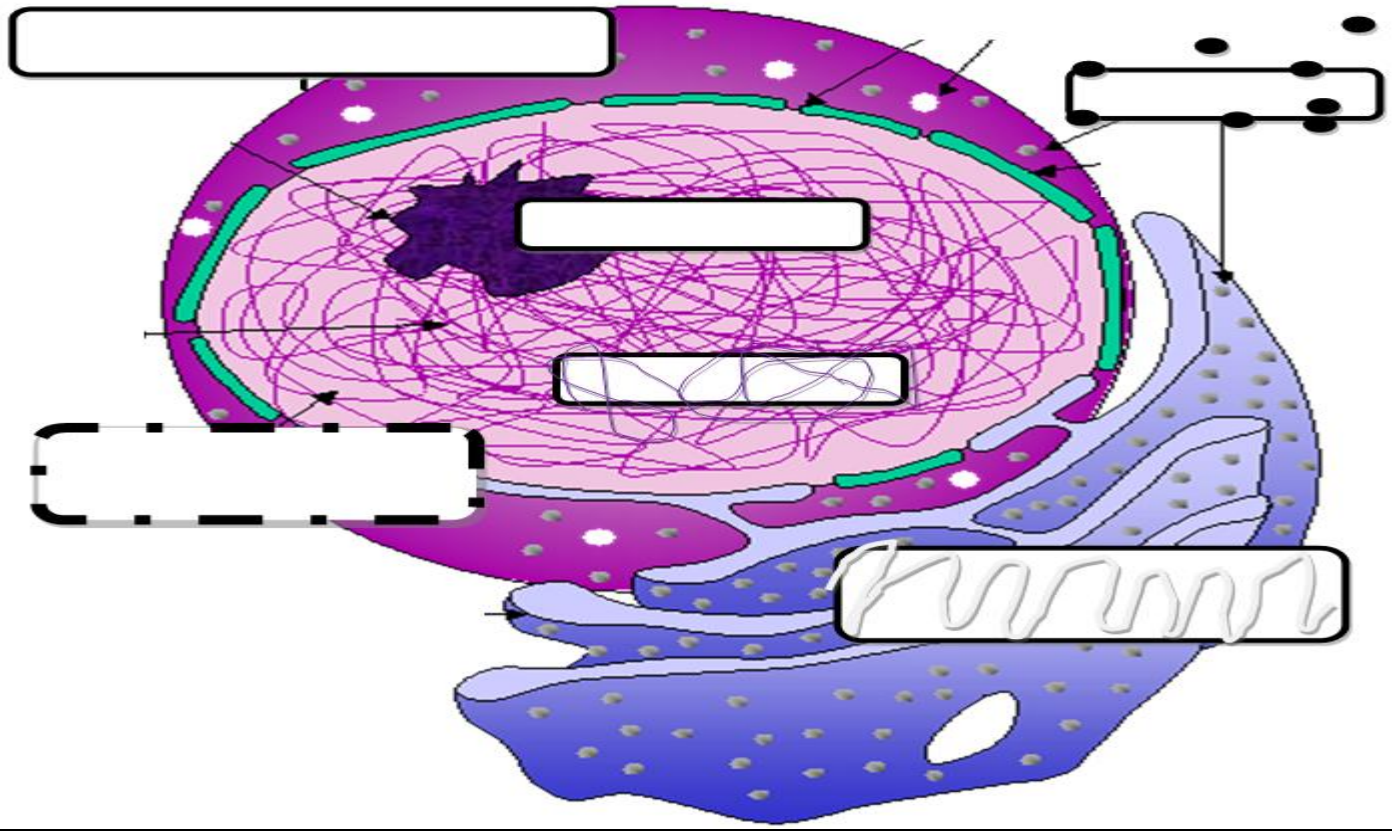
Please label the nucleus below. Word Bank: Nuclear pore, endoplasmic reticulum, chromatin, nucleolus, nuclear envelope, nucleoplasm



Where is the RNA transcribed? Where does it travel? Which organelle translates the RNA?



Please label the sketch of the nucleus, nucleolus, chromatin, nuclear membrane, endoplasmic reticulum, and ribosomes below.



Rough Endoplasmic reticulum (E.R. for short)

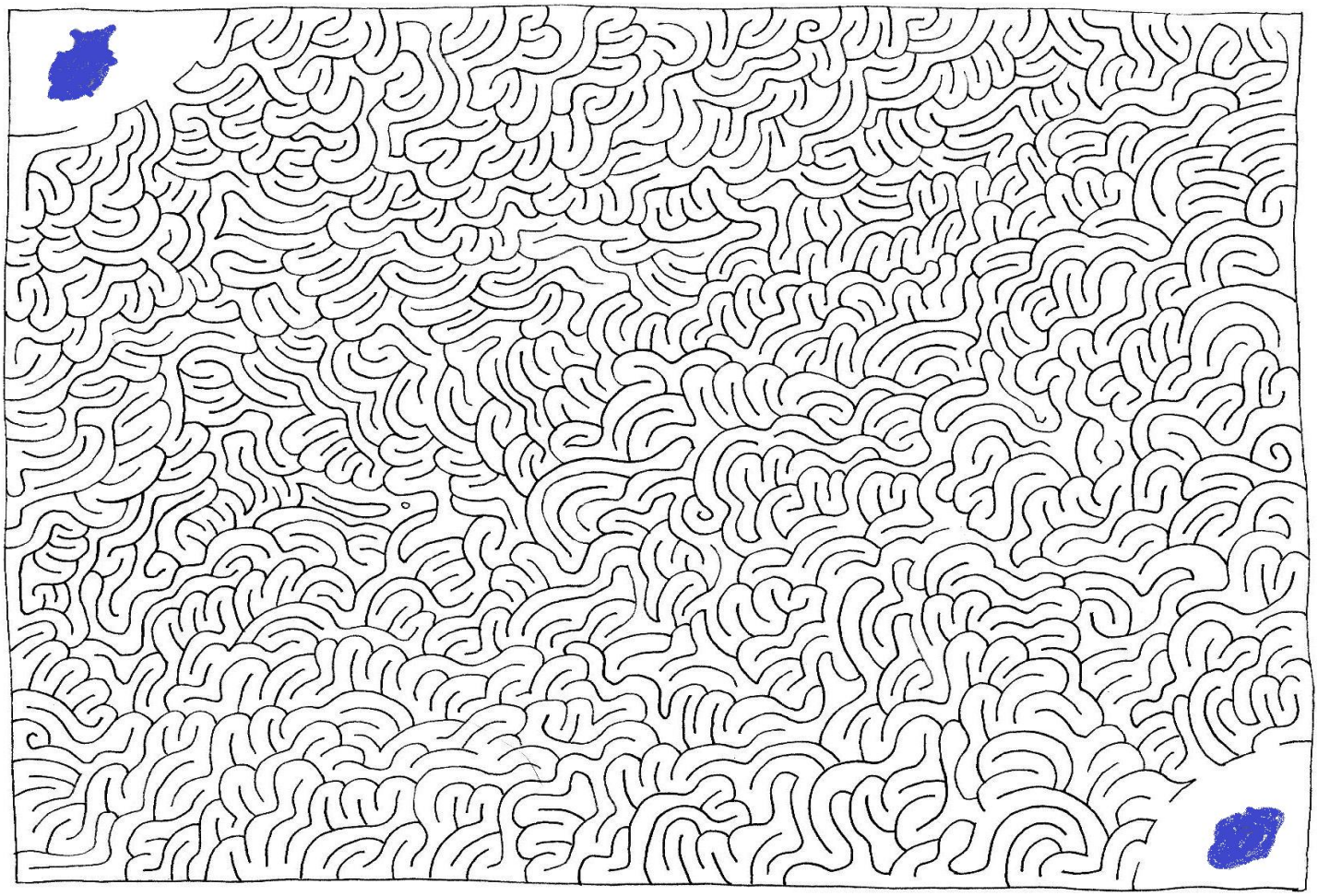
- - _____-like network fused to nuclear membrane.
- - Goes from _____ to cell _____.
- - Stores, separates, and serves as cell's _____ system
- - _____attach to and make proteins.

What are the two big roles of the endoplasmic reticulum

Smooth E.R.

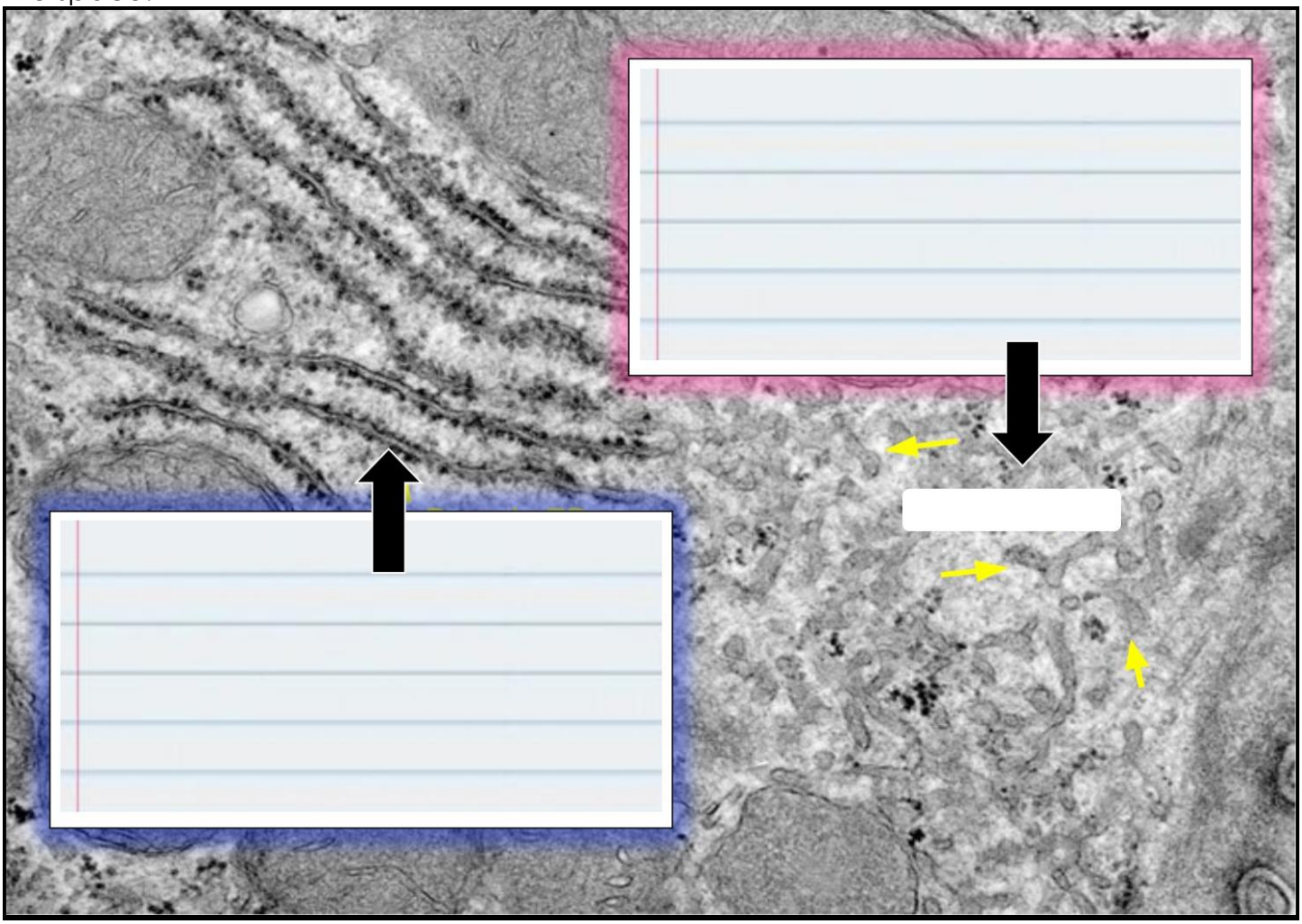
- - Makes _____ (fats) and steroids.
- - Regulates _____ production.
- - Synthesizes _____ "Gluconeogenesis"
- - Detoxifies _____
- -Stores important _____

Help Robbie Ribosome through the E.R. "Yes", you need to do it, and "yes" it can be done! Use pencil as you'll make errors. Use a colored pencil at the end to highlight the correct path.

