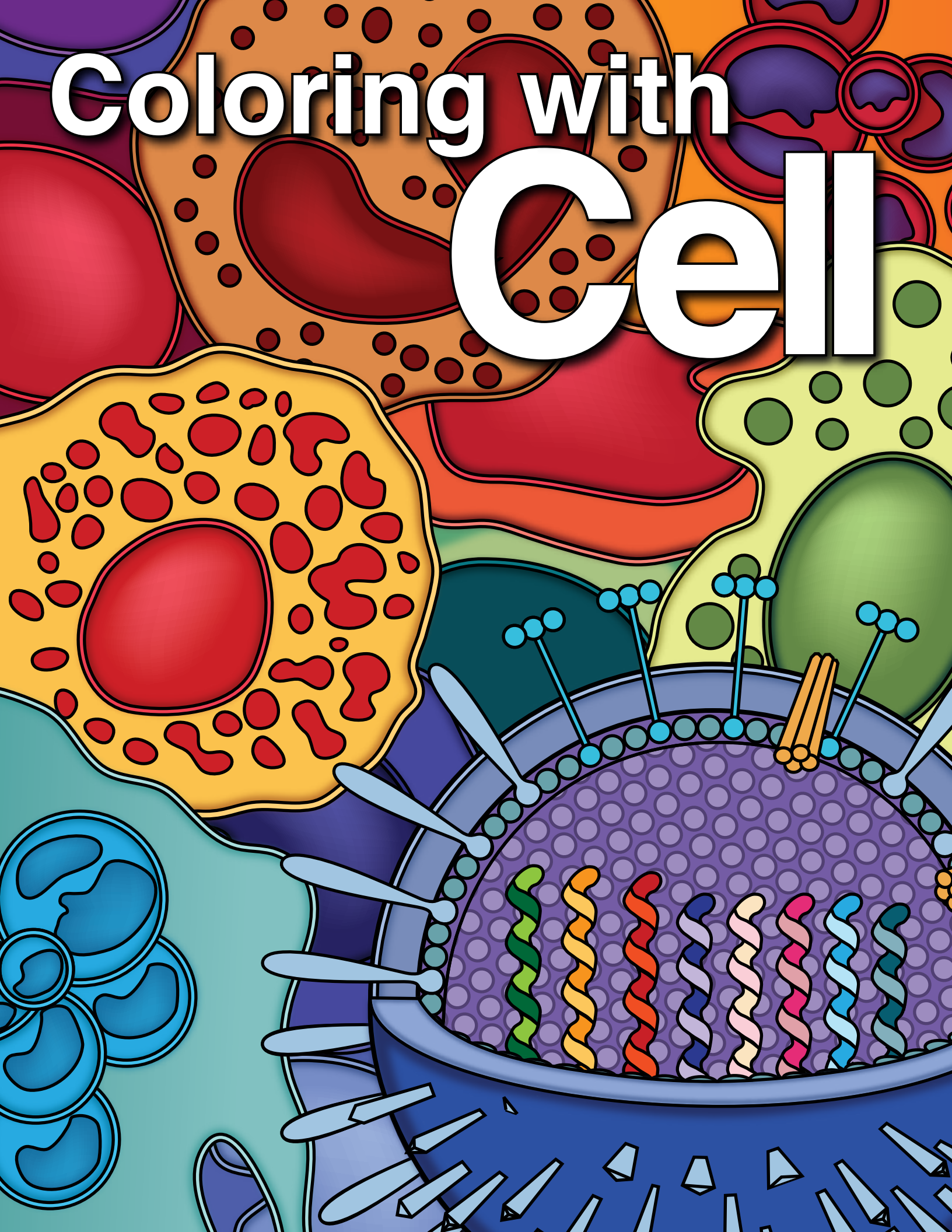


Coloring with Cell





Welcome to the *Cell* coloring book! I'm Sammy The Cell. I'm your guide as you color your way through biology.

Cell Press thinks biology is fun and exciting. We've created this coloring book to share our enthusiasm. Enjoy!

Cell

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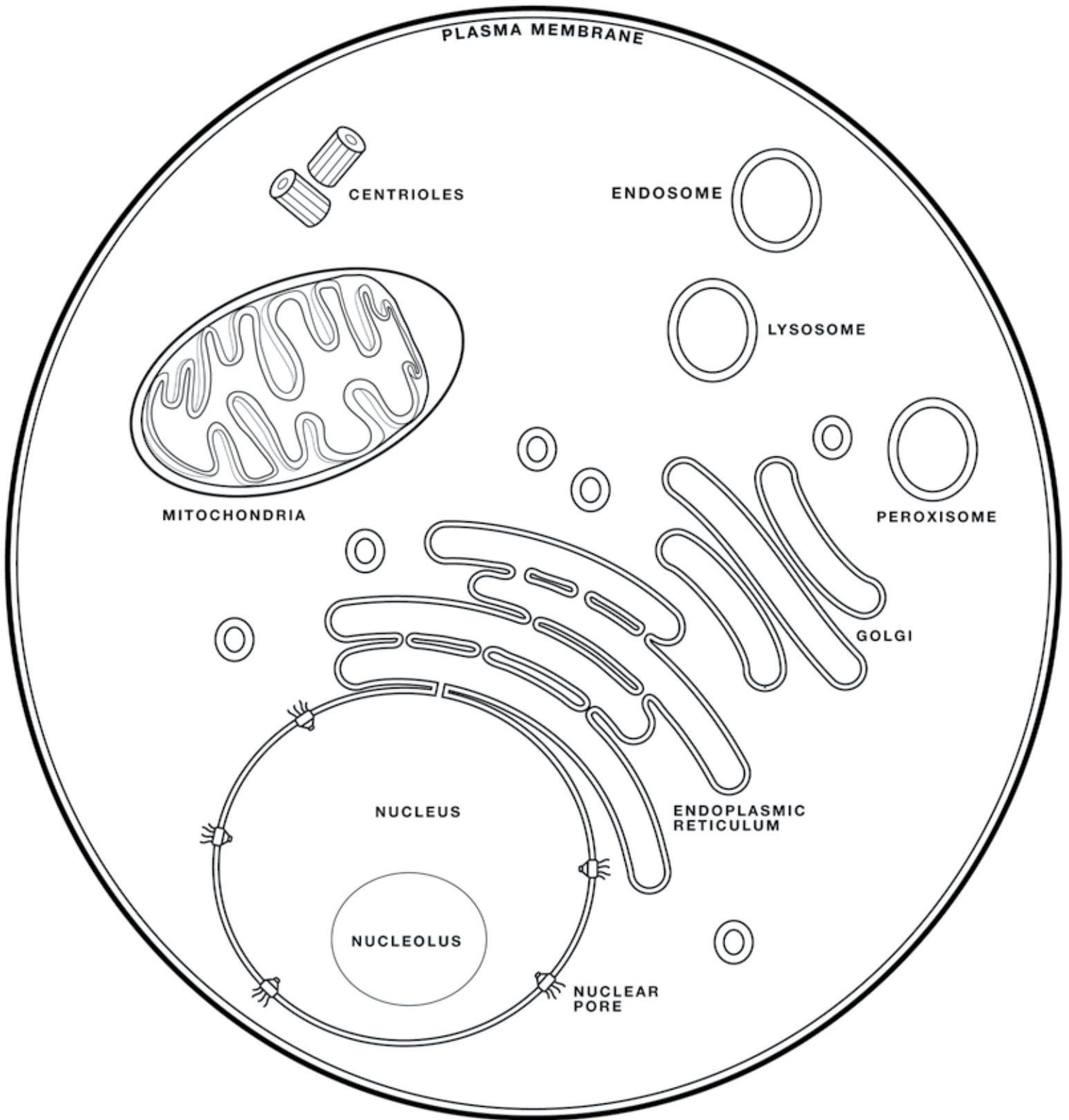
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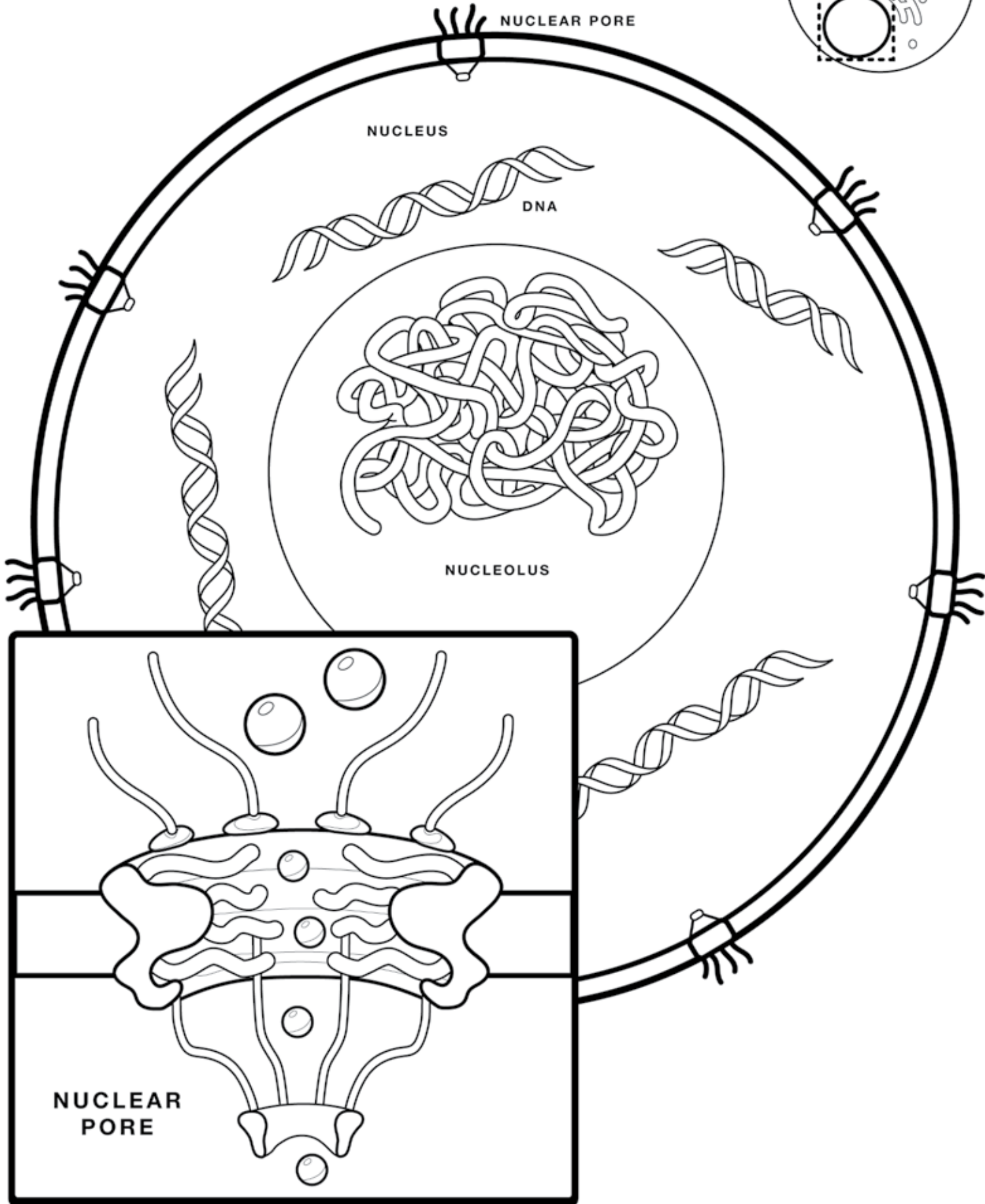


This is a cell; it's full of exciting biology!



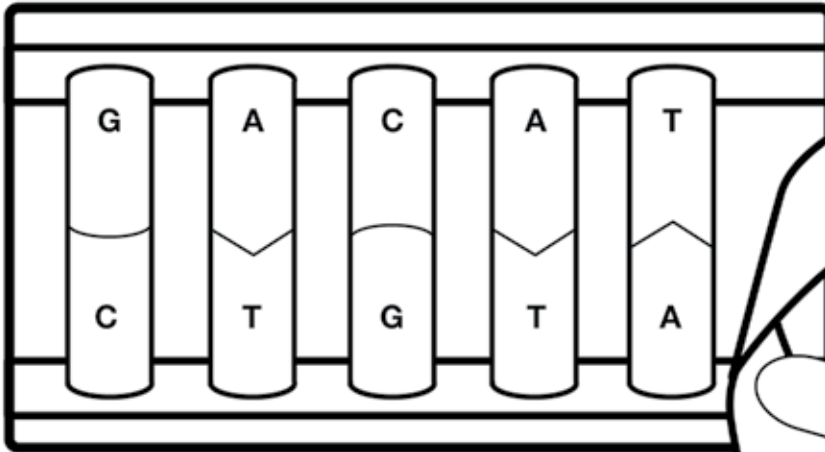


The nucleus is where DNA is kept and RNA is made. Molecules move in and out through nuclear pores.

