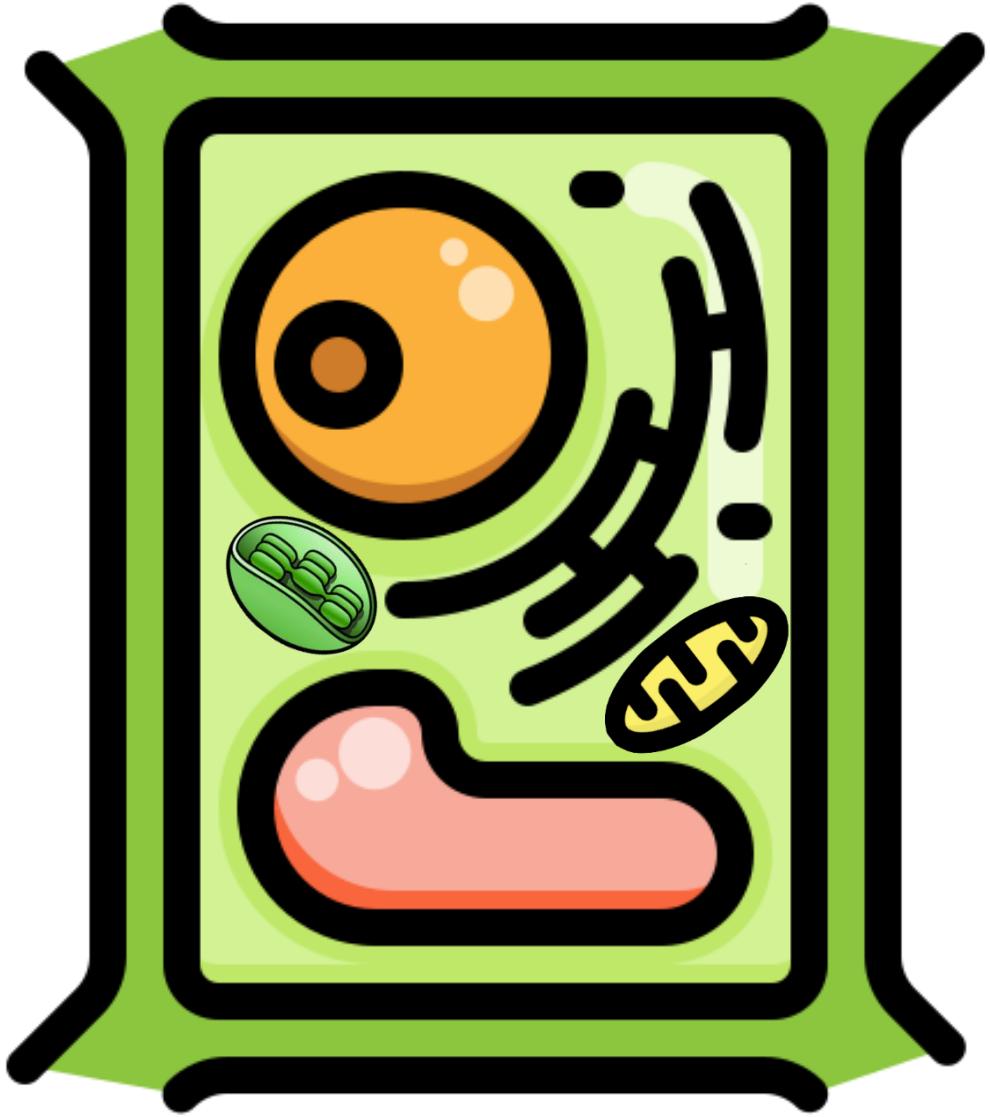
Przykładowa lekcja CLIL - BIOLOGIA

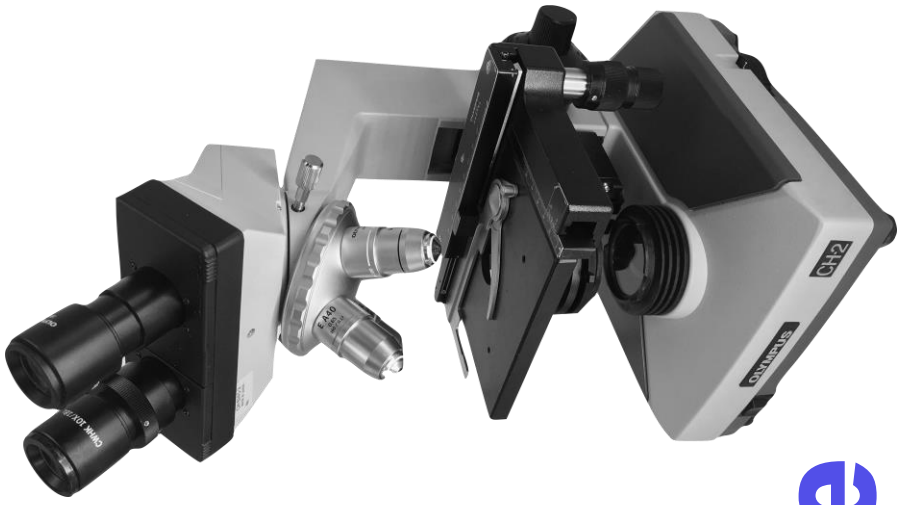
Materiał udostępniony przez szkołę