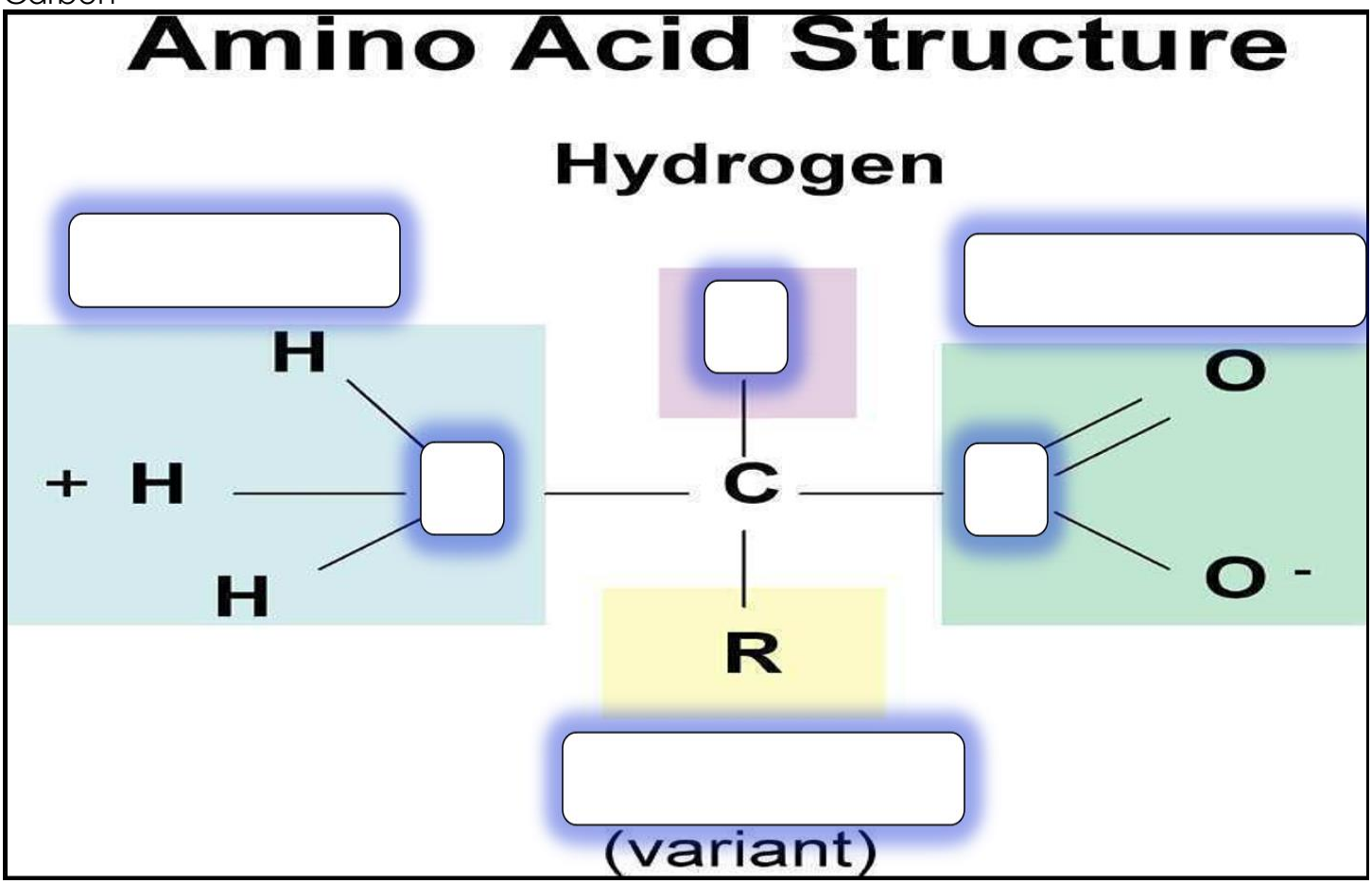


Why is it a mazelike passageway and what happens here?

What is the differences between the smooth and rough ER. Which is which below? Explain in the space.



Please identify the missing boxes to correctly label an Amino Acid, the building blocks of a protein. Word Bank: Carboxyl, Amino, R-group, (N) for Nitrogen, (H) for Hydrogen, (C) for Carbon



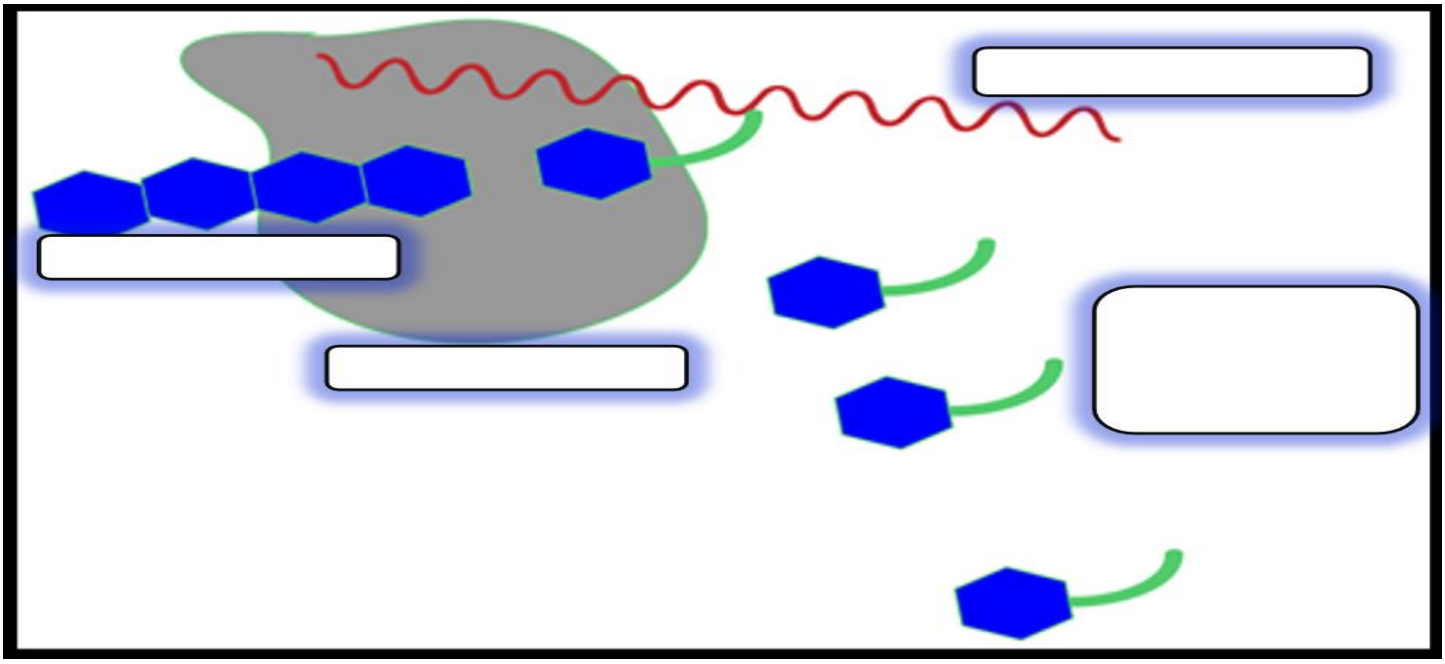
Part 3 Lesson 3 Protein Synthesis

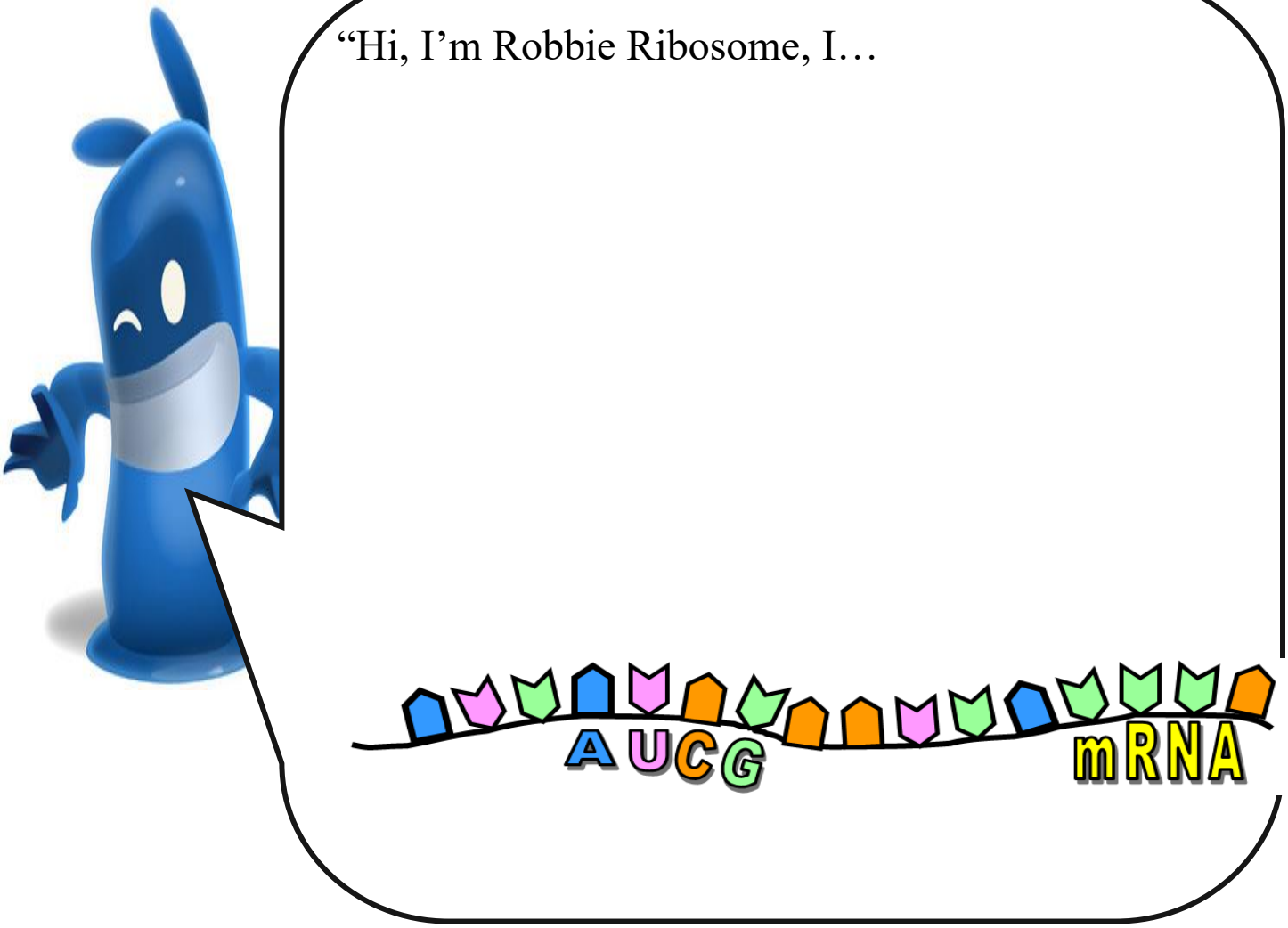
Ribosomes

- - Each cell contains _____
- - _____ Acids: The building blocks of proteins. 20 variations
- - Composes 25% of cell's _____
- - Most are embedded in rough endoplasmic reticulum. Some free in cytoplasm.
- - Site of Protein _____
- - Mini _____ making factories
- - Proteins (_____) are important to our cells and body.
- - DNA is copied into _____, RNA has information to make _____.
- - Ribosomes and m_____

Protein Synthesis: The process in which the _____code carried by messenger _____ directs cellular organelles called _____ to produce _____ from _____.