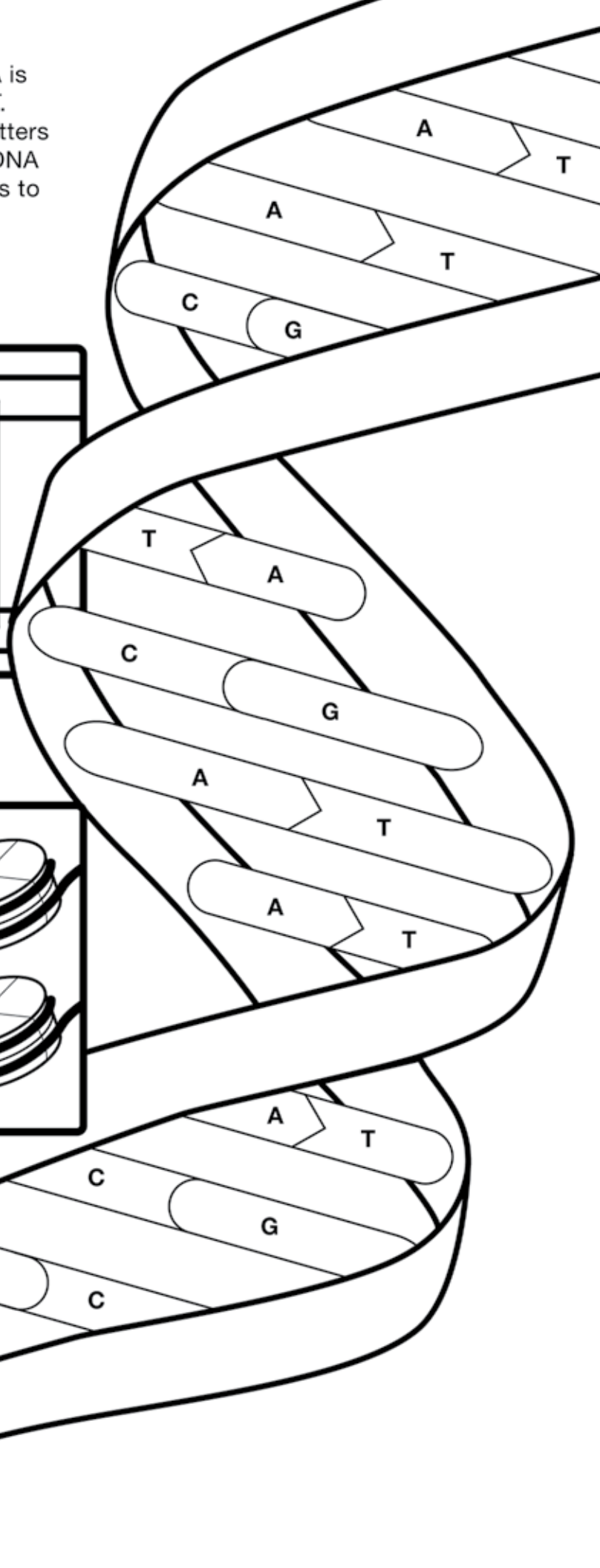
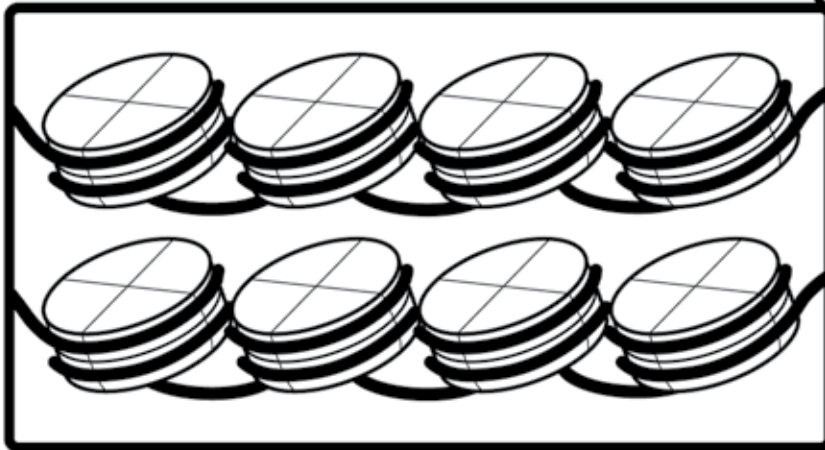




Cells store information in DNA. DNA is coded by four bases: A, G, C, and T. The linear sequence of these four letters forms the genome. Two strands of DNA associate through A-T and G-C pairs to make a double helix.

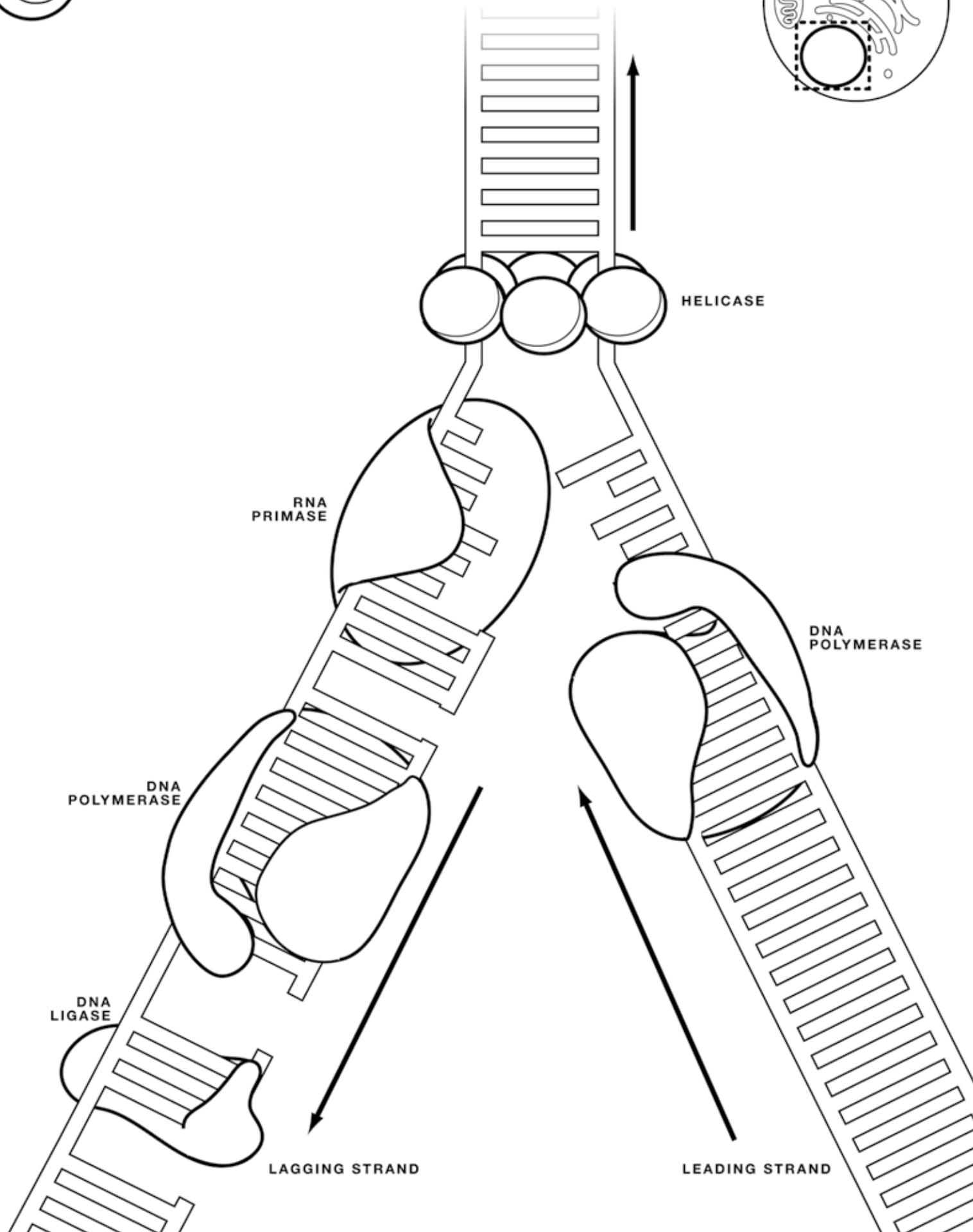


We store our DNA wrapped around proteins, like spools of thread all in a row.



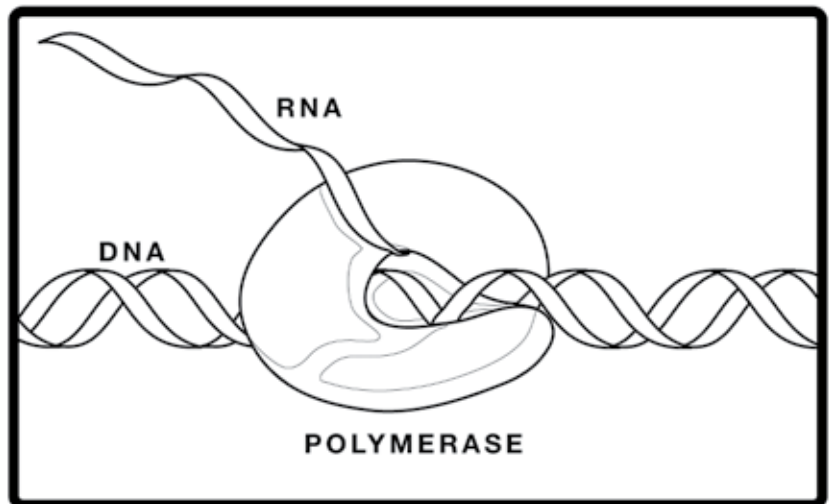
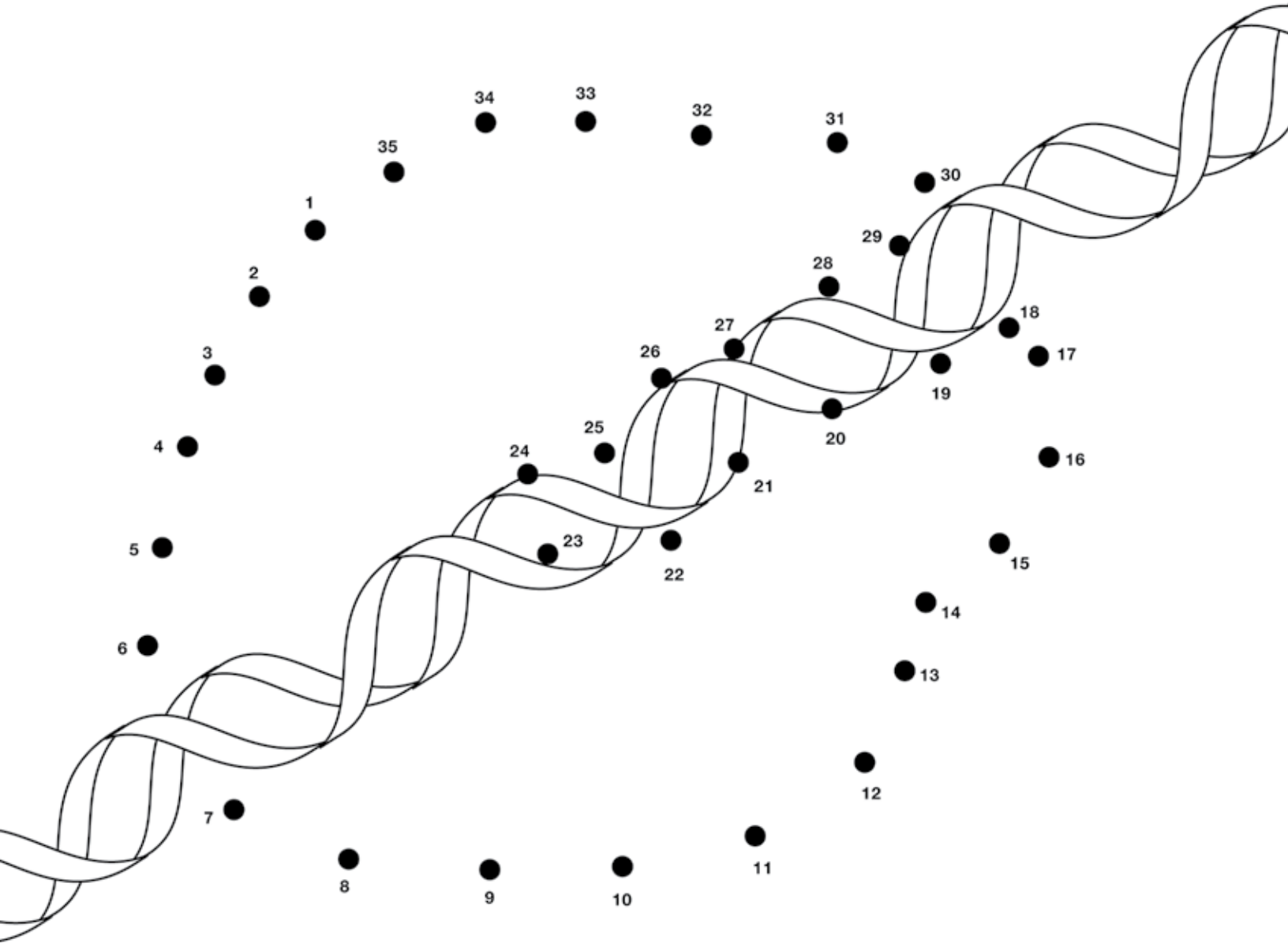


DNA polymerase (and some friends) get to work copying DNA every time a cell divides.



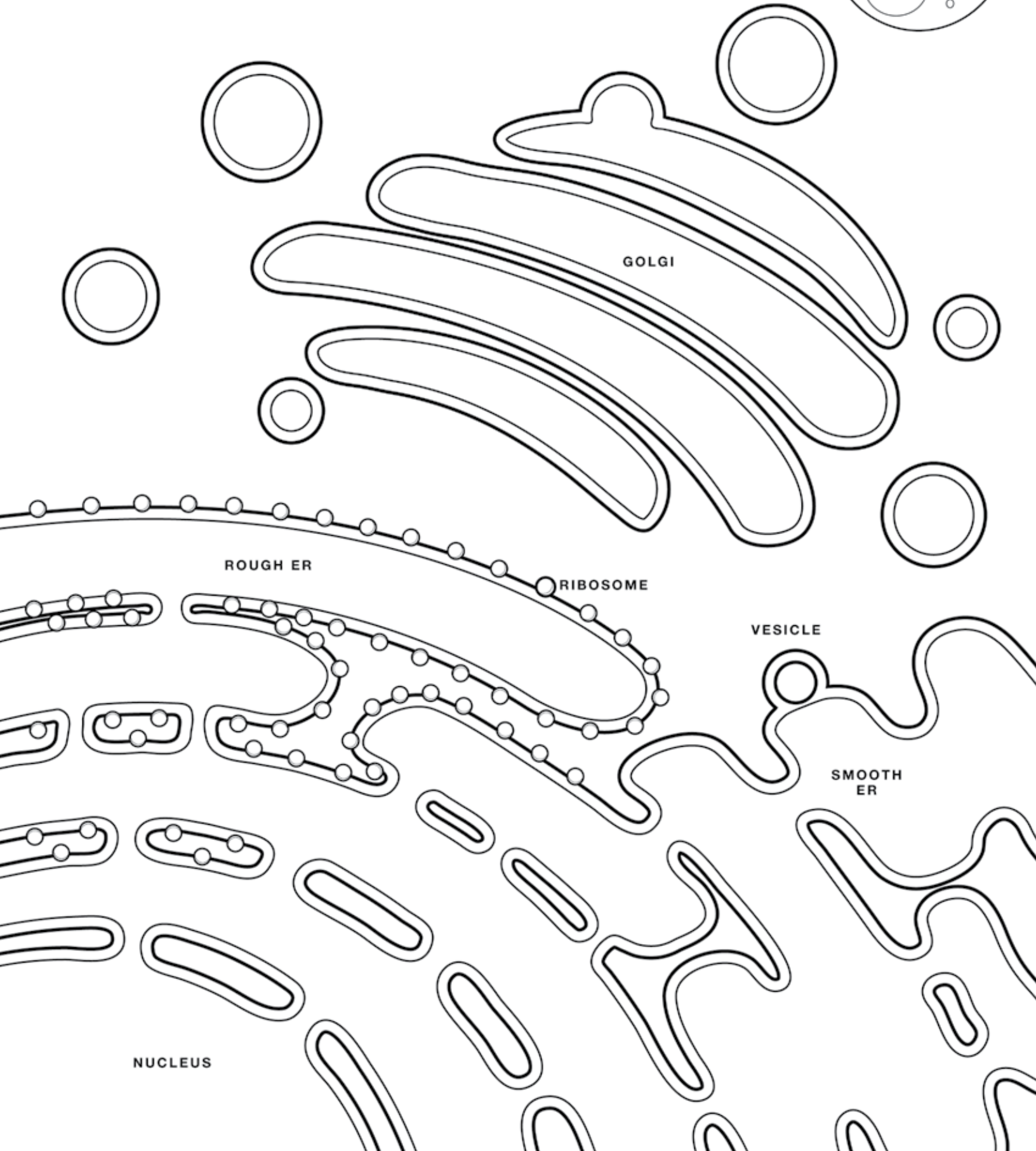
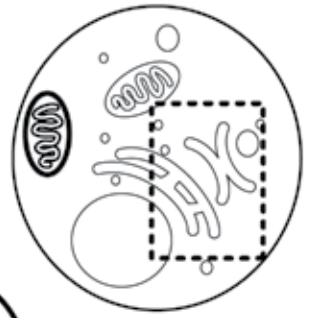


Proteins are the cell's machines. Information to make the proteins is stored in DNA. To get the instructions from DNA, RNA polymerase makes RNA. RNAs can then be made into proteins or can function on their own. Connect the dots to reveal the polymerase.