partnerską w Hiszpani podczas realizacji projektu.

Find out who did it!

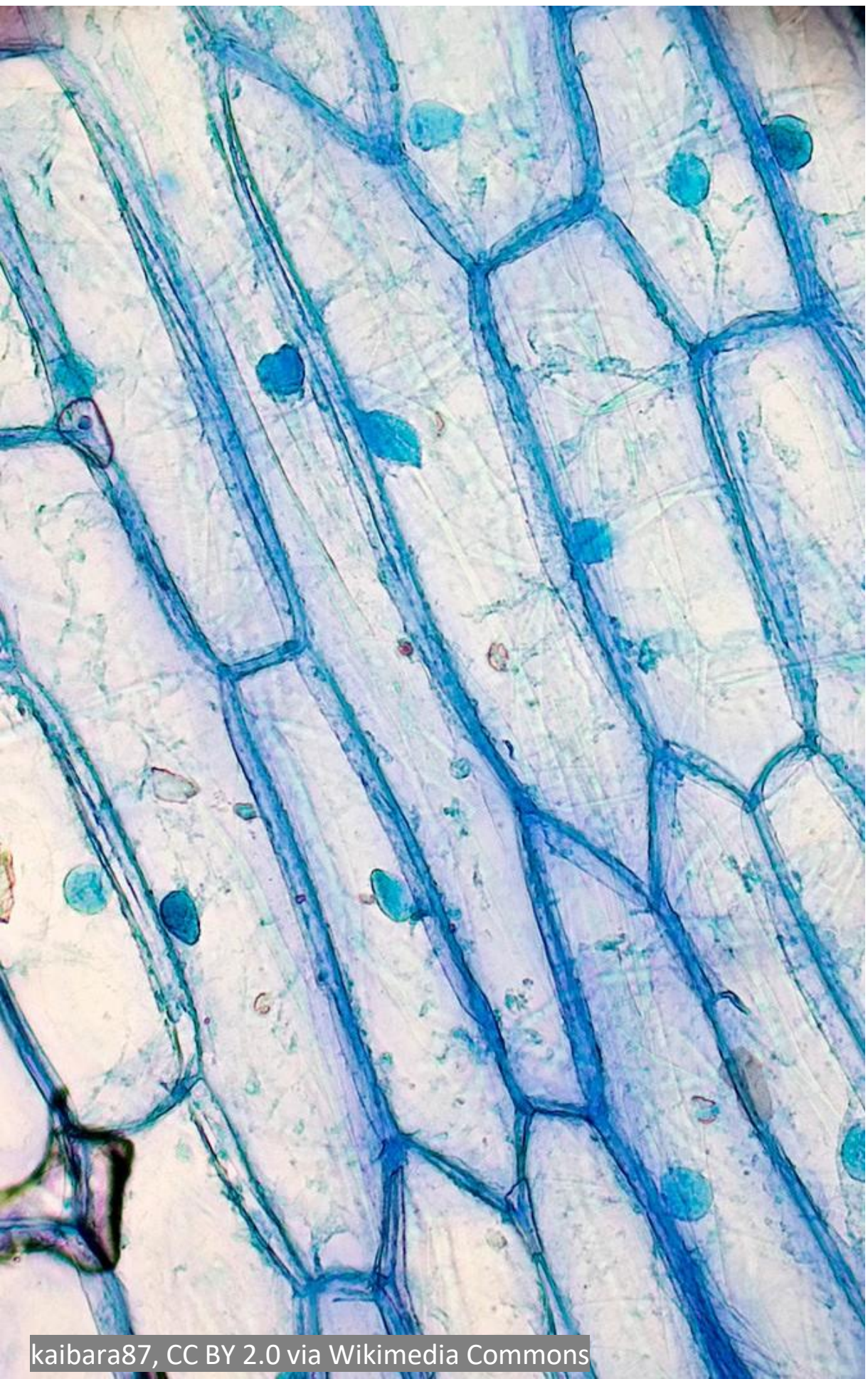
Compare and contrast animal and plant cells