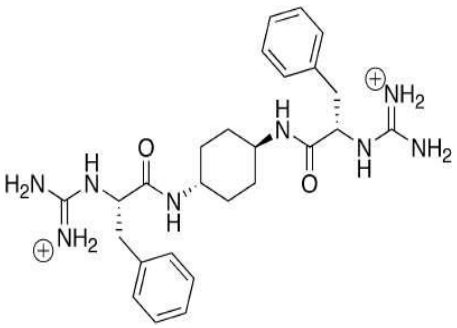
Please name the boxes: Word Bank: tRNA (Transfer RNA), Ribosome, mRNA (messenger RNA, Polypeptide Chain,




"Hi, I'm Robbie Ribosome, I…
AUCG
mRNA

Part 3 Lesson 4 Golgi Apparatus

What is so important about proteins and the human body?



GRRR!

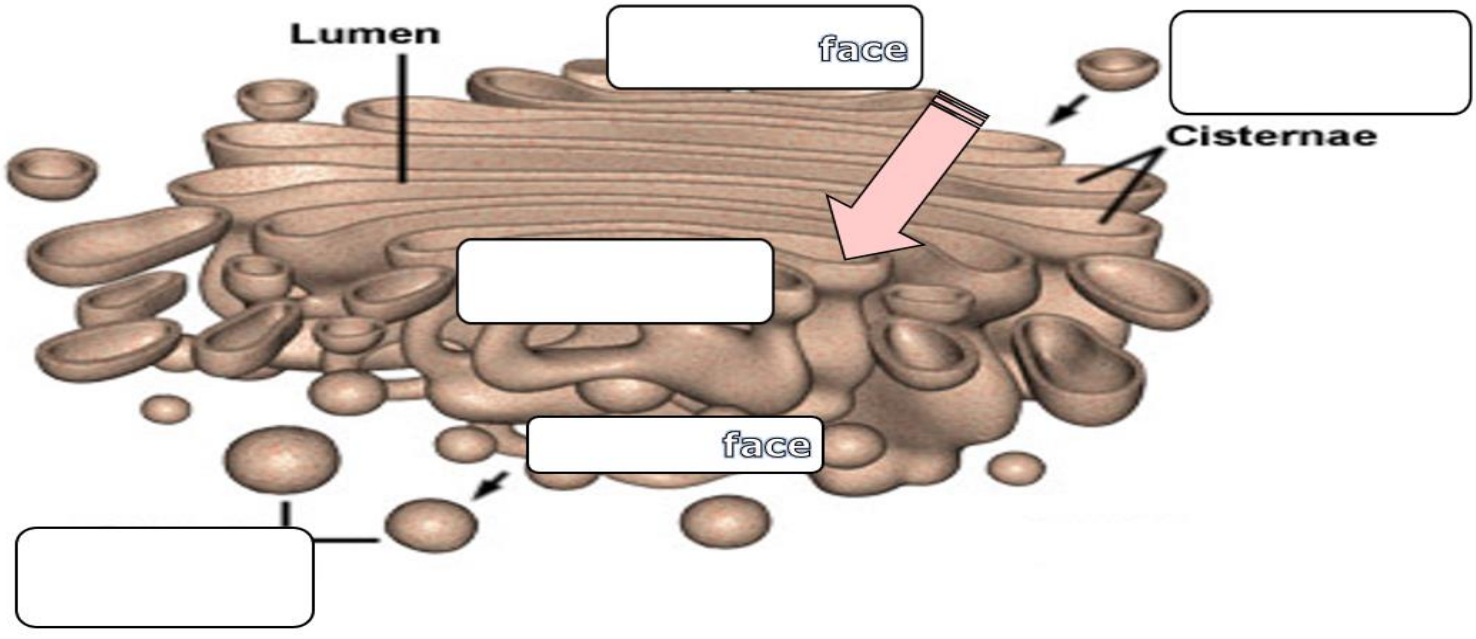
Hormones: Protein messengers which help to coordinate certain _____ activities.

Golgi Apparatus

- Protein _____ plant and other macromolecules.
- Sends _____ of macromolecules to destination in cell.
- Composed of numerous _____ forming a _____.
- Enzymes and contents of _____ are made here.

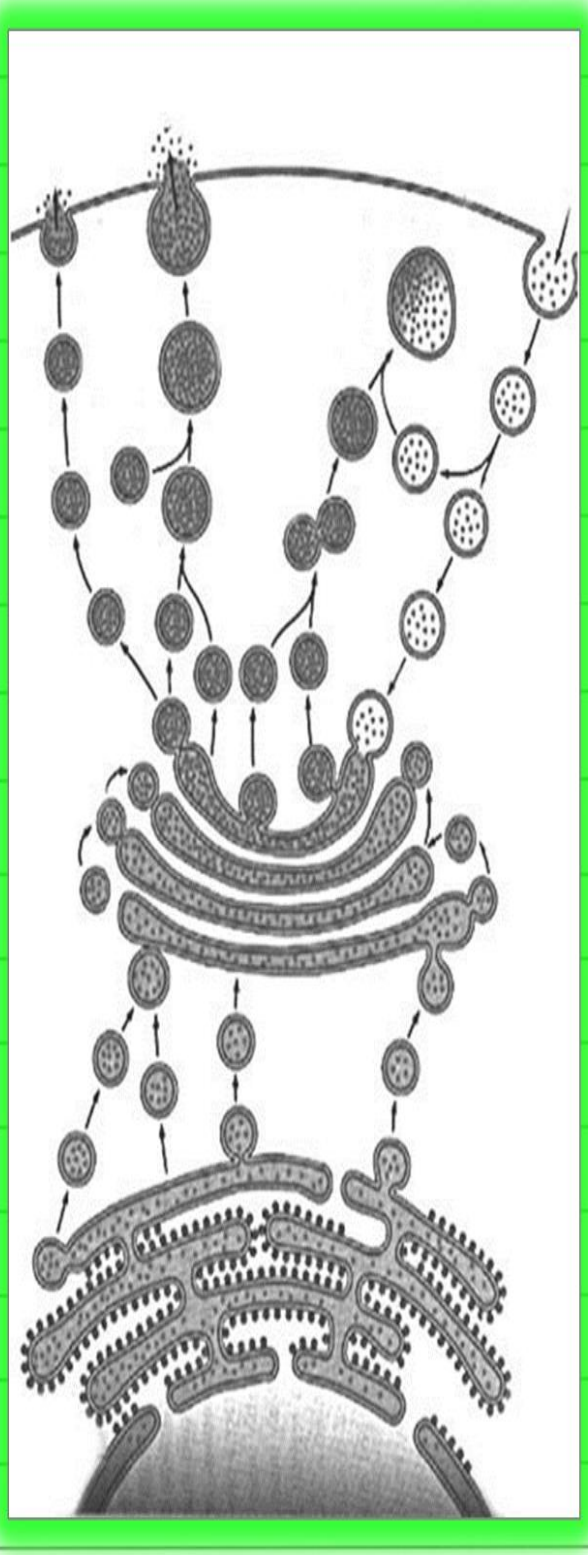
What are the two big roles of the Golgi Apparatus

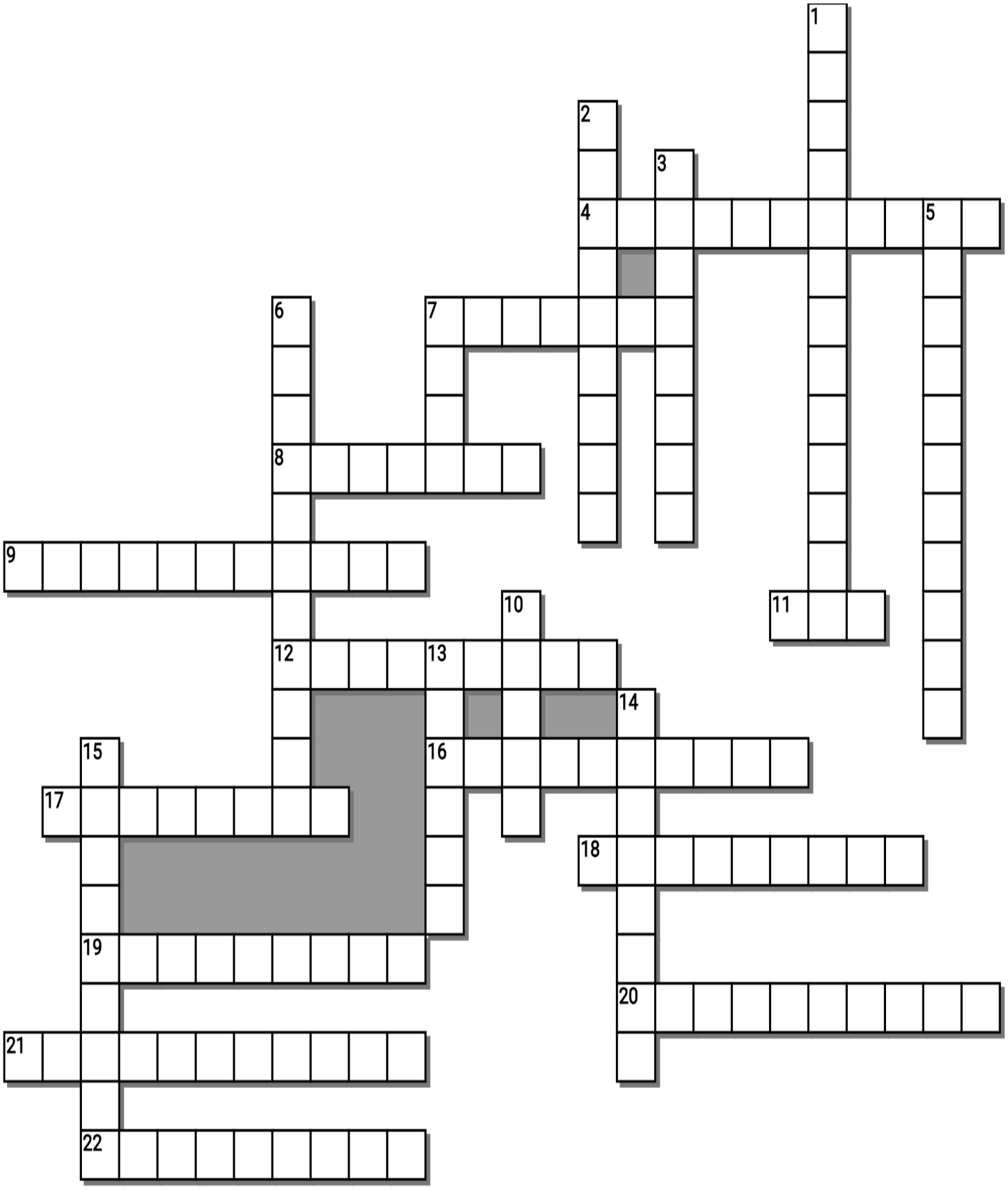
Please fill in the blanks below as shown in the slideshow.



Warning! 3 Part Question.

◊Describe the flow of materials (molecules) in the following pictures. ◊Please name the three organelles present and their job. ◊What process is seen at the top?





Possible Answers

CHROMATIN, CHROMOSOMES, DNA, ENDOPLASMIC, GOLGI, MEMBRANE, MESSENGER, NUCLEOLUS, NUCLEUS, ORGANELLES, PORE, PROTEIN, RETICULUM, RIBOSOMES, SMOOTH, TRANSCRIPTION, TRANSFER, TRANSLATION, TRANSPORT, EUKARYOTIC, NUCLEOPLASM , POLYPEPTIDE, VESICLES

Across

4. Humans have 46 _____ (23 pairs).
7. _____ Synthesis: The process in which the genetic code carried by messenger RNA directs cellular organelles called ribosomes to produce proteins from amino acids.
8. Largest organelle in the cell
9. A type of protoplasm, and is enveloped by the nuclear envelope (also known as the nuclear membrane). Includes the chromosomes and nucleolus.
11. The nucleus is a membrane-bound organelle that contains genetic material (___) of eukaryotic organisms
12. The ER - Stores, separates, and serves as cell's _____ system
16. Cellular _____: A membrane-bound compartment or structure in a cell that performs a special function.
17. Nuclear _____: Numerous openings for nuclear traffic.
18. Each cell contains thousands of these mini protein manufacturing sites
19. Chromosomes unwind into C_____
20. The nucleus is a membrane-bound organelle found in _____ cells
21. A _____ is a single linear chain of many amino acids
22. _____ RNA (mRNA) is a single-stranded RNA molecule that is complementary to one of the DNA strands of a gene.