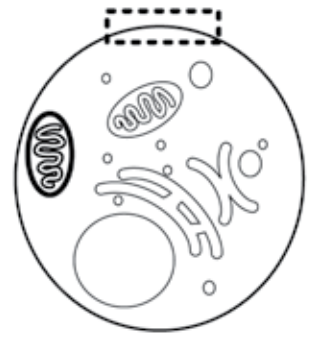


The endoplasmic reticulum (ER) is the first stop for proteins that are secreted to the plasma membrane. Ribosomes on the ER make proteins, which are then packaged into vesicles. The vesicles move through the Golgi Apparatus on their way to the cell surface.

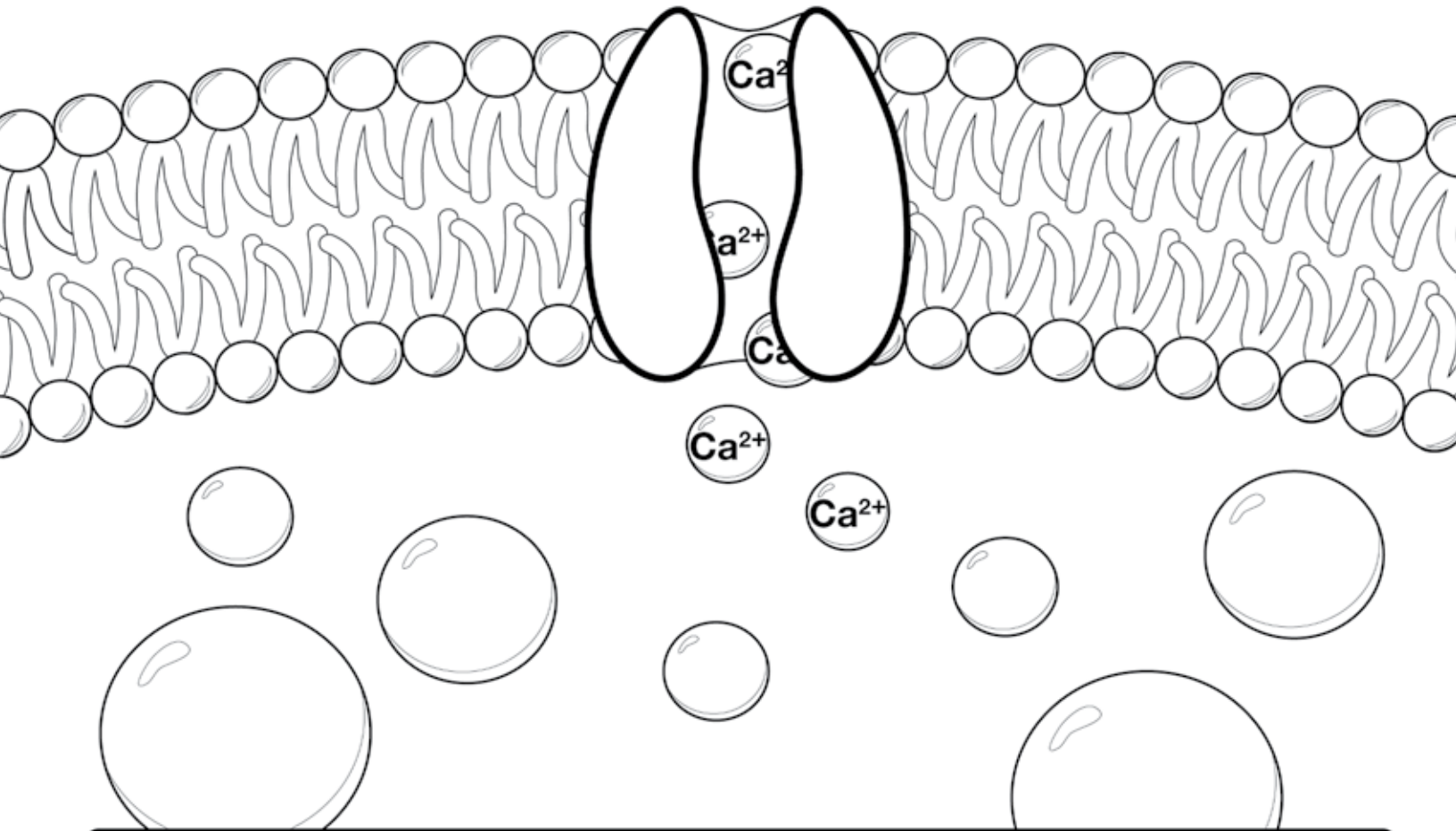




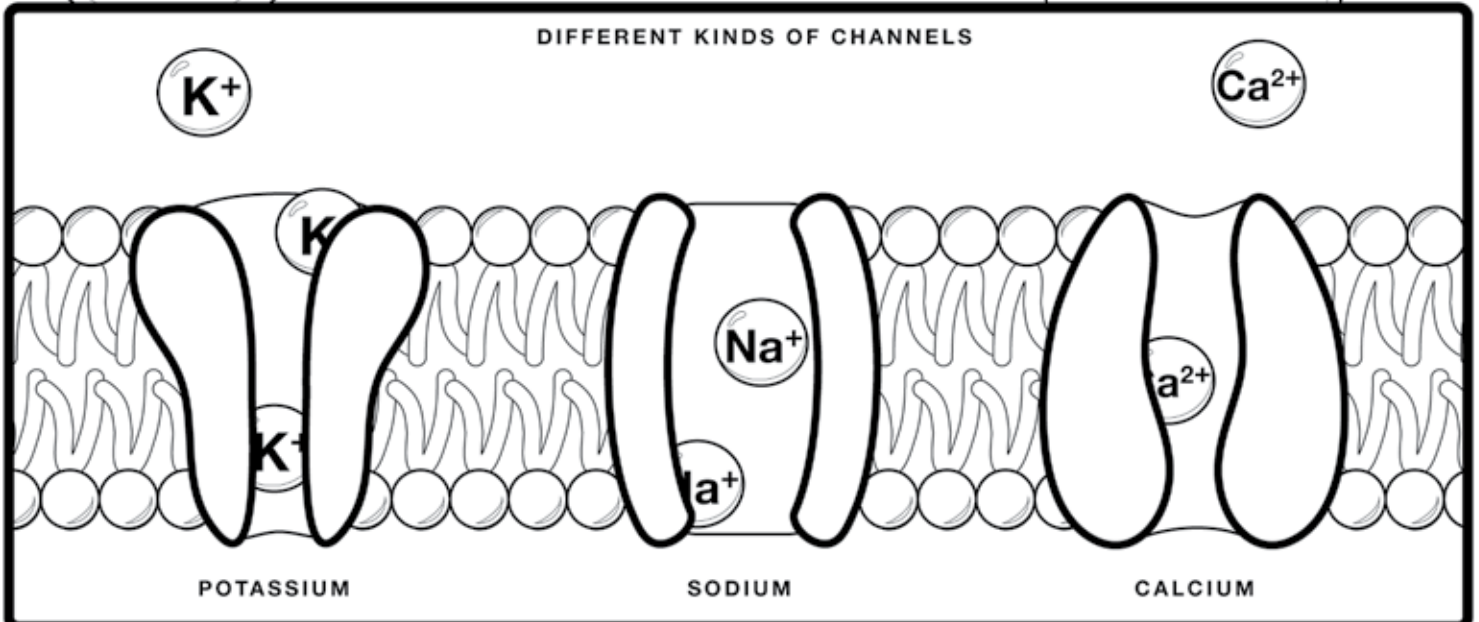
The plasma membrane defines the boundaries of a cell. Cells need nutrients, molecules, and even water from the outside and the membrane contains pores and channels to allow transport into and out of the cell.



Ca^{2+} CALCIUM

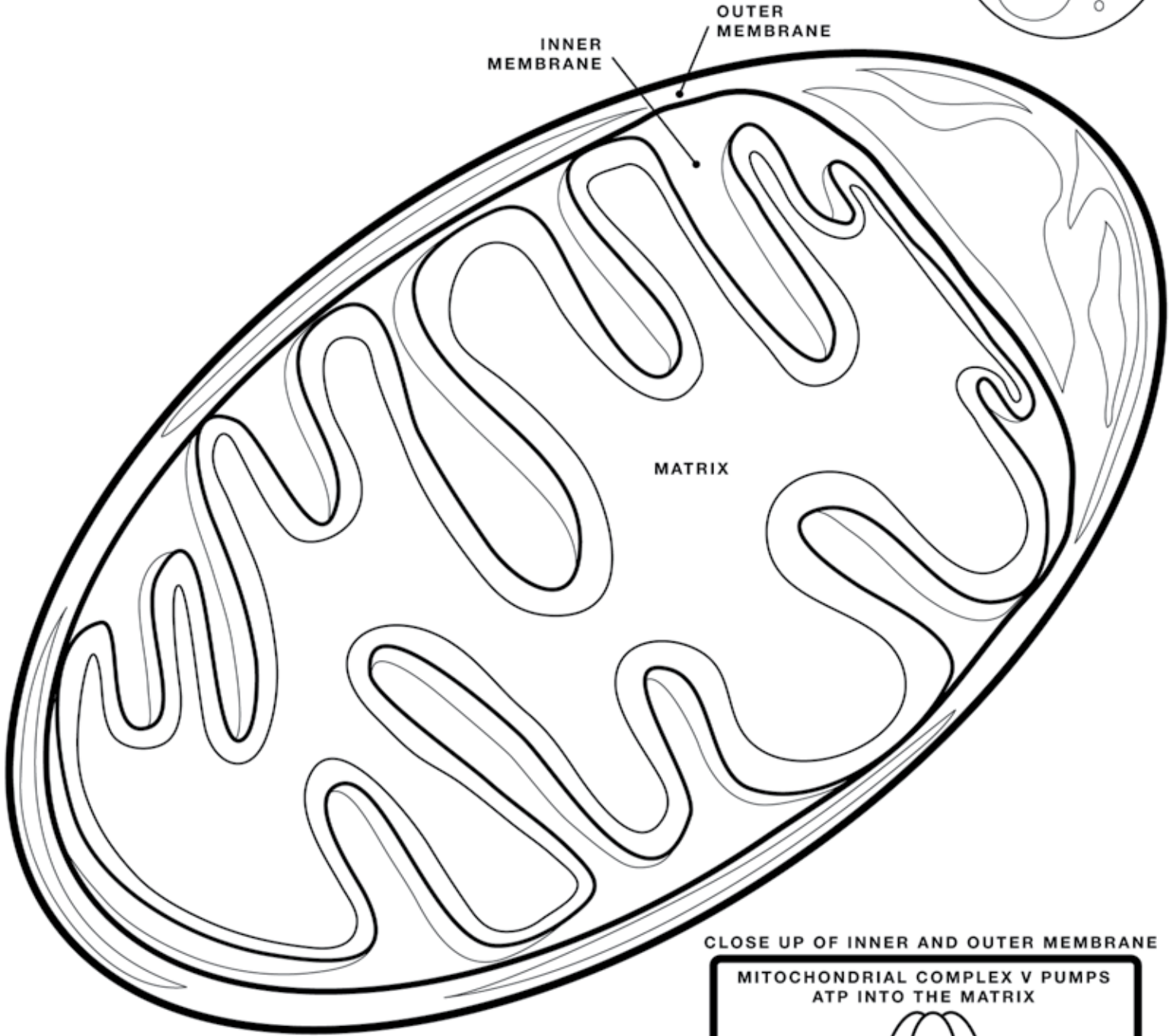


DIFFERENT KINDS OF CHANNELS



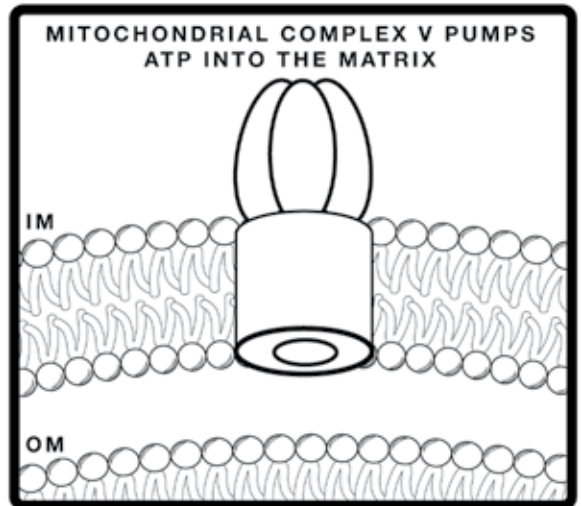


Mitochondria are the cell's powerhouses. They produce ATP from fatty acids and sugars.