Sarah Greenwood, CC BY 4.0, via Wikimedia Commons

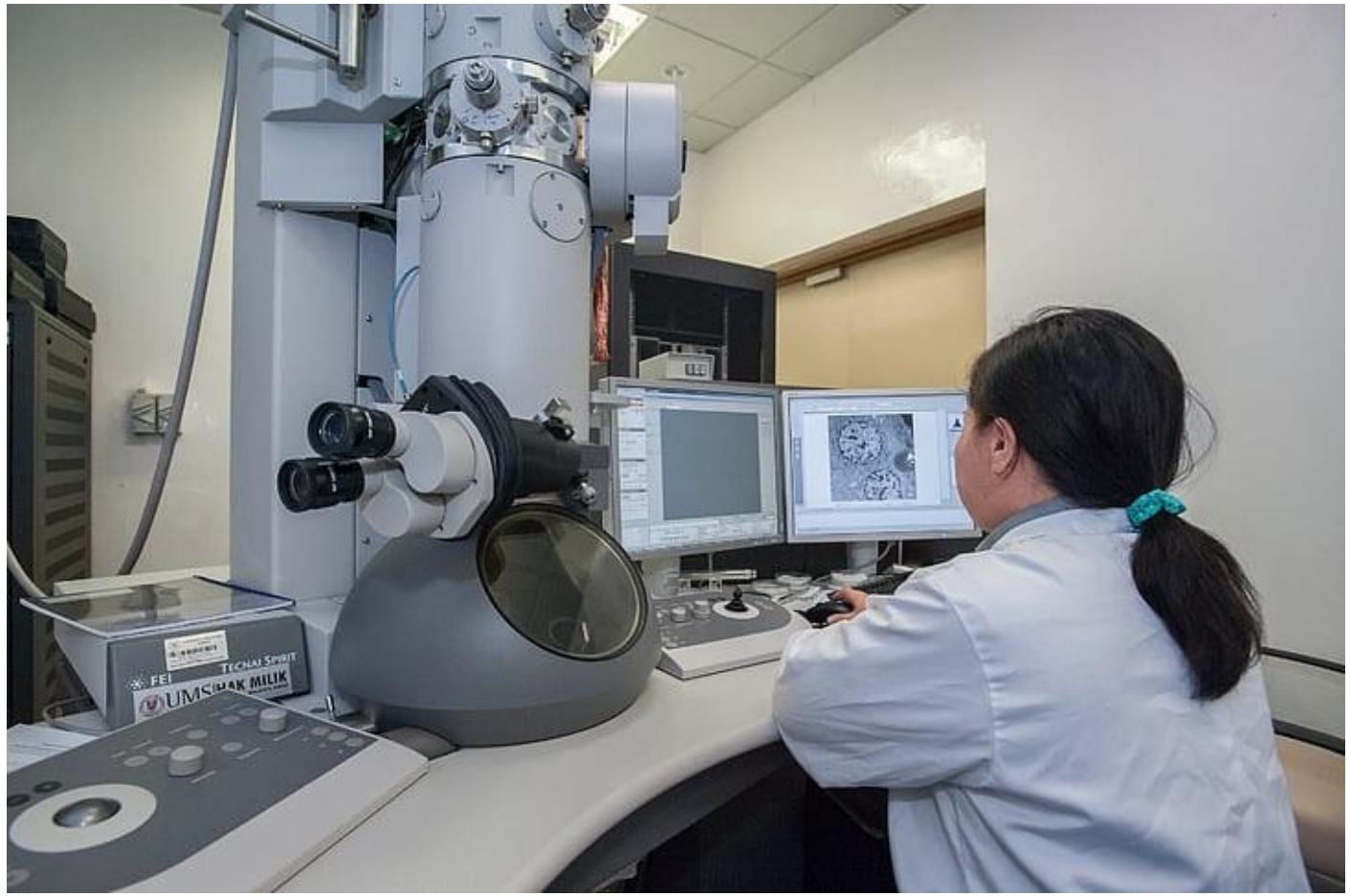


Light microscope