Down

1. DNA T_____ to RNA Translation to Proteins
2. This organelle makes ribosomes that travel out of nucleus
3. T_____ ribonucleic acid (tRNA) is a type of RNA molecule that helps decode a messenger RNA (mRNA) sequence into a protein. tRNAs function at specific sites in the ribosome during translation, which is a process that synthesizes a protein from an mRNA molecule.
5. Rough _____ Reticulum: Maze-like network fused to nuclear membrane
6. DNA transcription to RNA T_____ to Proteins
7. The nuclear _____ is a protein-lined channel in the nuclear envelope that regulates the transportation of molecules between the nucleus and the cytoplasm.
10. _____ Apparatus: Sends vesicles of macromolecules to destination in cell.
13. _____ Endoplasmic Reticulum: Makes lipids (fats) and steroids.
14. The Golgi apparatus is responsible for transporting, modifying, and packaging proteins and lipids into _____ for delivery to targeted destinations.
15. Rough endoplasmic _____ (RER), series of connected flattened sacs, part of a continuous membrane organelle within the cytoplasm of eukaryotic cells, that plays a central role in the synthesis of proteins.

Possible Answers

CHROMATIN, CHROMOSOMES, DNA, ENDOPLASMIC, GOLGI, MEMBRANE, MESSENGER, NUCLEOLUS, NUCLEUS, ORGANELLES, PORE, PROTEIN, RETICULUM, RIBOSOMES, SMOOTH, TRANSCRIPTION, TRANSFER, TRANSLATION, TRANSPORT, EUKARYOTIC, NUCLEOPLASM , POLYPEPTIDE, VESICLES

Part 3 Review Game

Name:

1-10 = 10 pts * = Bonus + 1 pt, Part 3 Lesson 5

(Secretly write owl in correct space +1 pt)

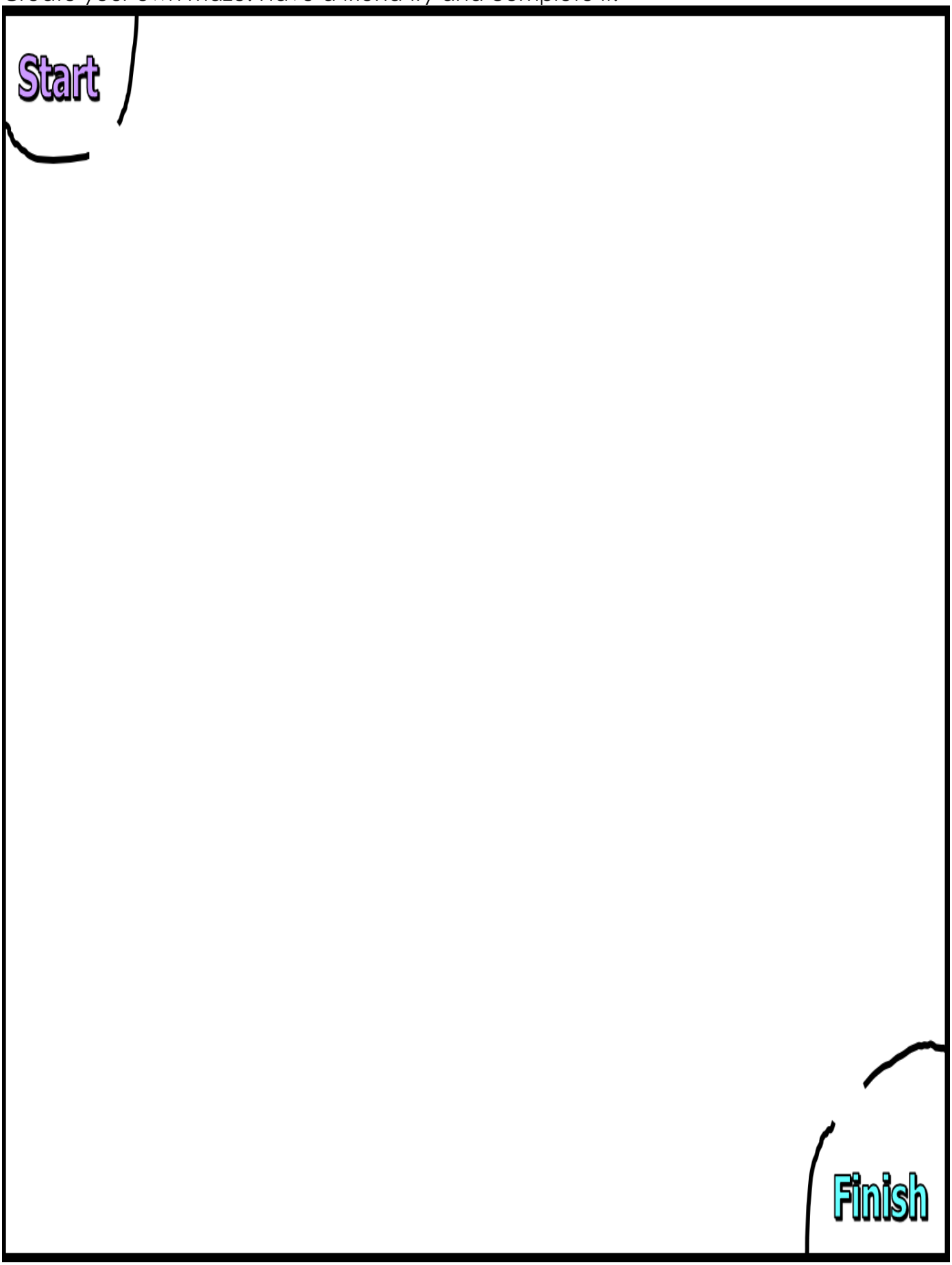
Score ____ / 100

Final Question = 5 pt wager

NUKEM	LOST IN TRANSLATION	IMPORTANT MESSAGE	FANNYPACKS	MAZES Bonus round 1 pt each
1)	6)	11)	16)	*21)
2)	7)	12)	17)	*22)
3)	8)	13)	18)	*23)
4)	9)	14)	19)	*24)
5)	10)	15)	20)	*25)

Final Question Wager ____/5 Answer: _____

Create your own maze. Have a friend try and complete it!



Part 3 Nucleus and Organelles

Name:

Part 3 Lesson 1 Nucleus

Cellular Organelles: A membrane-bound compartment or structure in a cell that performs a special function.

The Big / Roles / Jobs of Cellular Organelles. They…

Support	Make Manufacture	Breakdown Materials	Transport Materials	Communicate
Examples / Organelles or process where this happens. Cell Wall Cytoskeleton	Examples / Organelles or process where this happens Ribosomes Chloroplast	Examples / Organelles or process where this happens Lysosome Peroxisome	Examples / Organelles or process where this happens Endoplasmic Reticulum Golgi Apparatus Cell Membrane	Examples / Organelles or process where this happens Nucleus

The Nucleus

- Largest organelle in the cell (dark spot)
- Contains Genetic information (DNA)
- DNA transcription to RNA Translation to Proteins
  - Chromosomes / Chromatin
    - Composed of DNA
    - Thicken for cellular division.
    - Set number per species.
      - Humans have 46 chromosomes (23 pairs).

Nucleolus

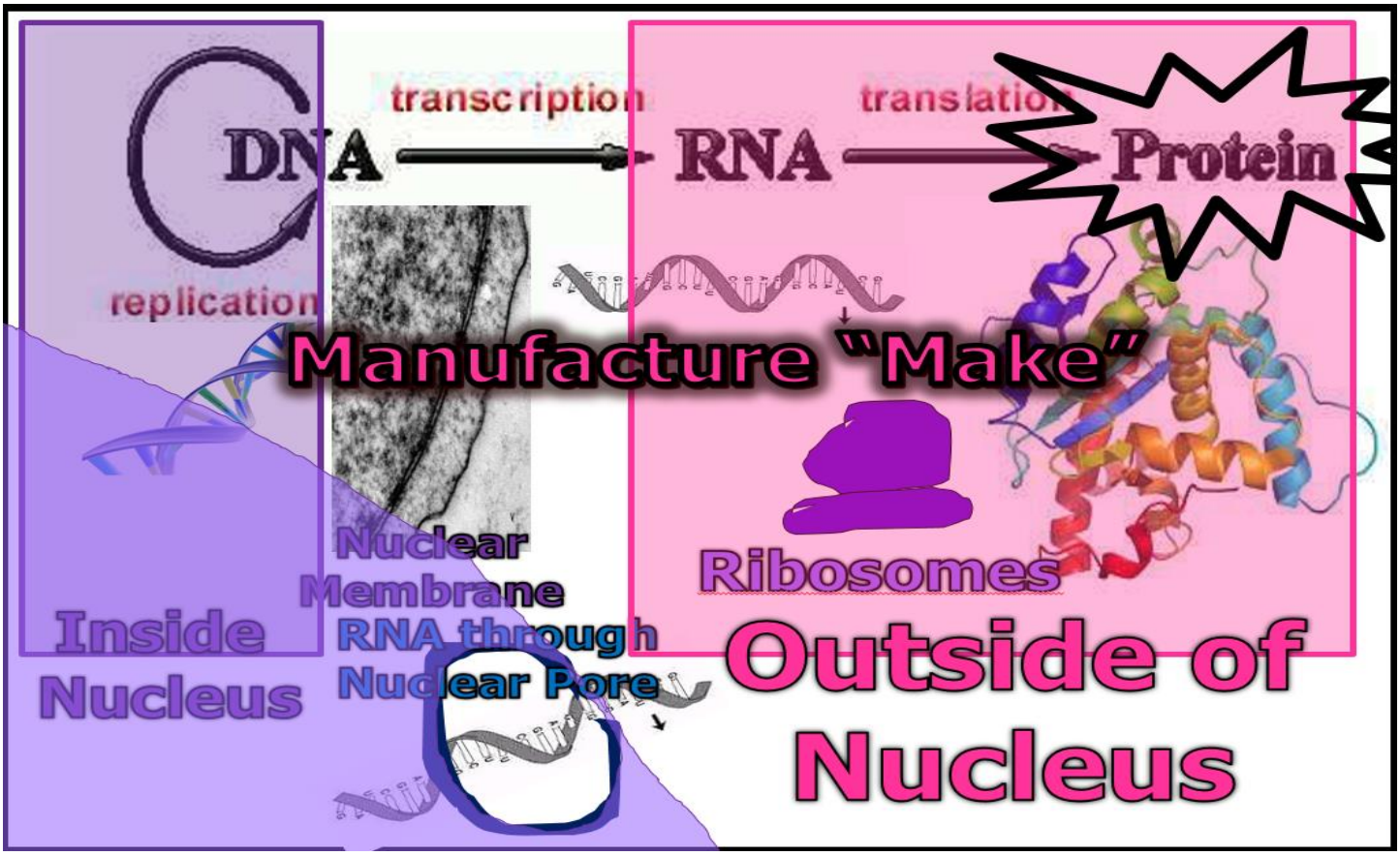
- Round dark spot shape in nucleus.
- Only visible when cell is not dividing.
- Contains RNA for protein manufacturing.
- Makes ribosomes that travel out of nucleus