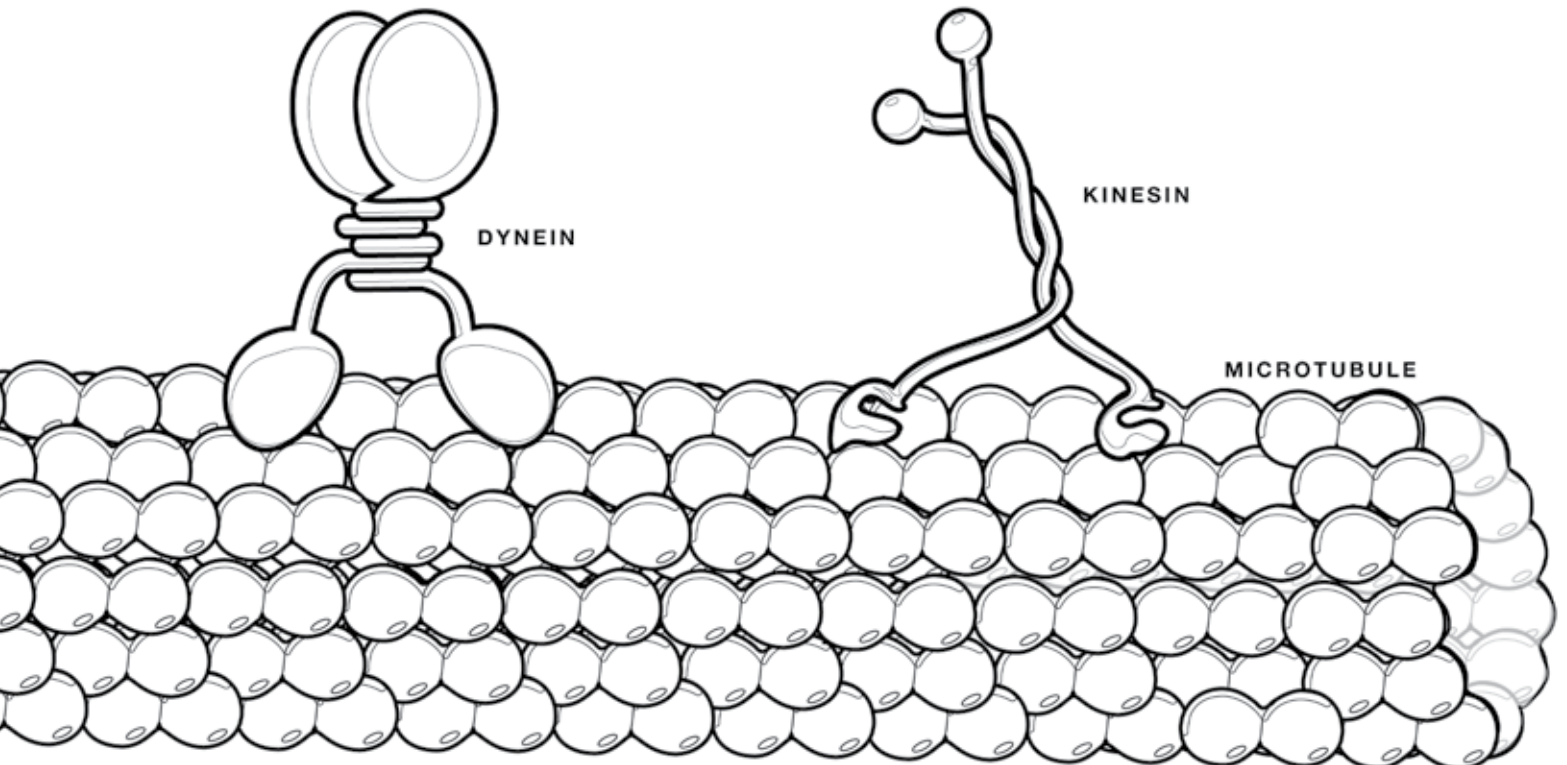
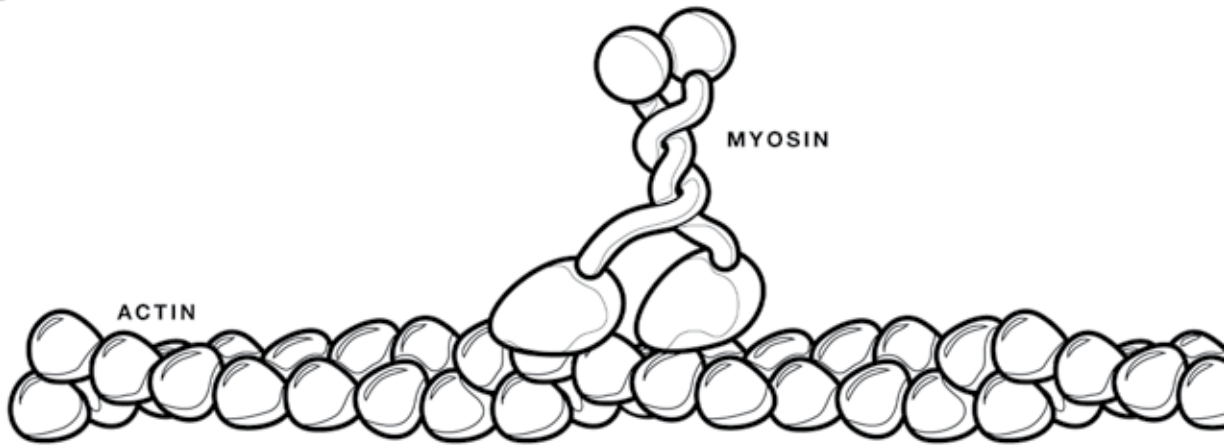
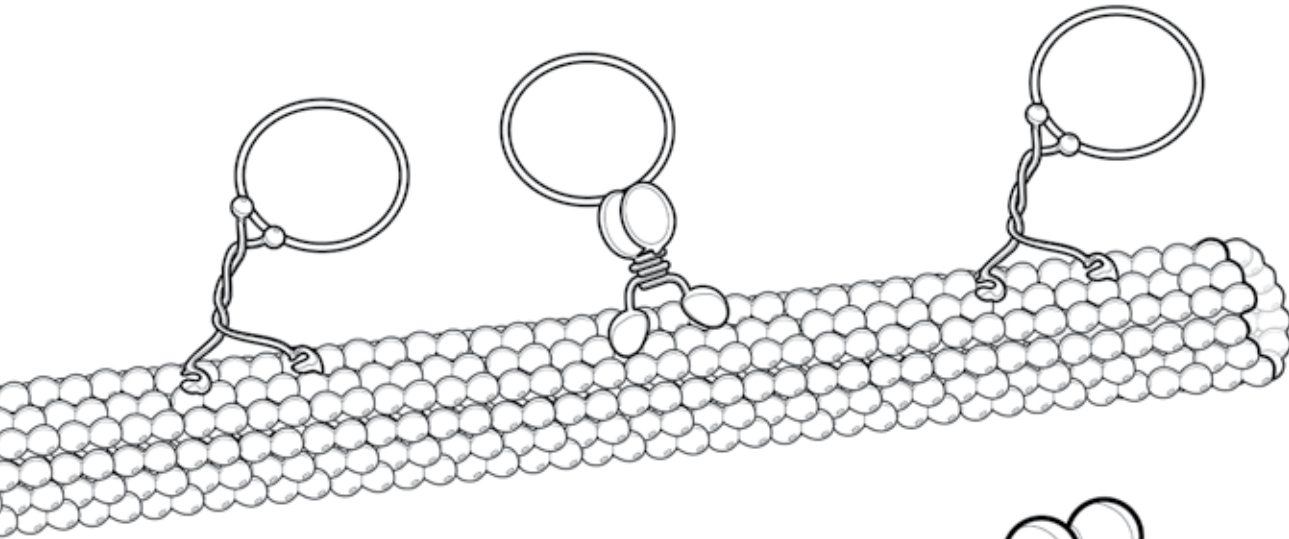
The inner membrane has folds called cristae that give it a lot of surface area to make ATP.

CLOSE UP OF INNER AND OUTER MEMBRANE



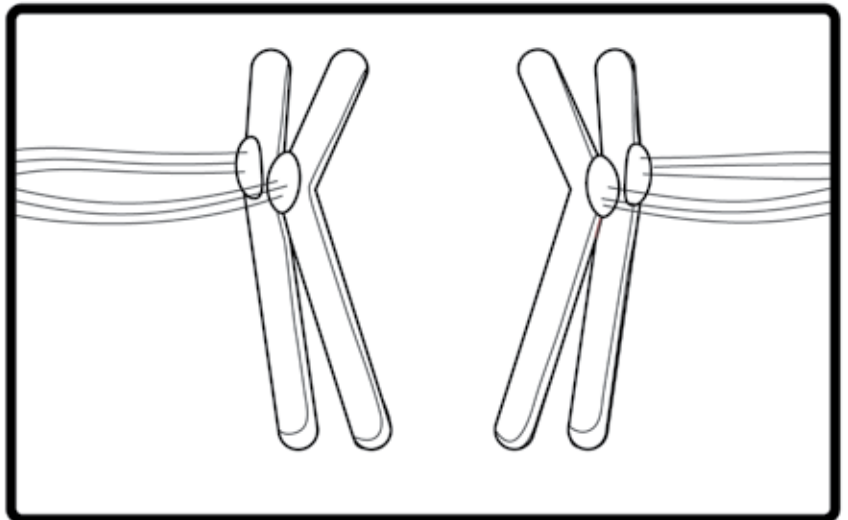
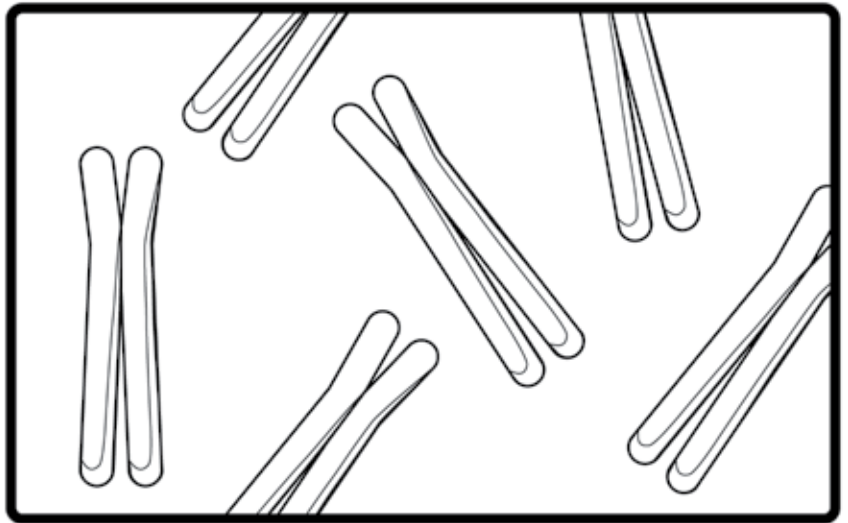
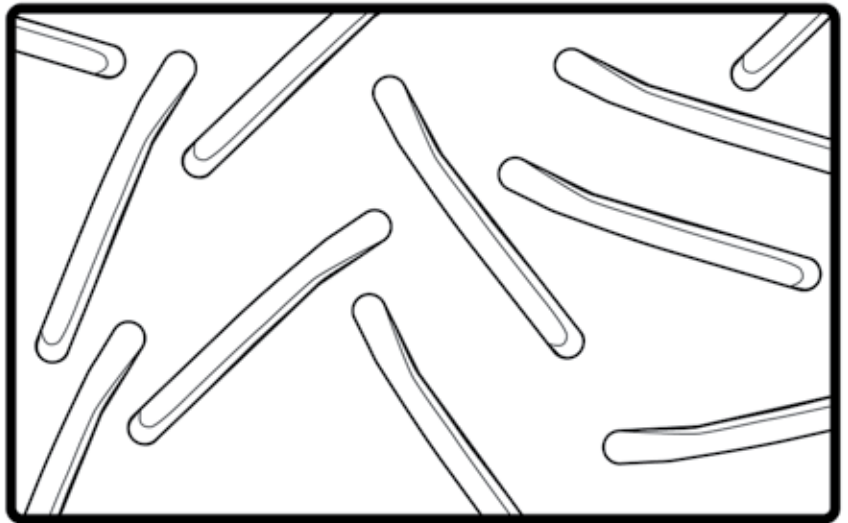
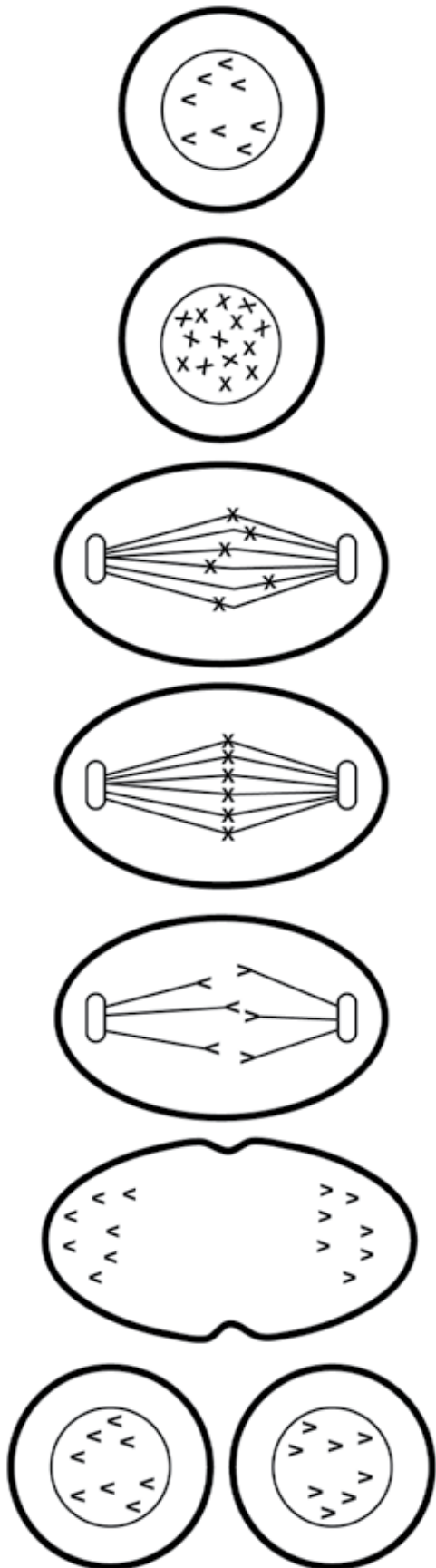


Motor proteins help move cargo (like proteins, vesicles, or even mitochondria!) through the cell. The motors walk along the cytoskeleton.



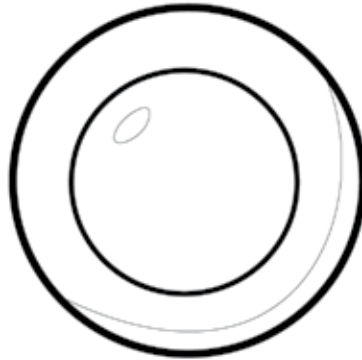


Mitosis, it's how cells divide! Each cell duplicates its chromosomes (its DNA) and then uses microtubules to pull a complete set of chromosomes into each daughter cell.





Stem cells can become any other kind of cell in the body. They are pluripotent. What do you think this cell will be?