Part 3 Lesson 2 Nuclear Membrane

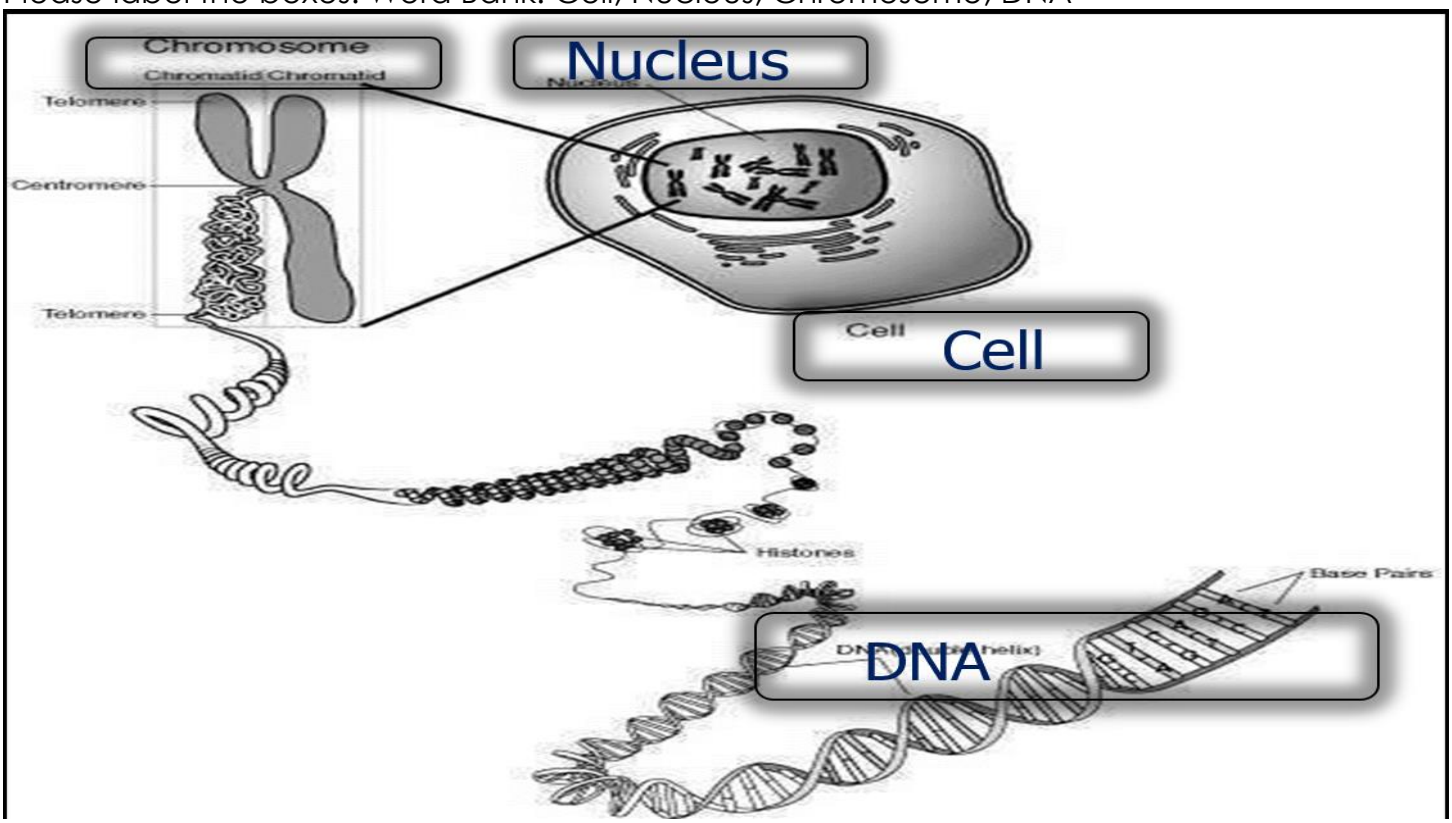
Nuclear Membrane

- Surrounds nucleus.
- Composed of two layers (Bilayer)
- Numerous openings for nuclear traffic.

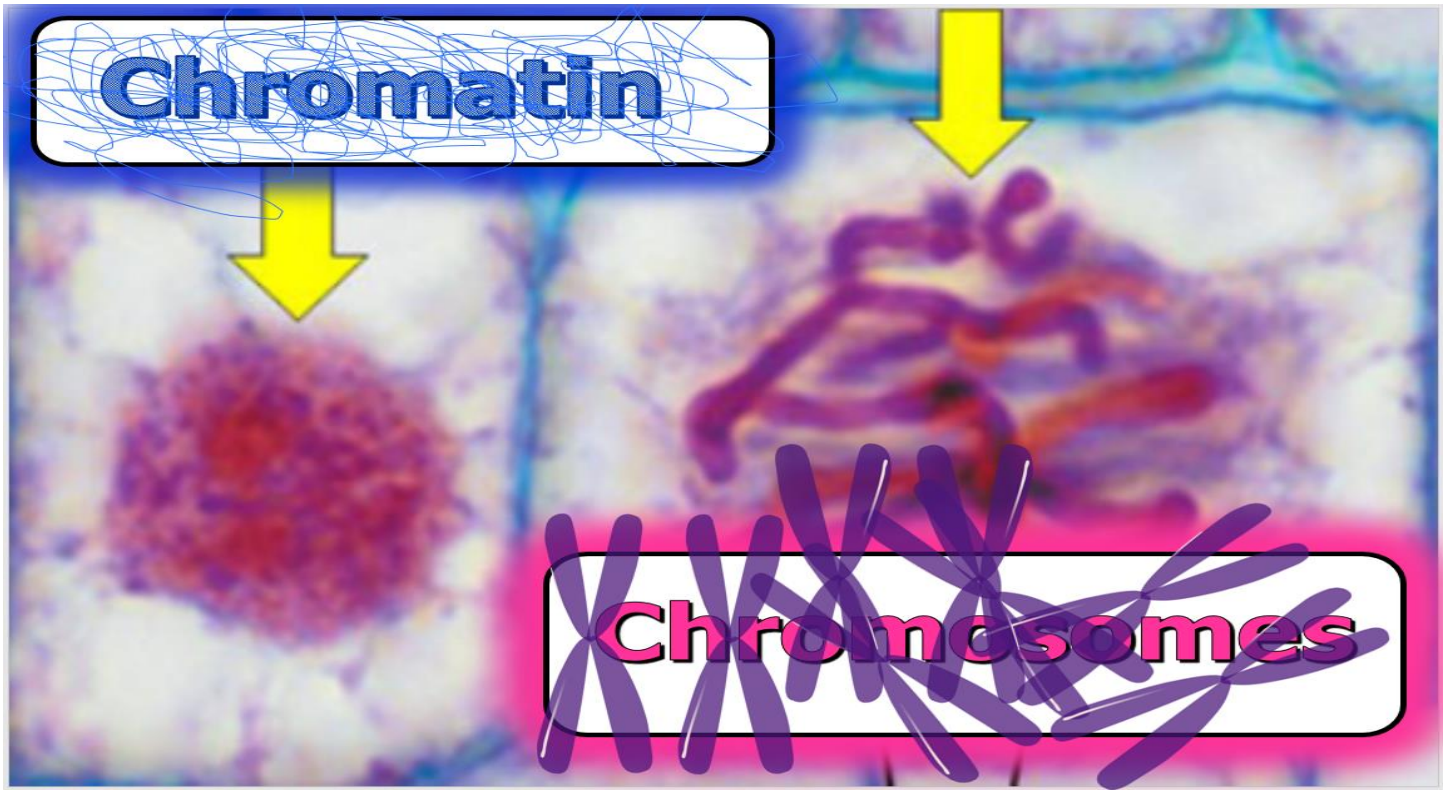
Please fill-in the spaces with the correct term as described in the lesson. Word Bank; the Nucleus, in the Cytoplasm / ER, DNA, Proteins, RNA, Translation, Ribosomes, Transcription, Nuclear Membrane



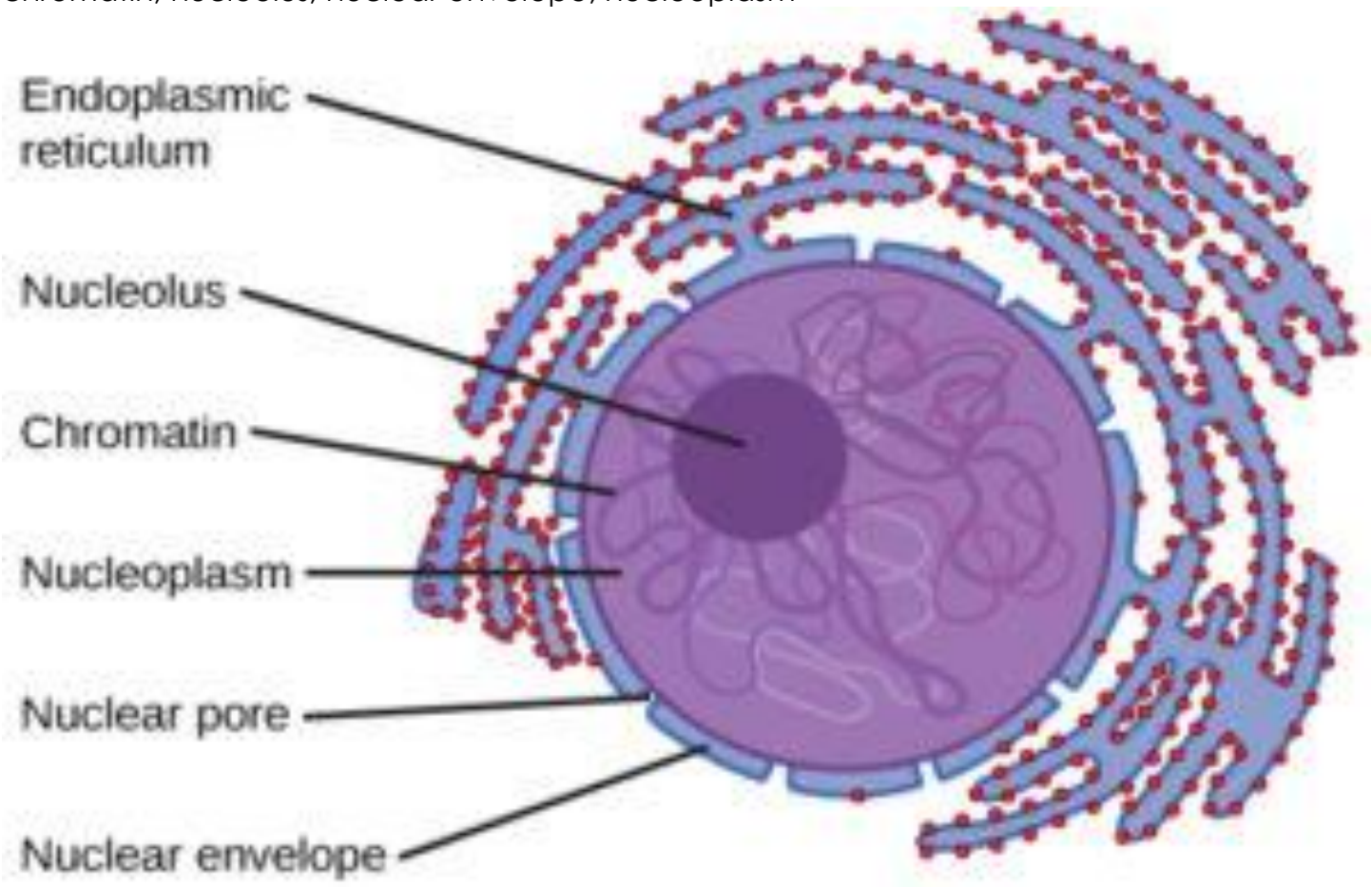
Please label the boxes. Word Bank: Cell, Nucleus, Chromosome, DNA



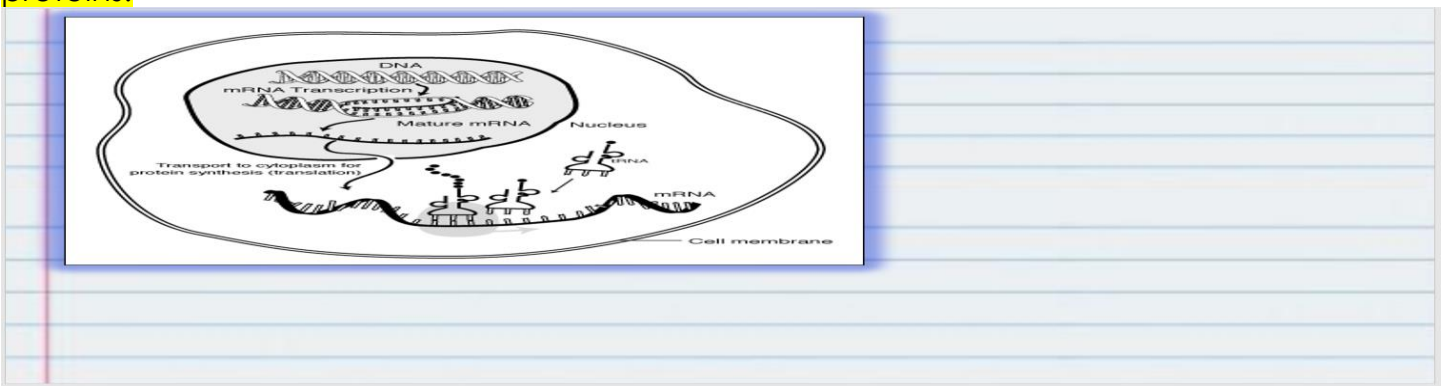
Which are chromosomes, and which is chromatin below?



Please label the nucleus below. Word Bank: Nuclear pore, endoplasmic reticulum, chromatin, nucleolus, nuclear envelope, nucleoplasm



Where is the RNA transcribed? Where does it travel? Which organelle translates the RNA?
Transcription occurs in the nucleus. DNA is unwound and a segment of RNA is transcribed. The mRNA leaves the nucleus through a nuclear opening. It's read by ribosomes and the information is translated into polypeptide chains which will become the building blocks of proteins.



Please label the sketch of the nucleus, nucleolus, chromatin, nuclear membrane, endoplasmic reticulum, and ribosomes below.

Rough Endoplasmic reticulum (E.R. for short)

- - Maze-like network fused to nuclear membrane.
- - Goes from nucleus to cell membrane.
- - Stores, separates, and serves as cell's transport system
- - Ribosomes attach to and make proteins.

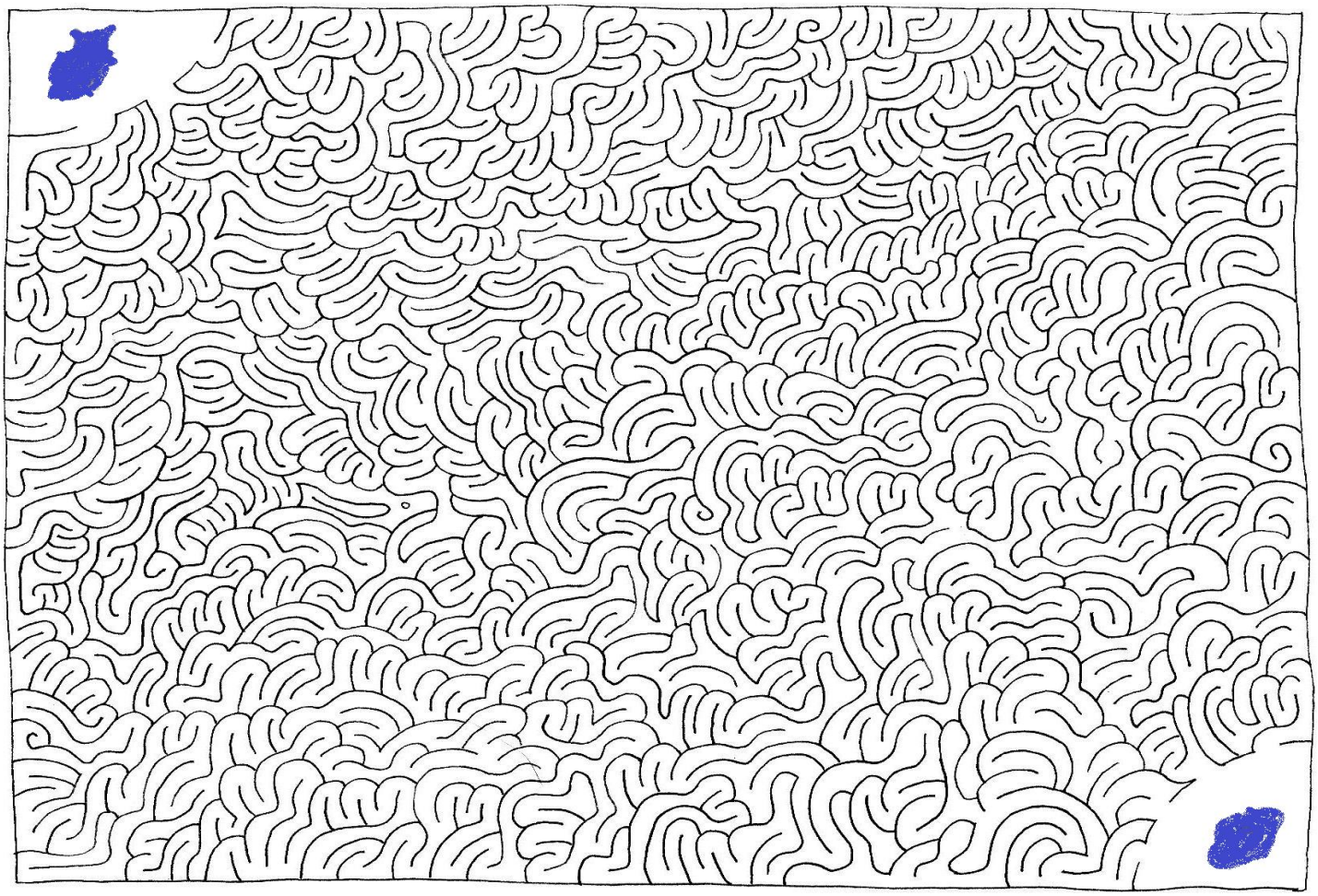
What are the two big roles of the endoplasmic reticulum

Manufacturing :To Make" particularly in the synthesis, folding, modification, and transport of proteins	Transport: Ribosomes and Proteins that are synthesized in the ER must be transported through the network to their final destination in membrane-bound vesicles.

Smooth E.R.

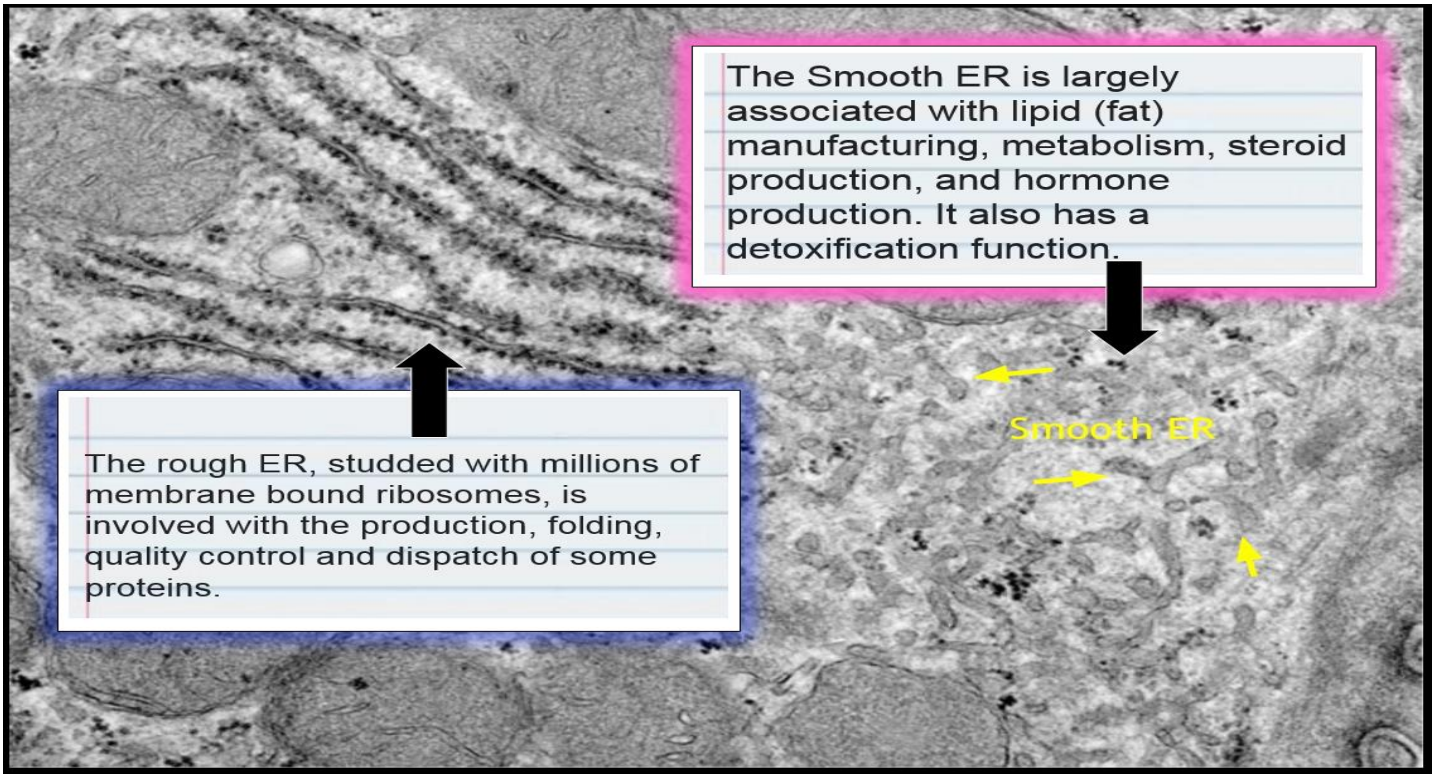
- - Makes Lipids (fats) and steroids.
- - Regulates calcium production.
- - Synthesizes sugars "Gluconeogenesis"
- - Detoxifies toxins
- -Stores important enzymes

Help Robbie Ribosome through the E.R. "Yes", you need to do it, and "yes" it can be done! Use pencil as you'll make errors. Use a colored pencil at the end to highlight the correct path.