Stem cell



Vascular cell



Muscle cell



Liver cell



Pancreatic cell



Skin cell



T, B lymphocyte



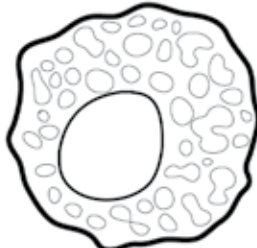
Red blood cell



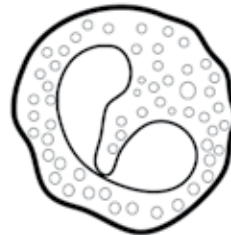
Megakaryocyte



Monocyte/
Macrophage



Mast cell



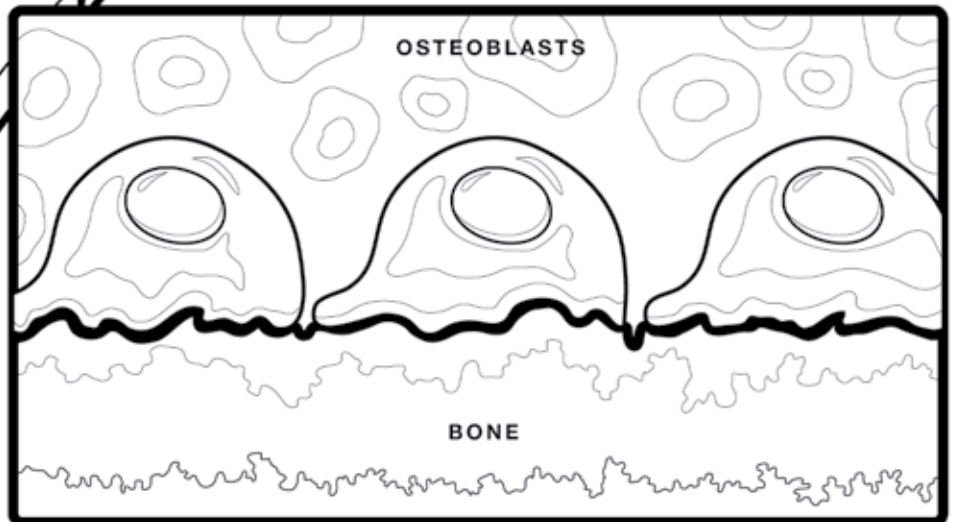
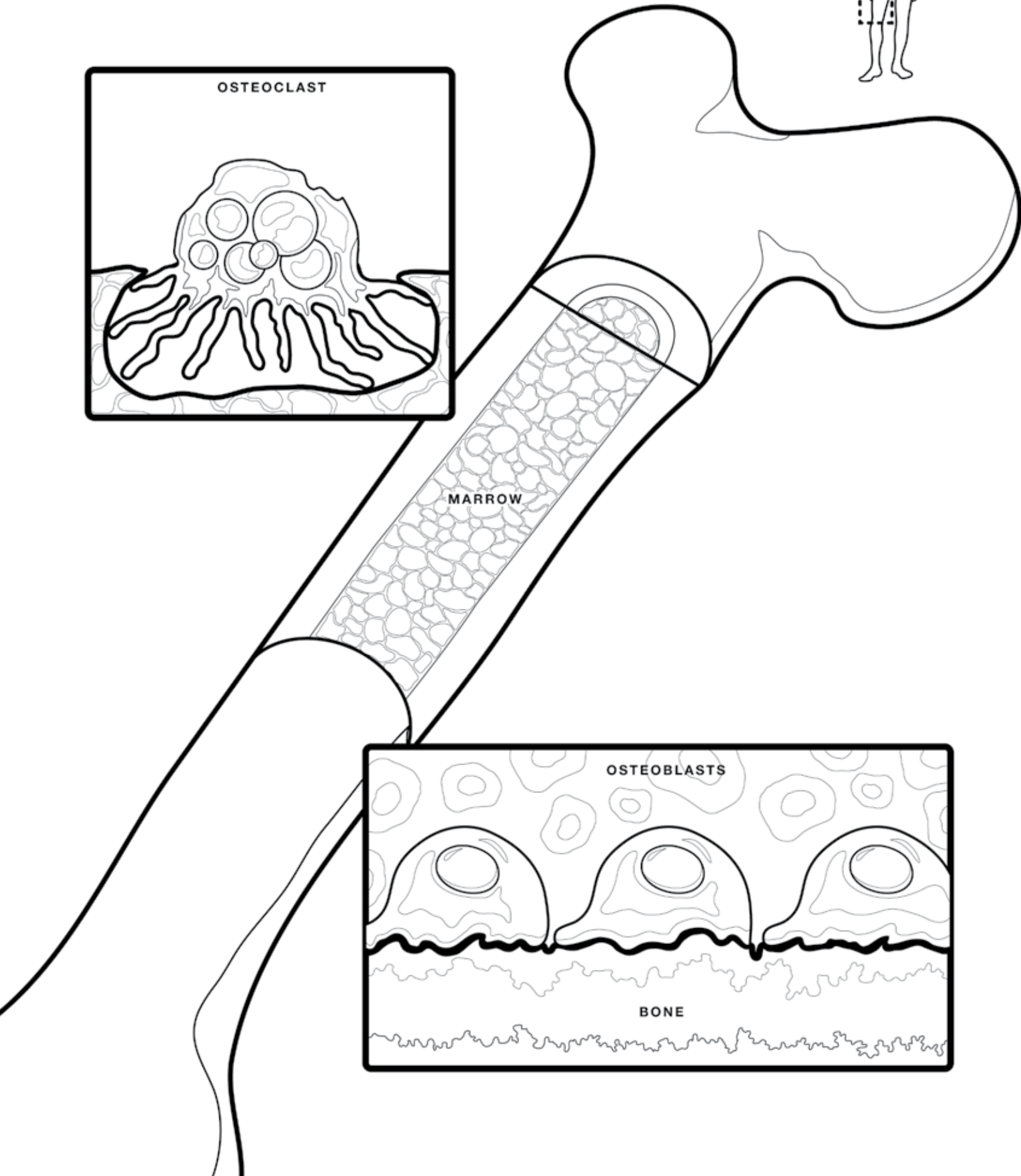
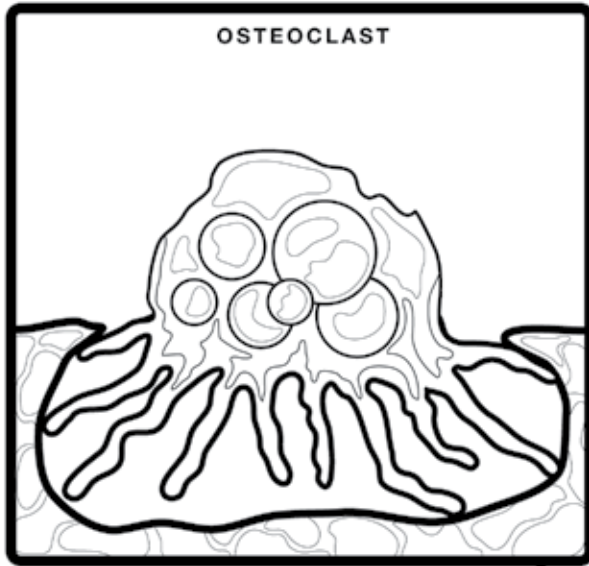
Eosinophil



Neutrophil



Our skeleton is made of bones. Osteoblasts build bone up and osteoclasts break it down. Bone marrow in the center of the bone is where new blood cells are made.





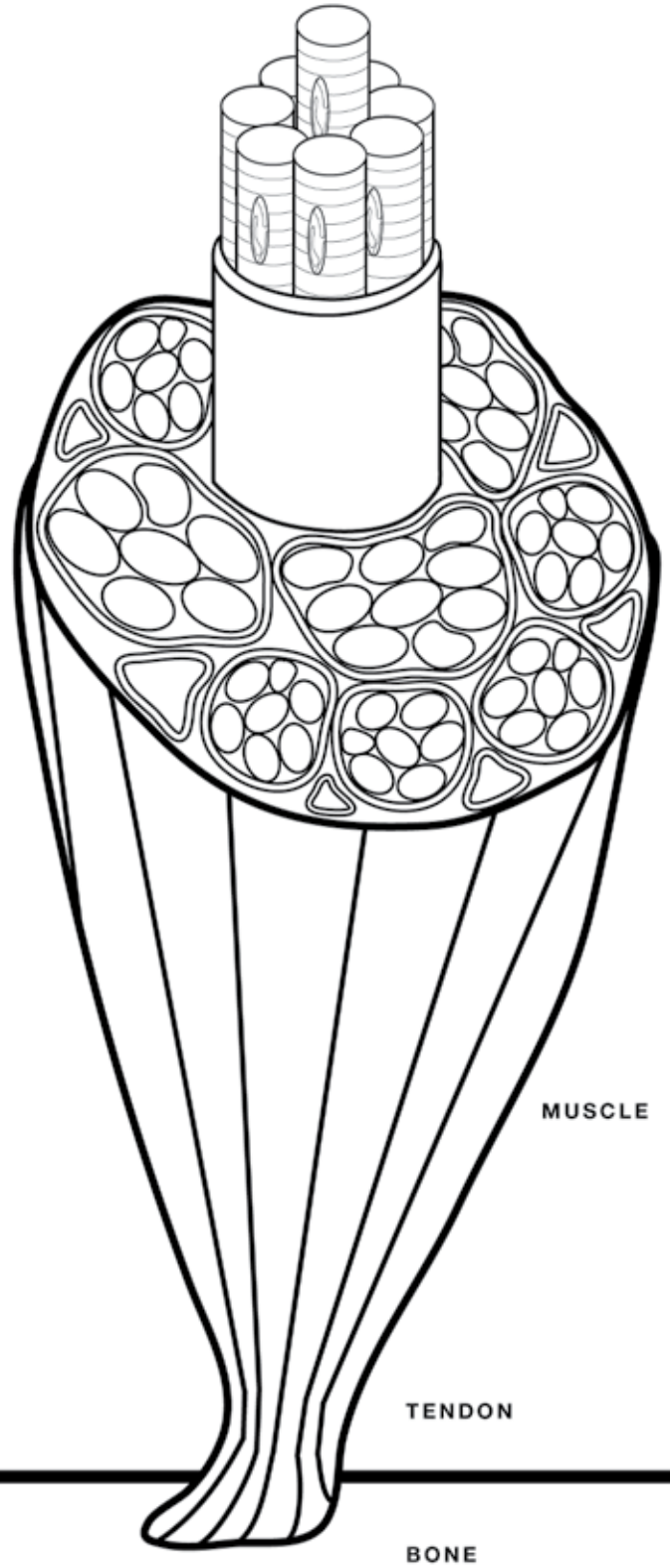
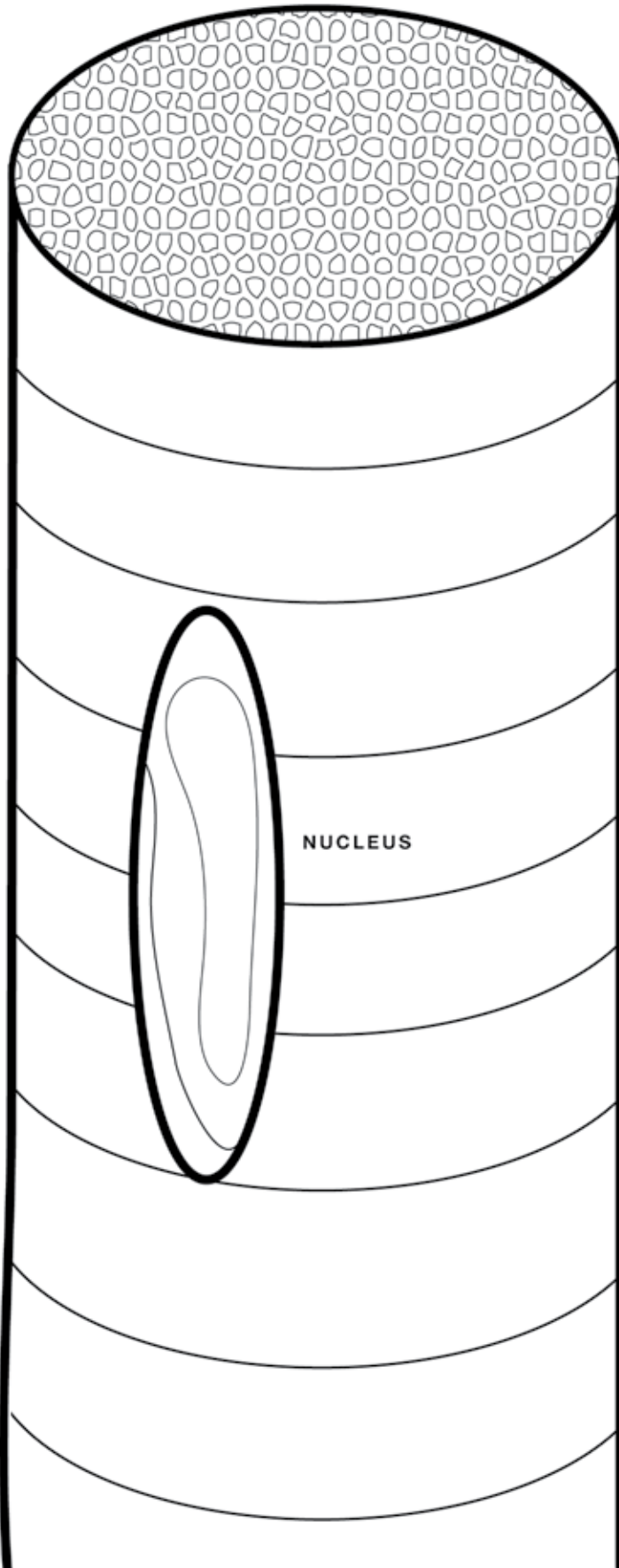
This is a blood vessel, like an artery or a vein. It carries red blood cells. The main vessel branches off to smaller ones that reach throughout the body.