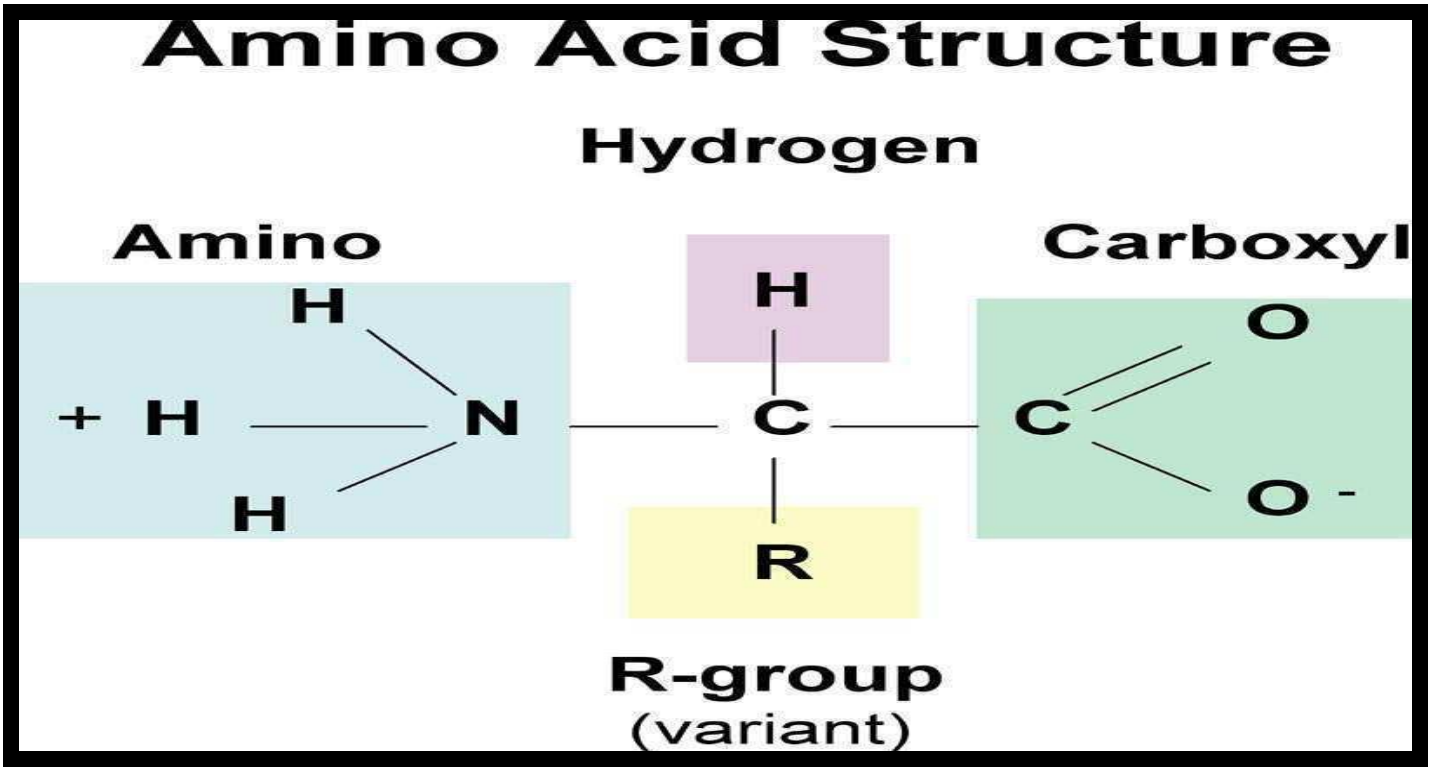


Why is it a mazelike passageway and what happens here?
Structurally, the endoplasmic reticulum is a network of membranes found throughout the cell and connected to the nucleus. The ER functions as a manufacturing and packaging system. It works closely with the Golgi Apparatus, and Ribosomes, mRNA, and tRNA. The double membranes of smooth and rough ER form sacs. Protein molecules are synthesized and collected in the cisternal space. When enough proteins have been synthesized, they collect and are pinched off in vesicles. The vesicles often move to the Golgi apparatus for additional protein packaging and distribution.

What is the differences between the smooth and rough ER. Which is which below? Explain in the space.



Please identify the missing boxes to correctly label an Amino Acid, the building blocks of a protein. Word Bank: Carboxyl, Amino, R-group, (N) for Nitrogen, (H) for Hydrogen, (C) for Carbon



Part 3 Lesson 3 Protein Synthesis

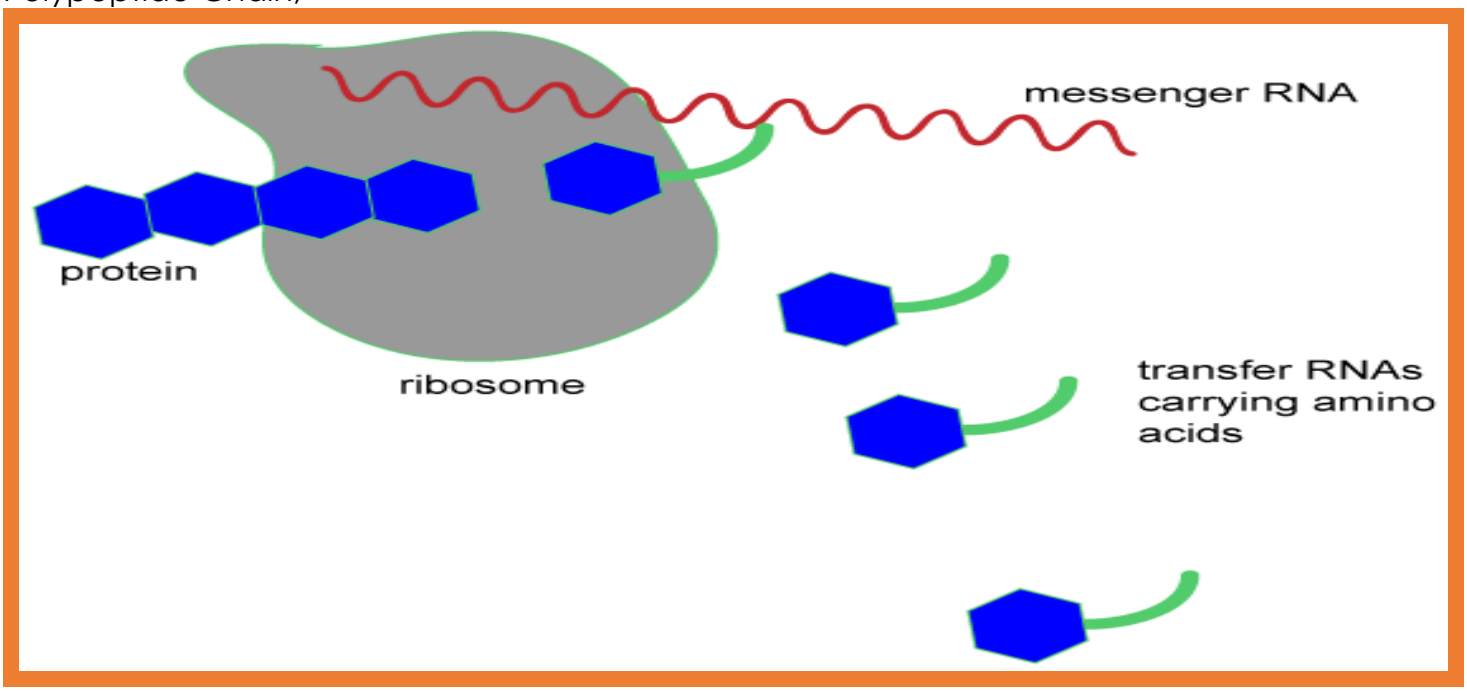
Ribosomes

- - Each cell can contain millions.
- - Amino Acids: The building blocks of proteins. 20 variations
- - Composes 25% of cell's mass

- - Most are embedded in rough endoplasmic reticulum. Some free in cytoplasm.
- - Site of Protein synthesis
- - Mini protein making factories
- - Proteins (ONCH) are important to our cells and body.
- - DNA is copied into mRNA, mRNA has information to make proteins

Protein Synthesis: The process in which the genetic code carried by messenger RNA directs cellular organelles called ribosomes to produce proteins from amino acids.

Please name the boxes: Word Bank: tRNA (Transfer RNA), Ribosome, mRNA (messenger RNA, Polypeptide Chain,



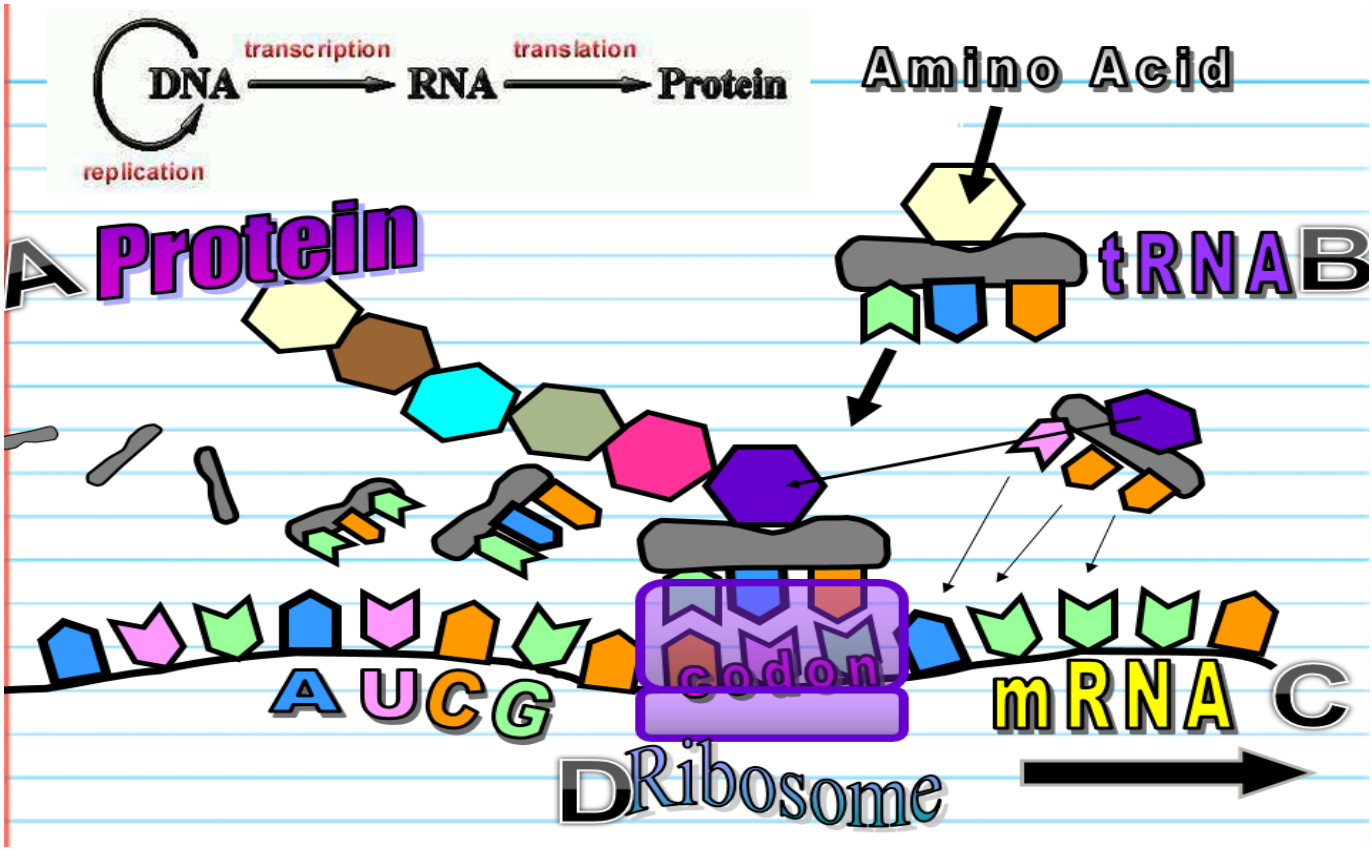
Robbie Ribosome, I…

A ribosomes is a small organelle involved in the process of making protein, which is called protein synthesis. The ribosome handles translation, which is the second part of protein synthesis. Ribosomes can be found floating freely in the cytoplasm or attached to rough endoplasmic reticulum

Protein Synthesis: The process in which the genetic code carried by messenger RNA directs cellular organelles called ribosomes to produce proteins from amino acids.

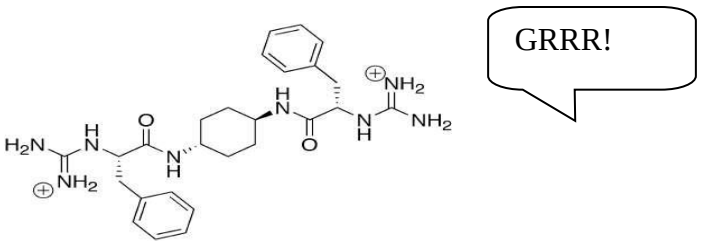
Proteins Synthesis Animation

- To make proteins
- Ribosomes are units that help read RNA
- RNA is the information code that tells the type of proteins to be made.
- Protein synthesis is the process of making



Part 3 Lesson 4 Golgi Apparatus

What is so important about proteins and the human body?

	GRRR =GROWTH, REPAIR, REPRODUCTION, REGULATION Protein participates in practically every process of a cell. It plays a part in metabolic reactions, immune response, protein provides a source of energy, assists in cellular repair, form blood cells, and more.

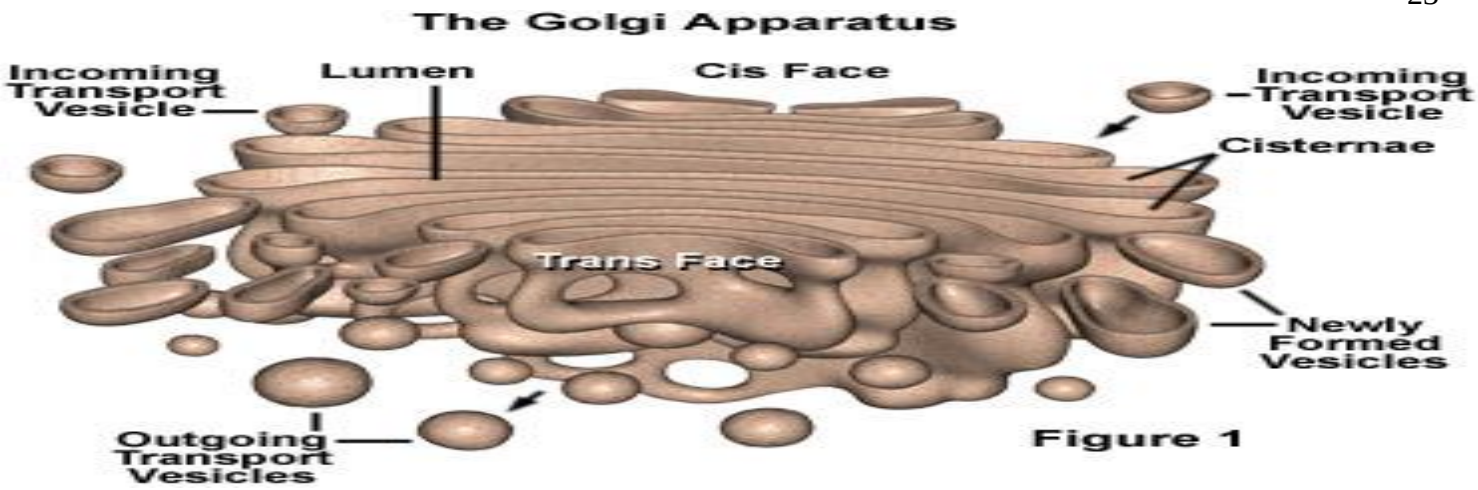
Hormones: Protein messengers which help to coordinate certain bodily activities.

Golgi Apparatus

- Protein packaging plant and other macromolecules.
- Sends vesicles of macromolecules to destination in cell.
- Composed of numerous layers forming a sac
- Enzymes and contents of lysosomes are made here.

What are the two big roles of the Golgi Apparatus

Transport: The Golgi apparatus is responsible for transporting, modifying, and packaging proteins and lipids into vesicles for delivery to targeted destinations	Manufacture: Vesicles are made for delivery to targeted destinations.



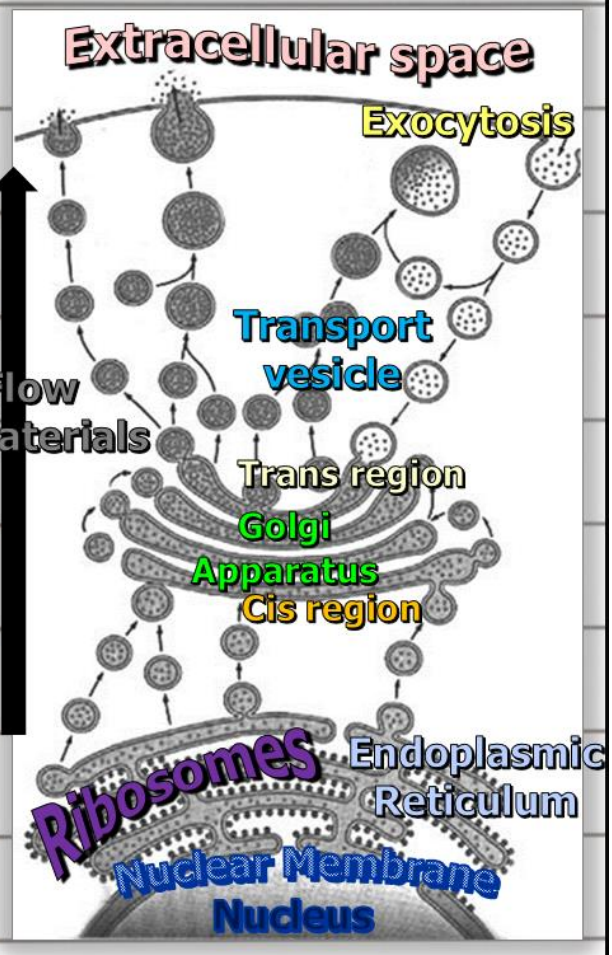
Warning! 3 Part Question.

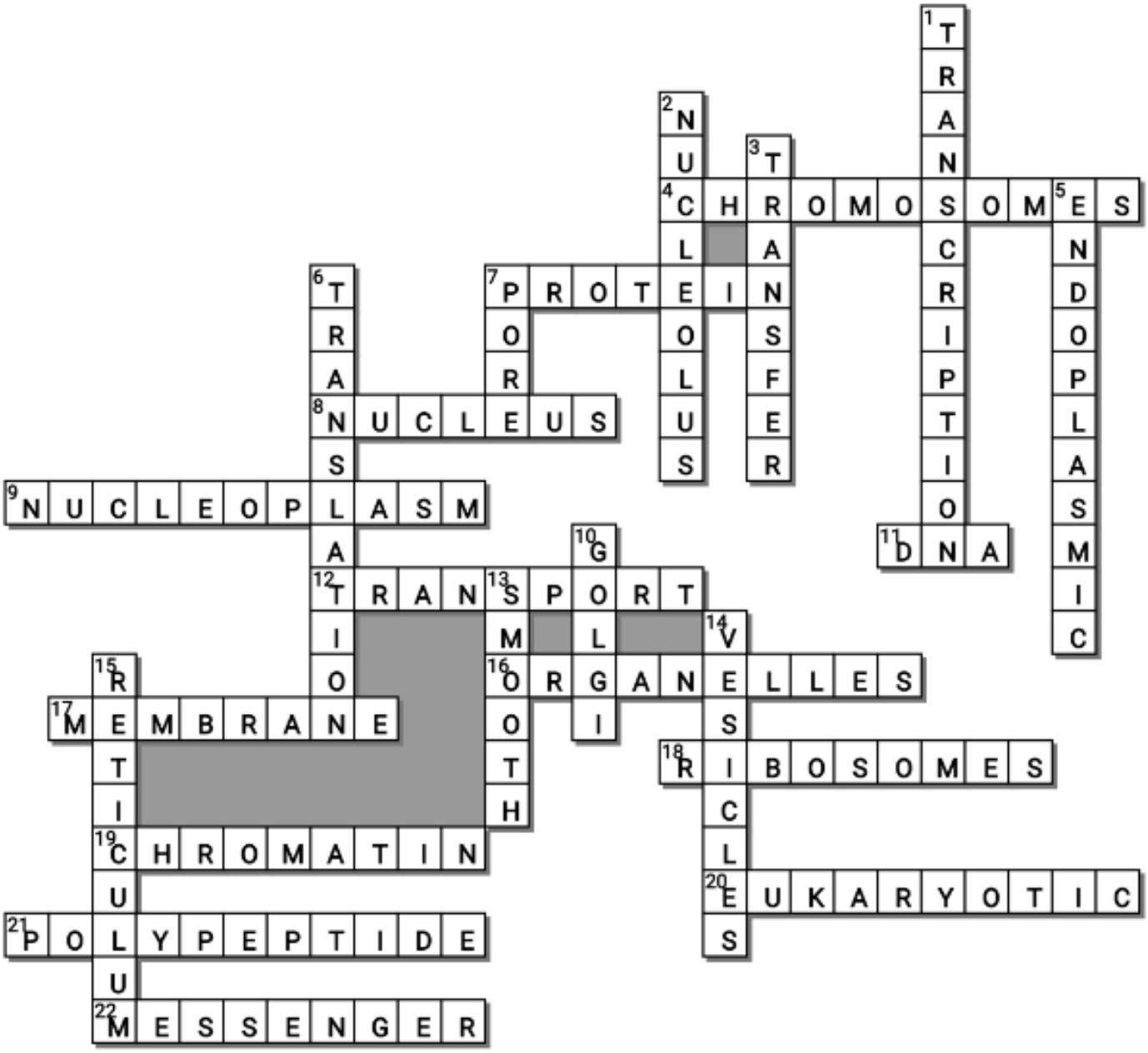
◊Describe the flow of materials (molecules) in the following pictures. ◊Please name the three organelles present and their job. ◊What process is seen at the top?

The transport vesicles fuse with the plasma membrane and leave the cell through exocytosis

The Golgi Apparatus modifies the lipids and proteins from the ER. Sorts and packages them in vesicles

Protein-containing vesicles from the ER transfer substances to the cis region of the Golgi apparatus





Possible Answers

CHROMATIN, CHROMOSOMES, DNA, ENDOPLASMIC, GOLGI, MEMBRANE, MESSENGER, NUCLEOLUS, NUCLEUS, ORGANELLES, PORE, PROTEIN, RETICULUM, RIBOSOMES, SMOOTH, TRANSCRIPTION, TRANSFER, TRANSLATION, TRANSPORT, EUKARYOTIC, NUCLEOPLASM , POLYPEPTIDE, VESICLES

Across

4. Humans have 46 _____ (23 pairs).
7. _____ Synthesis: The process in which the genetic code carried by messenger RNA directs cellular organelles called ribosomes to produce proteins from amino acids.
8. Largest organelle in the cell
9. A type of protoplasm, and is enveloped by the nuclear envelope (also known as the nuclear membrane). Includes the chromosomes and nucleolus.
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Down

1. DNA T_____ to RNA Translation to Proteins
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3. T_____ ribonucleic acid (tRNA) is a type of RNA molecule that helps decode a messenger RNA (mRNA) sequence into a protein. tRNAs function at specific sites in the ribosome during translation, which is a process that synthesizes a protein from an mRNA molecule.
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13. _____ Endoplasmic Reticulum: Makes lipids (fats) and steroids.
14. The Golgi apparatus is responsible for transporting, modifying, and packaging proteins and lipids into _____ for delivery to targeted destinations.
15. Rough endoplasmic _____ (RER), series of connected flattened sacs, part of a continuous membrane organelle within the cytoplasm of eukaryotic cells, that plays a central role in the synthesis of proteins.

Possible Answers

CHROMATIN, CHROMOSOMES, DNA, ENDOPLASMIC, GOLGI, MEMBRANE, MESSENGER, NUCLEOLUS, NUCLEUS, ORGANELLES, PORE, PROTEIN, RETICULUM, RIBOSOMES, SMOOTH, TRANSCRIPTION, TRANSFER, TRANSLATION, TRANSPORT, EUKARYOTIC, NUCLEOPLASM , POLYPEPTIDE, VESICLES

Part 3 Review Game

Name:

1-10 = 10 pts * = Bonus + 1 pt, Part 3 Lesson 5

(Secretly write owl in correct space +1 pt)

Score ____ / 100

Final Question = 5 pt wager

NUKEM	LOST IN TRANSLATION	IMPORTANT MESSAGE	FANNYPACKS	MAZES Bonus round 1 pt each
1) NUCLEUS	6) ROUGH ENDOPLASMIC RETICULUM	11) SMOOTH ENDOPLASMIC RETICULUM	16) TRUE	*21) LABRYRINTH
2) NUCLEAR OPENINGS/ PORES	7) RIBOSOMES	12) HORMONES	17) NUCLEAR MEMBRANE	*22) HARRY POTTER Goblet of FIRE
3) DNA/ CHROMATIN	8) A=Protein B=tRNA C=mRNA D=Ribosome	13) AMINO ACID	18) LYSOSOME	*23) BLINKY INKY PINKY CLYDE
4) NUCLEOLUS	9) GOLGI APPARATUS	14) PROTEIN	19) CHROMOSOME	*24) SPEED RACER
5) DNA-> RNA-> Protein	10) SUPPORT TRANSPORT BREAKDOWN MANUFACTURE COMMUNICATE	15) VESICLES	20) GROWTH REPAIR REPRODUCTION	*25) LEGEND of ZELDA

Final Question Wager ___ /5 Answer: A=NUCEOLUS, B=NUCLEUS, C=NUCLEAR MEMBRANE, C=PORES/OPENINGS, D=GOLGI APPARATUS