RED BLOOD CELL

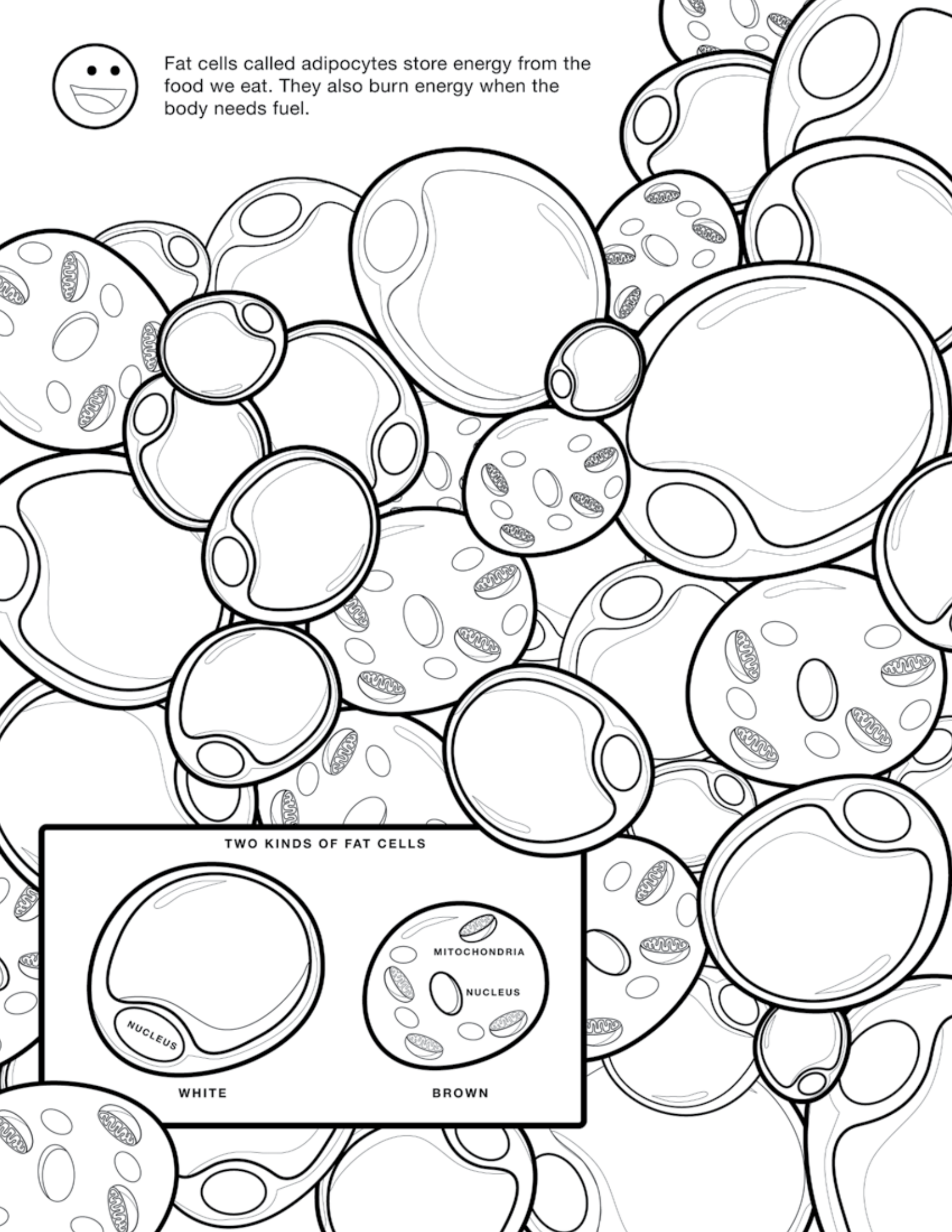


This is a muscle fiber. It gets bundled together with other fibers, and the bundles are wrapped together to make a muscle.

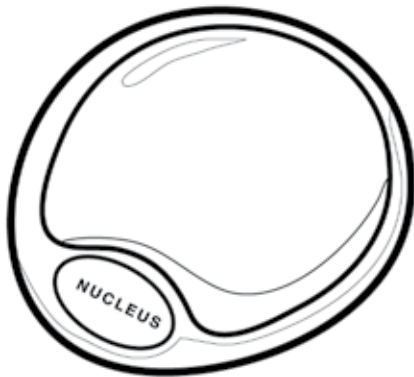




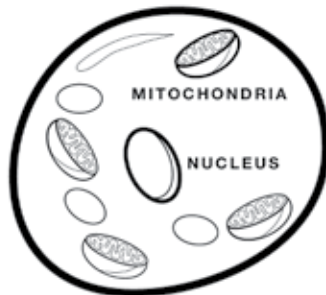
Fat cells called adipocytes store energy from the food we eat. They also burn energy when the body needs fuel.



TWO KINDS OF FAT CELLS



WHITE



BROWN

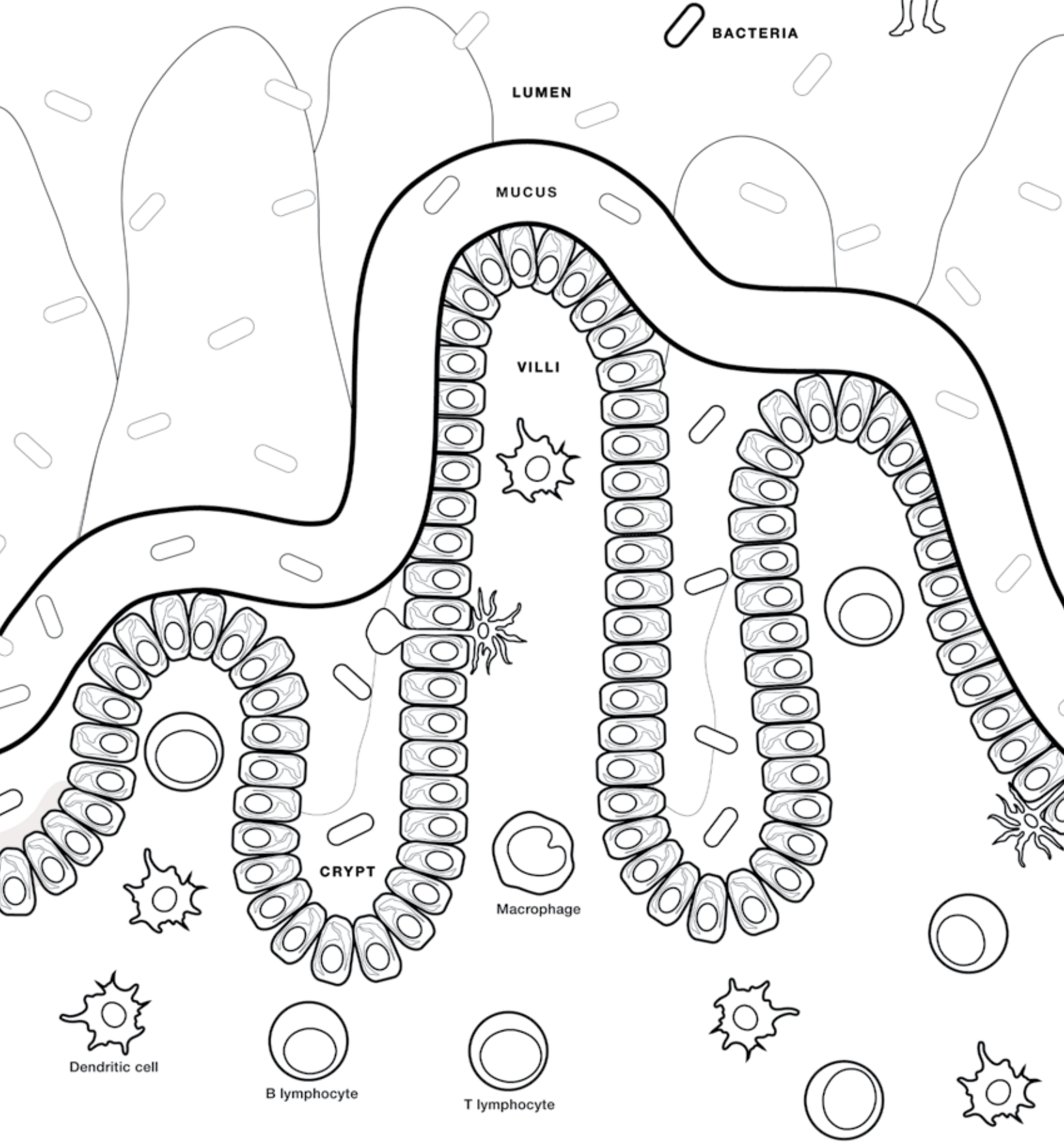
MITOCHONDRIA

NUCLEUS

NUCLEUS

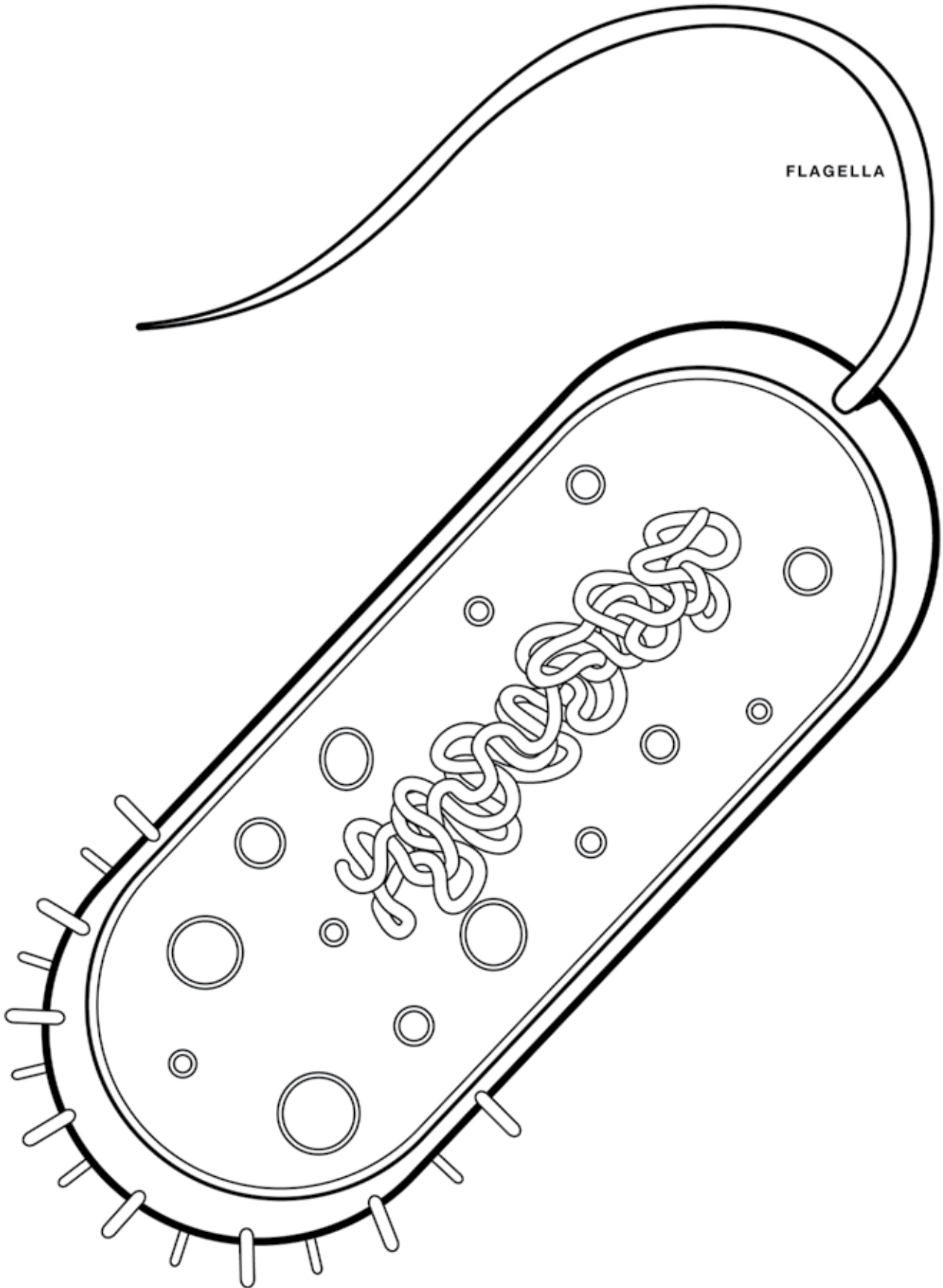


The intestine is a place where the body interacts with food and microorganisms from the outside world. The cells that line the intestine protect the body from foreign invaders like bacteria. Cells of the immune system are nearby and ready to fight bacteria that make it past this barrier.





Bacteria are all around us and even inside us! They can be helpful, like the bacteria in yogurt, but some can make us sick. This bacterium moves by rotating its flagella.





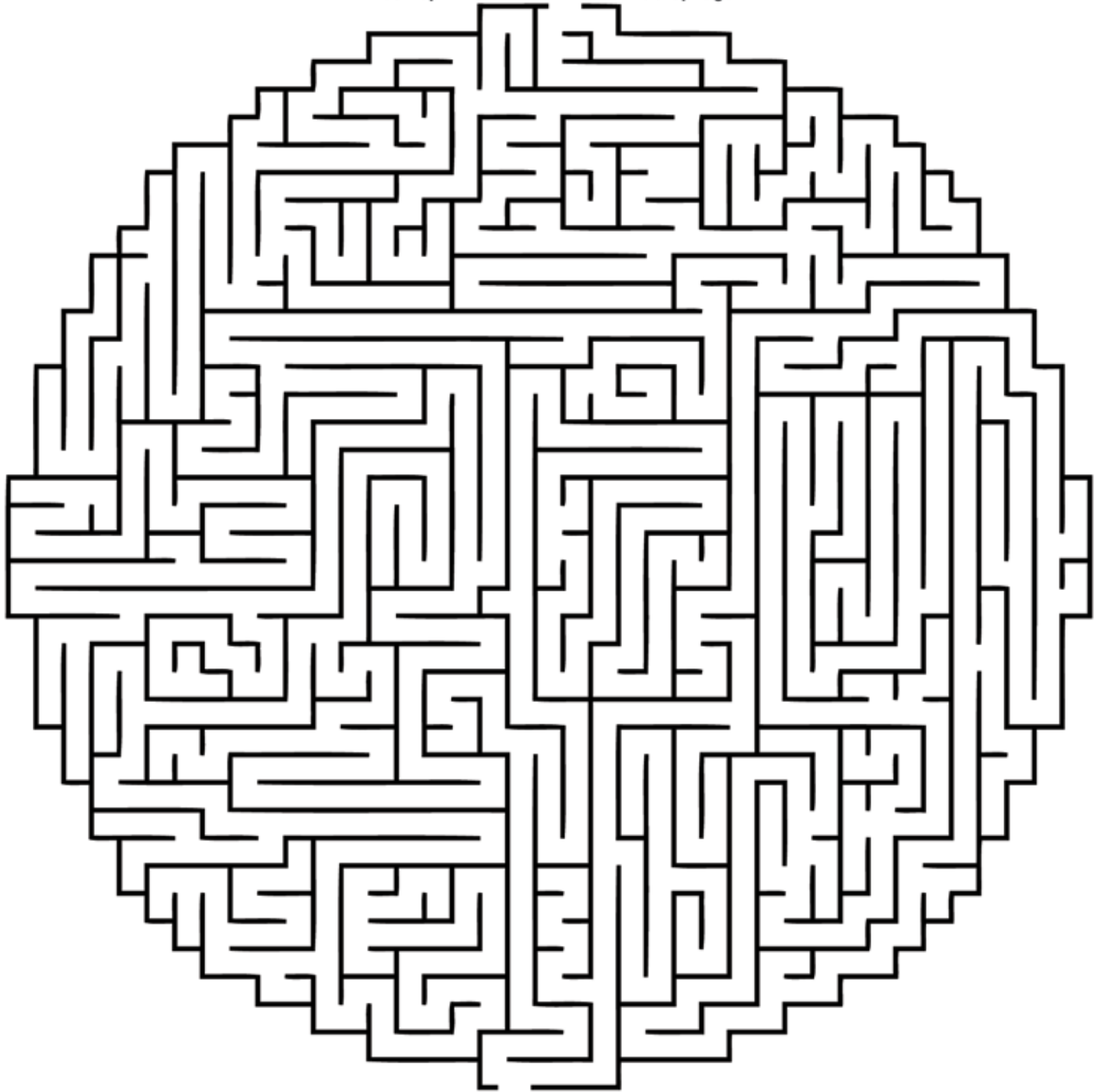
Uh oh! Some bacteria got into the blood stream! Help my friends Phil and Mack get to the infection so that they can help fight it!



PHIL
Eosinophil



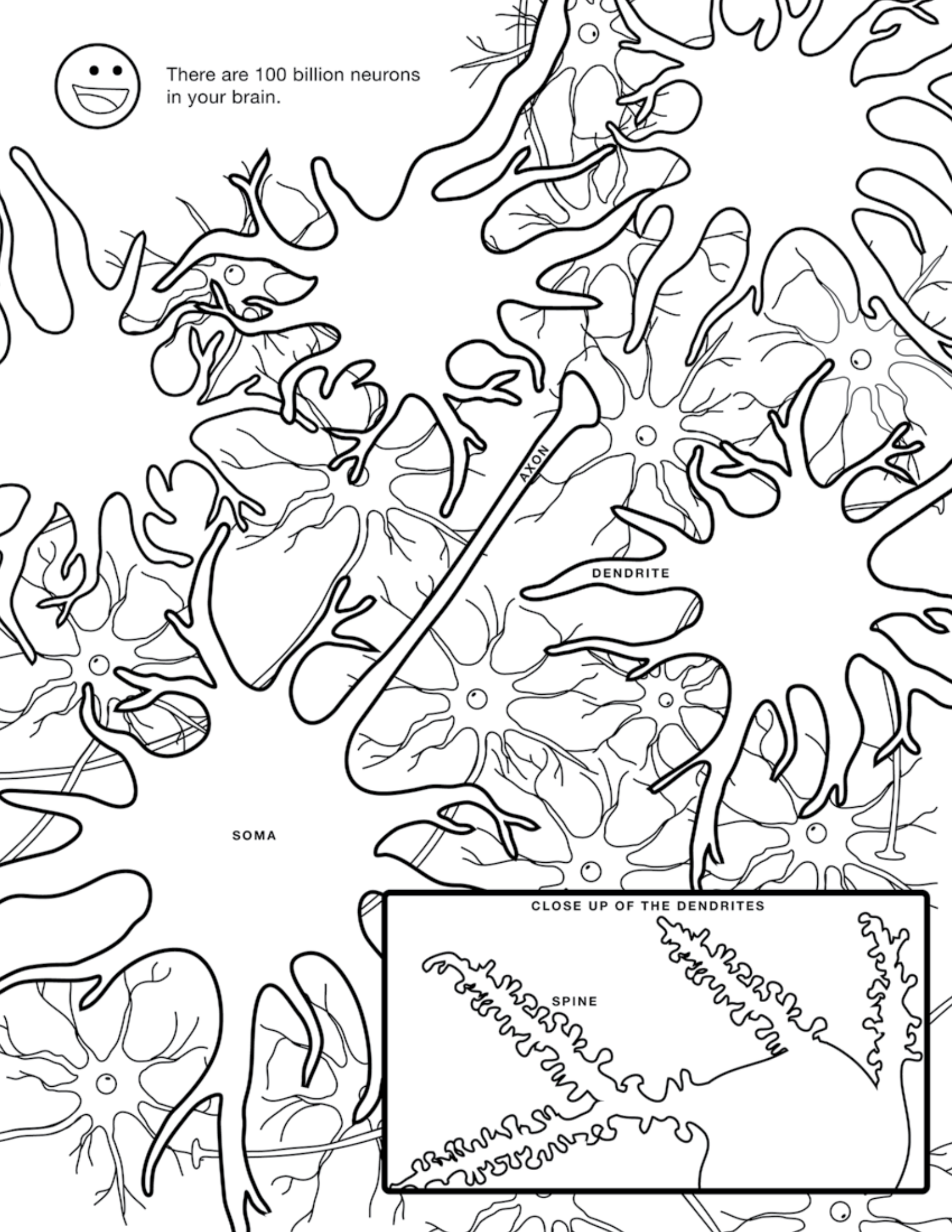
MACK
Macrophage



SAL
Bacterium



There are 100 billion neurons
in your brain.



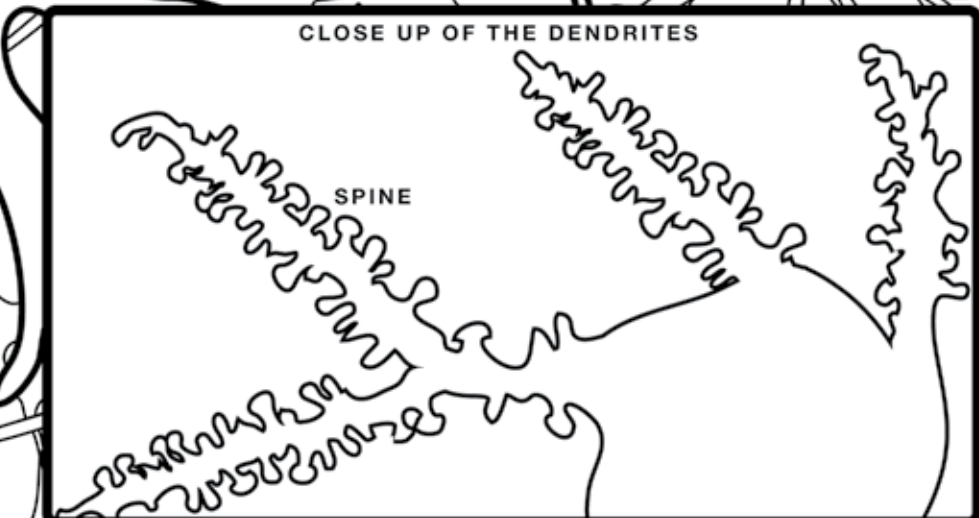
AXON

DENDRITE

SOMA

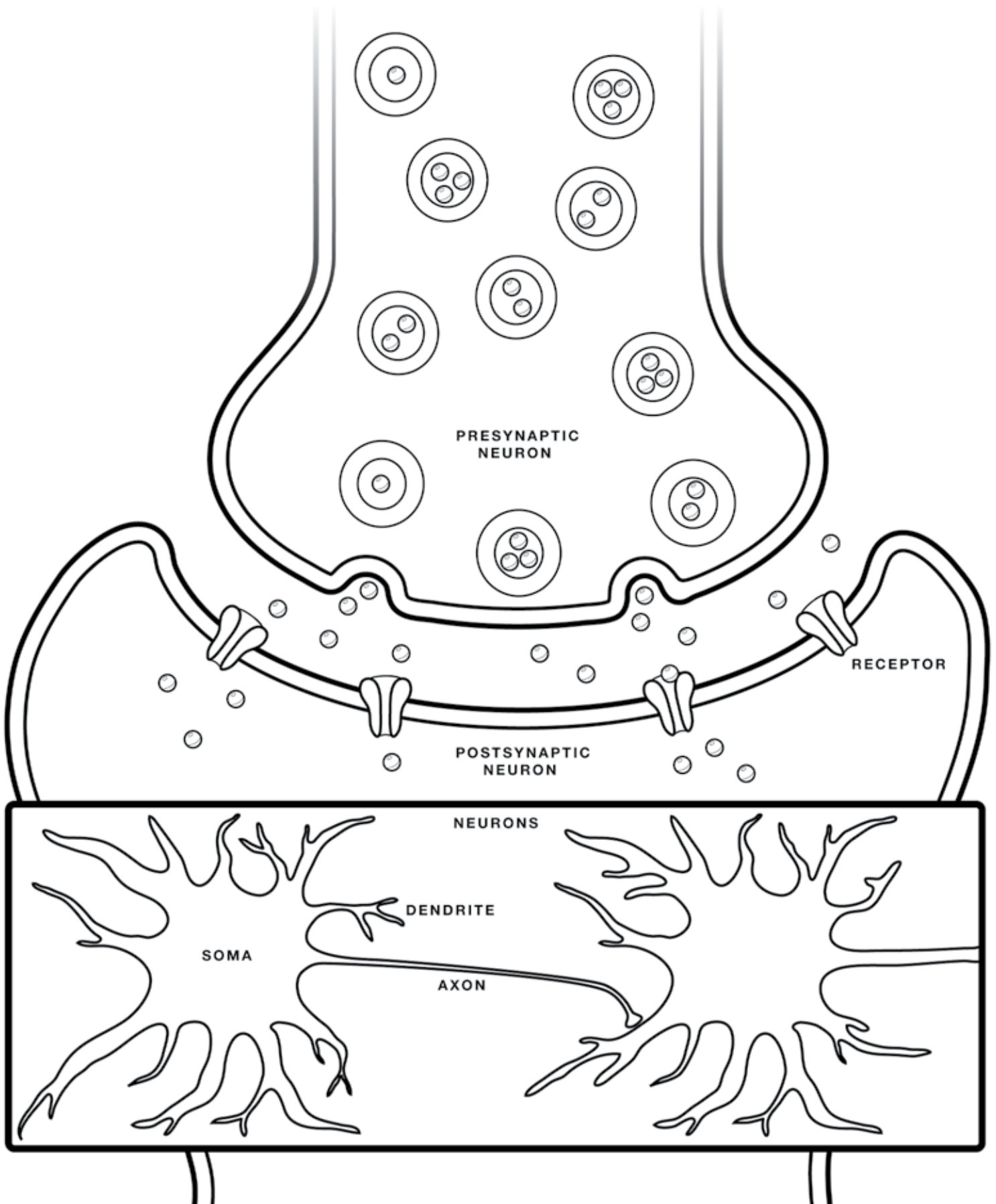
CLOSE UP OF THE DENDRITES

SPINE





Neurons communicate with one another at synapses where two cells exchange signals. Here, the postsynaptic neuron takes up molecules released by the presynaptic neuron. Synapses form circuits between cells and are important for learning new things and remembering what you've learned.

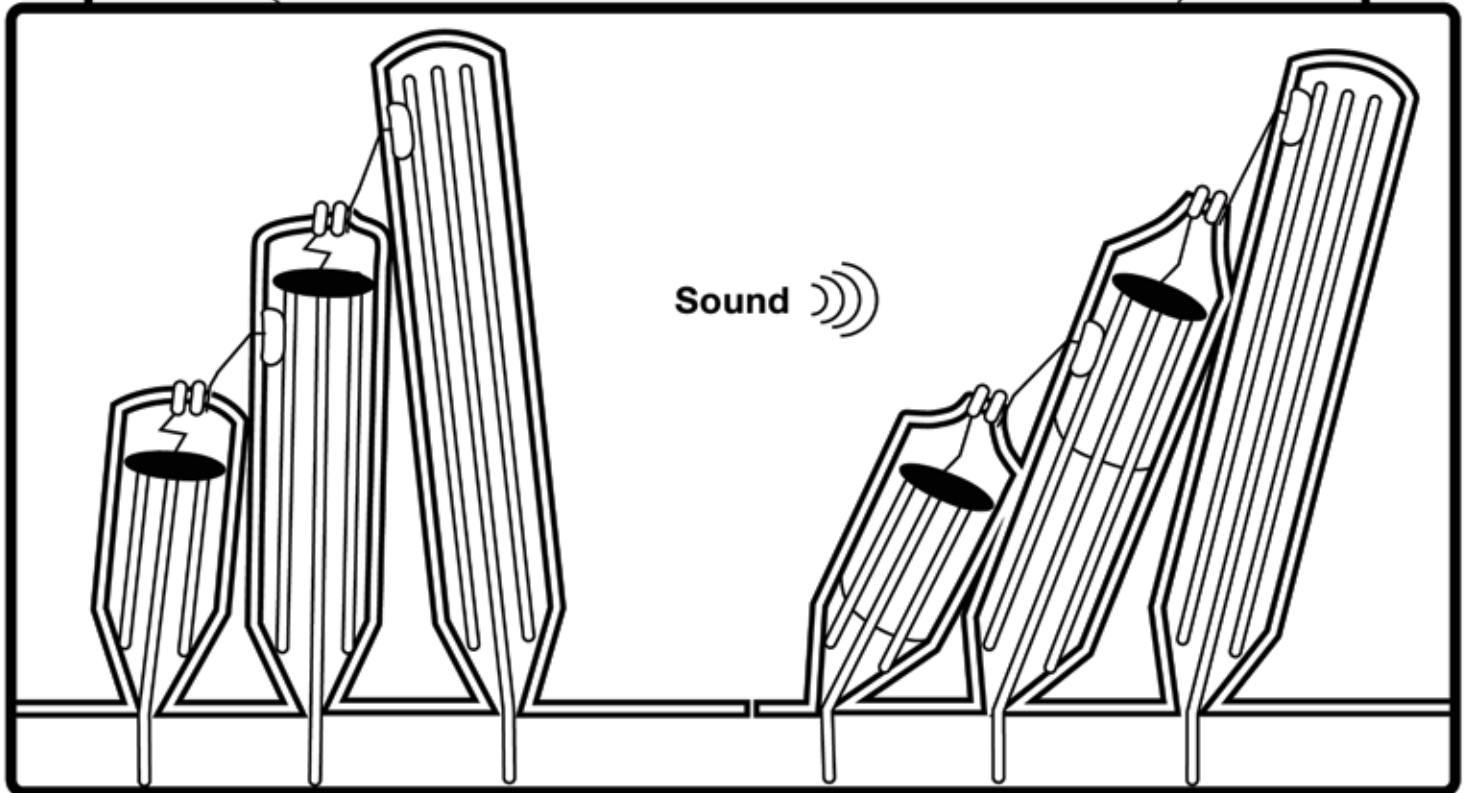
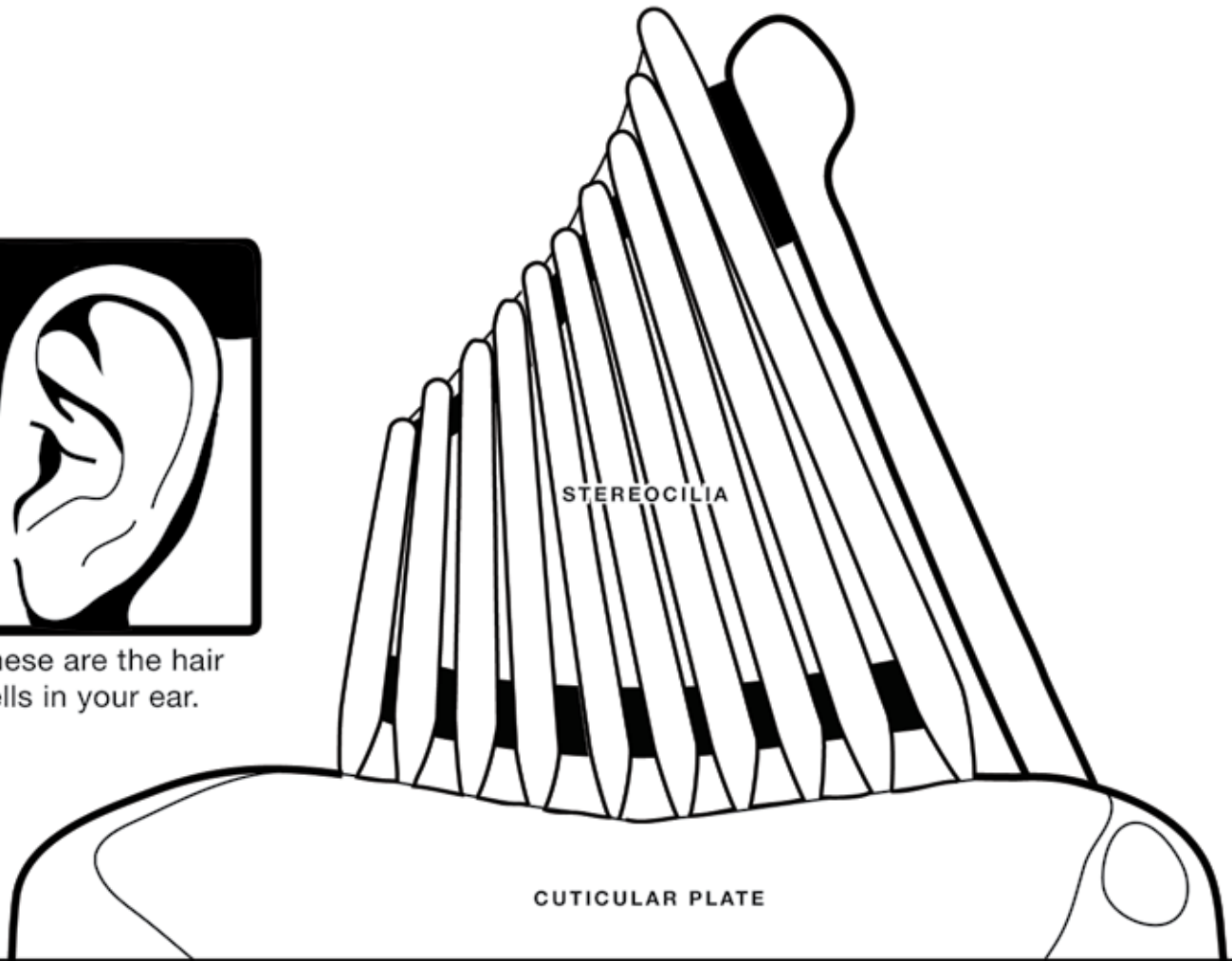




Shhhh. Listen. Hear that? Those are stereocilia in the ear at work. They move in response to sound, sending signals to the brain.



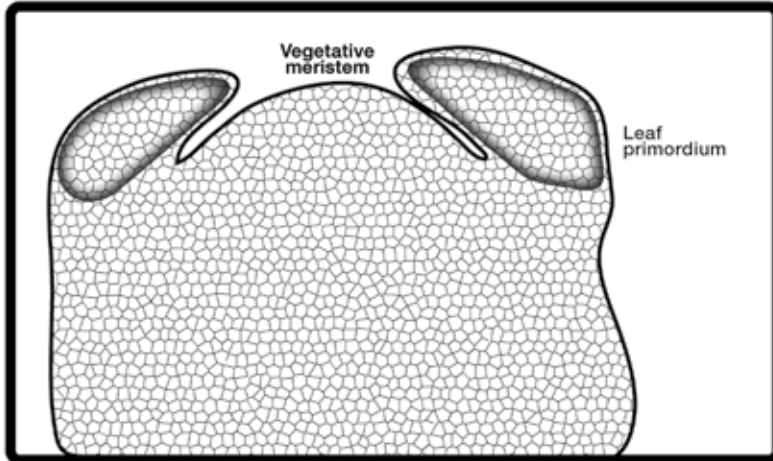
These are the hair cells in your ear.



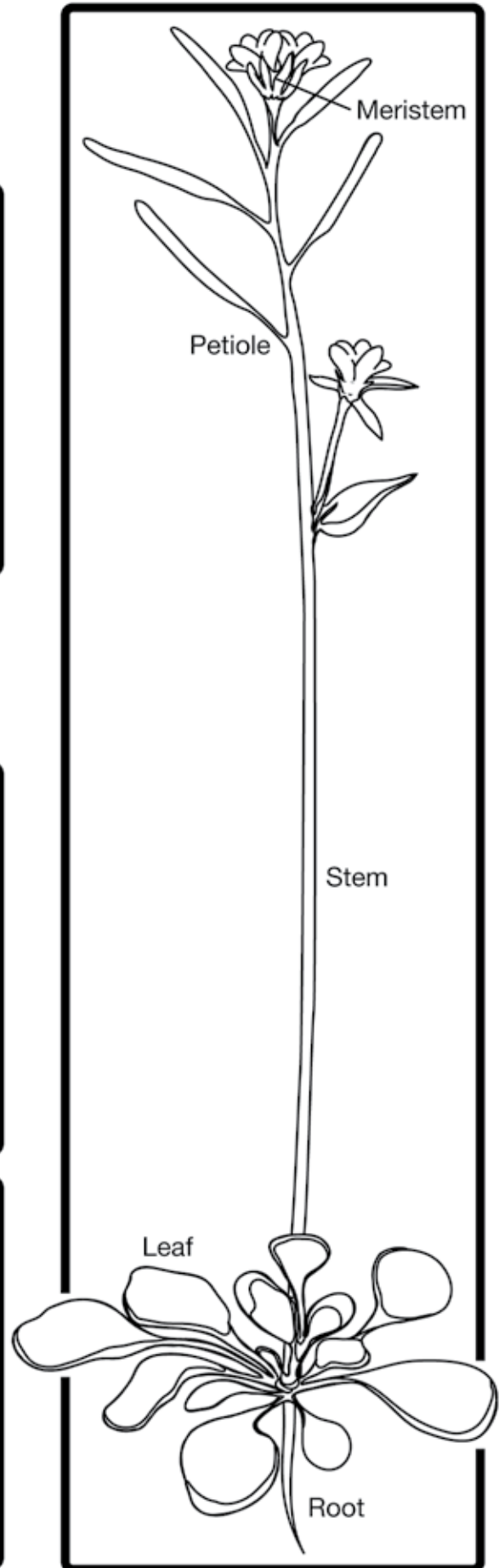
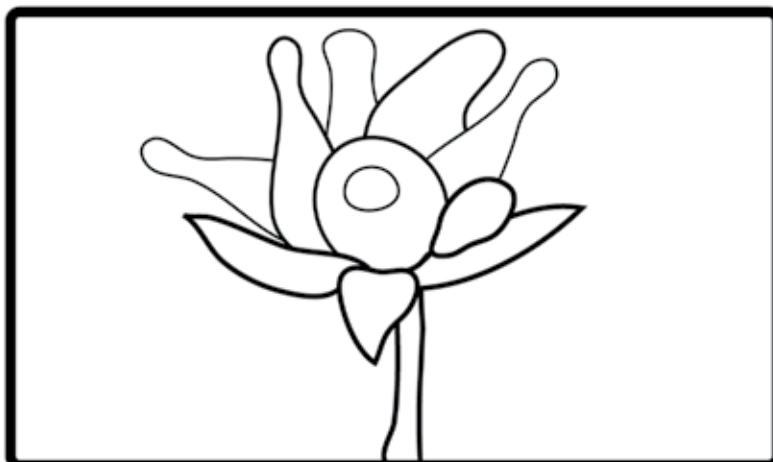
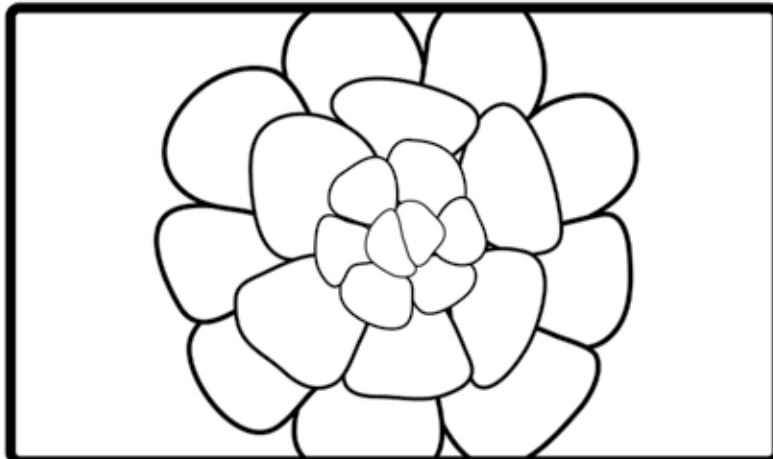


Scientists use *Arabidopsis thaliana* to study cellular processes, like flowering, in plants.

Cells that produce flowers and leaves are located in the meristem.

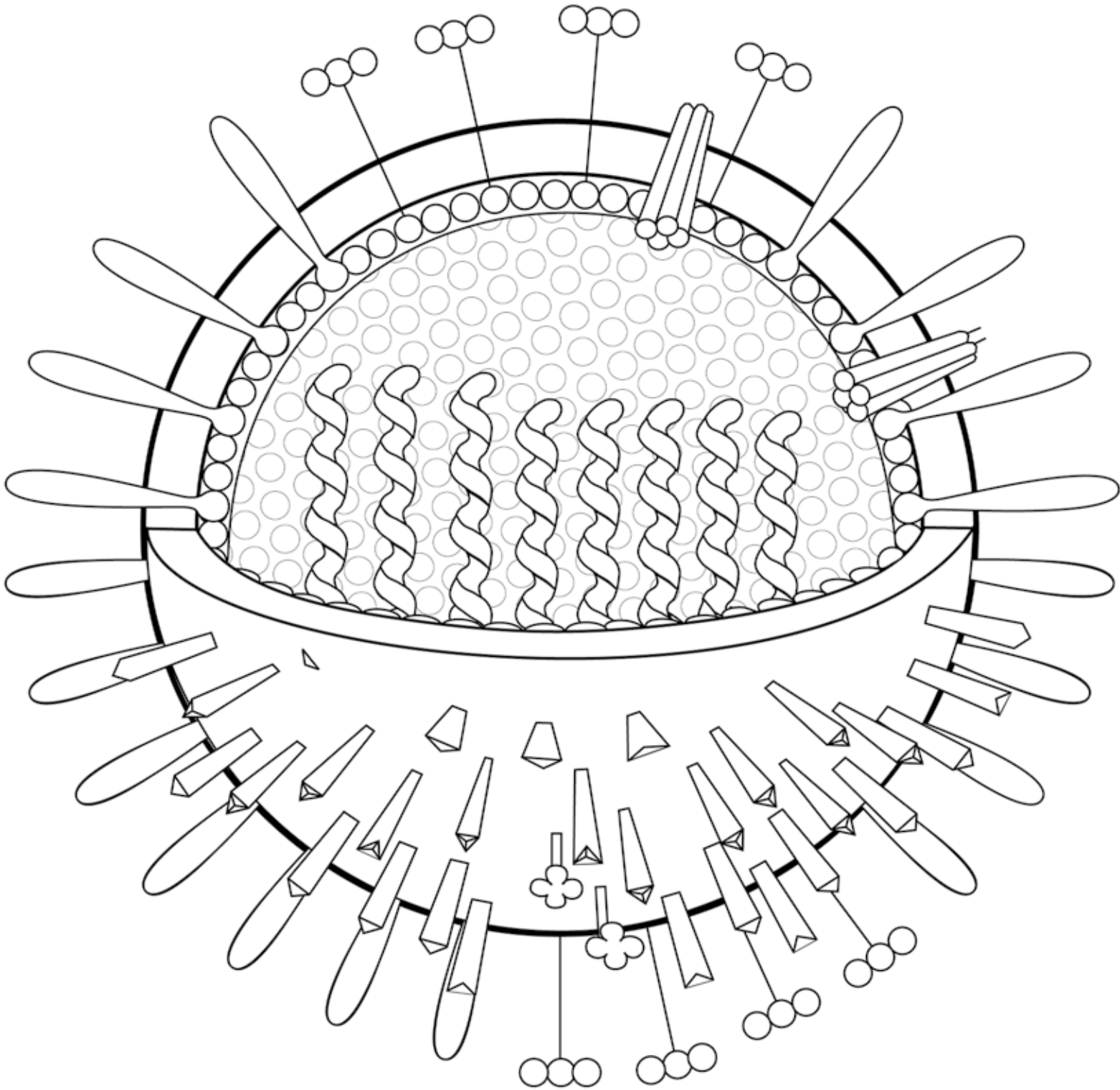


When something goes wrong with these cells, a mutation occurs that can increase the number of petals or leave it petal-less with lots of pistils.





This is a virus particle. It's the kind of virus that can give you the flu. Each virus particle carries its genome wrapped up in layers of proteins and lipid membranes.



How many different parts can you spot?



Help me find the names of all the different cells and parts that you've seen in this book!

X U N A Z H K N H U R M U S C L E Y A O S T U V O
R Z P S O T N K N W C V N A L E Q G J U D E H T H
P O L Y M E R A S E V H I E Z D E N D O S O M E E
F U P X X M V C R Y P T Q K U I I S Q V N S G H R
N S J I K T P L E A L I P I D T N A C U S I H R W
U H U K R X A I S Z J M N N R C R T R F F N B V E
C E Z N N M N E U R O N O U D Q V O Z N M O Z Z V
L O B C P E E N T P E I D A A T V K P Z L P E A H
E H S D R N T G Z K T P V B Z U H S Z H U H L J V
U W C T E J H U G P V K L Q T O K O P W I I C O V
S C K N E K Q G I Q I O J I Y W F R F D B L I S R
Q E O U Y O S R Z U S D K J C H Q T M X I Z J T I
S L R C M A C R O P H A G E M A C K E F A A W E B
W L O L L S V L G O L G I M E F T Y T N O B L O O
C U M E N K J M A Y E B C I R J Y I T H D E S B S
Y E R A T F C M N S O O O S I Q T T O O N O H L O
W W R R G B Y L U N T L O T S G P K K N P Q N A M
S T E P R A H T O N M Y J J T Q D X A U B L A S E
M Q W O K S W X L K G S X O E X R H P Q D N A T Z
A B T R J O A K D L X O H Z M O C Z C X G U Q S G
Z Q M E K P D T R N A S F R D H D A Z Y N G I S M
T E P I T H E L I A L O C D E N D R I T E Y F O E
J G A Z E I Q B F G V M O L Y M P H O C Y T E C N
J Y N V I L L I U I M E A P U Q O R Y E V J B L B
R B U O I R C O V M S S M T R C H W H A C F U X T

DNA
NUCLEUS
CYTOPLASM
GOLGI
ER
RIBOSOME
LYSOSOME
ENDOSOME
NUCLEARPORE

OSTEOCLAST
OSTEOBLAST
MERISTEM
RNA
POLYMERASE
VILLI
CRYPT
TRANSCRIPTION
REPLICATION

CHANNEL
LIPID
ION
MUSCLE
TENDON
BASOPHIL
NEUTROPHIL
EOSINOPHIL
LYMPHOCYTE

MACROPHAGE
PANETH
CELL
EPITHELIAL
NEURON
DENDRITE
AXON