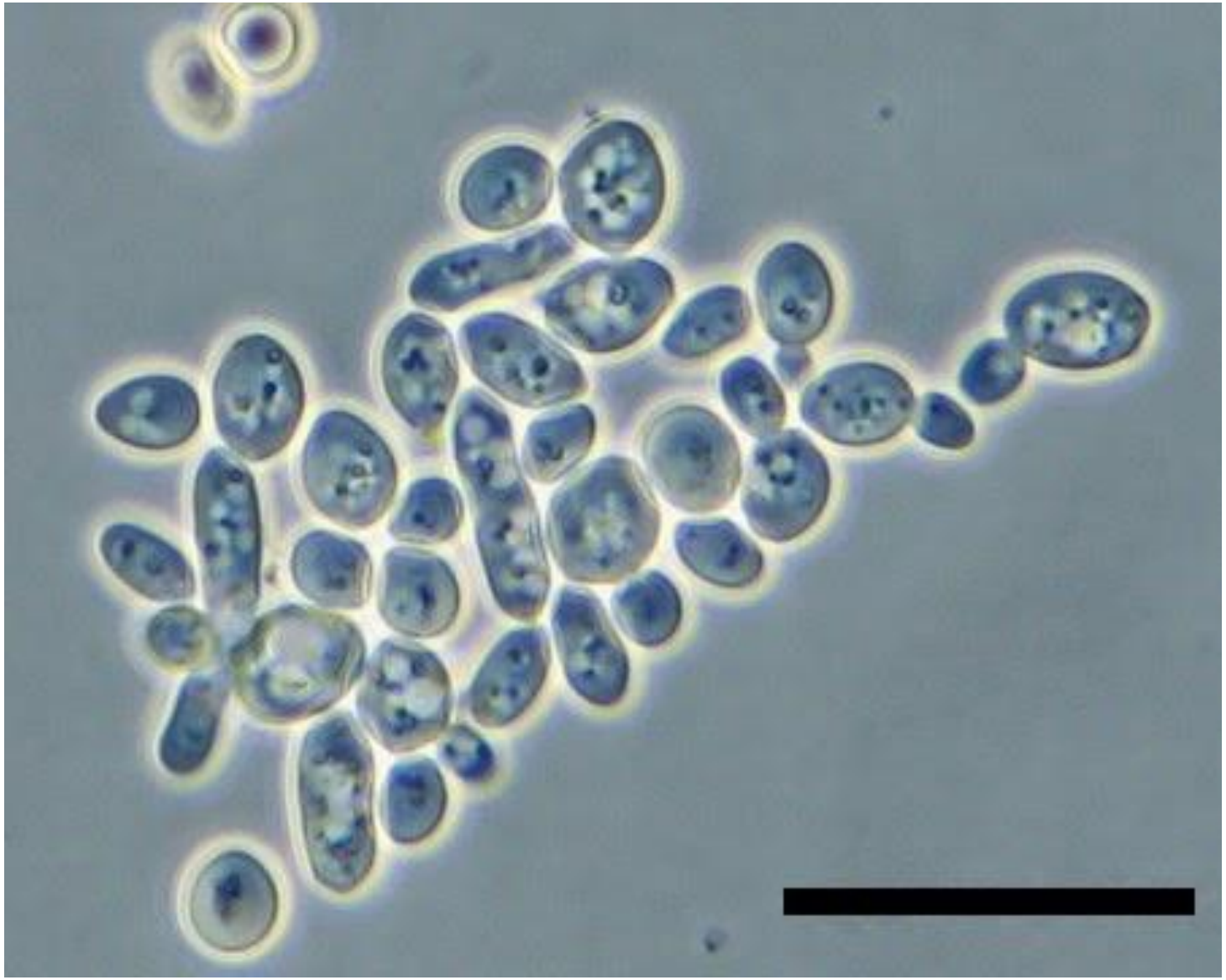


kaibara87, CC BY 2.0 via Wikimedia Commons

Electron microscope

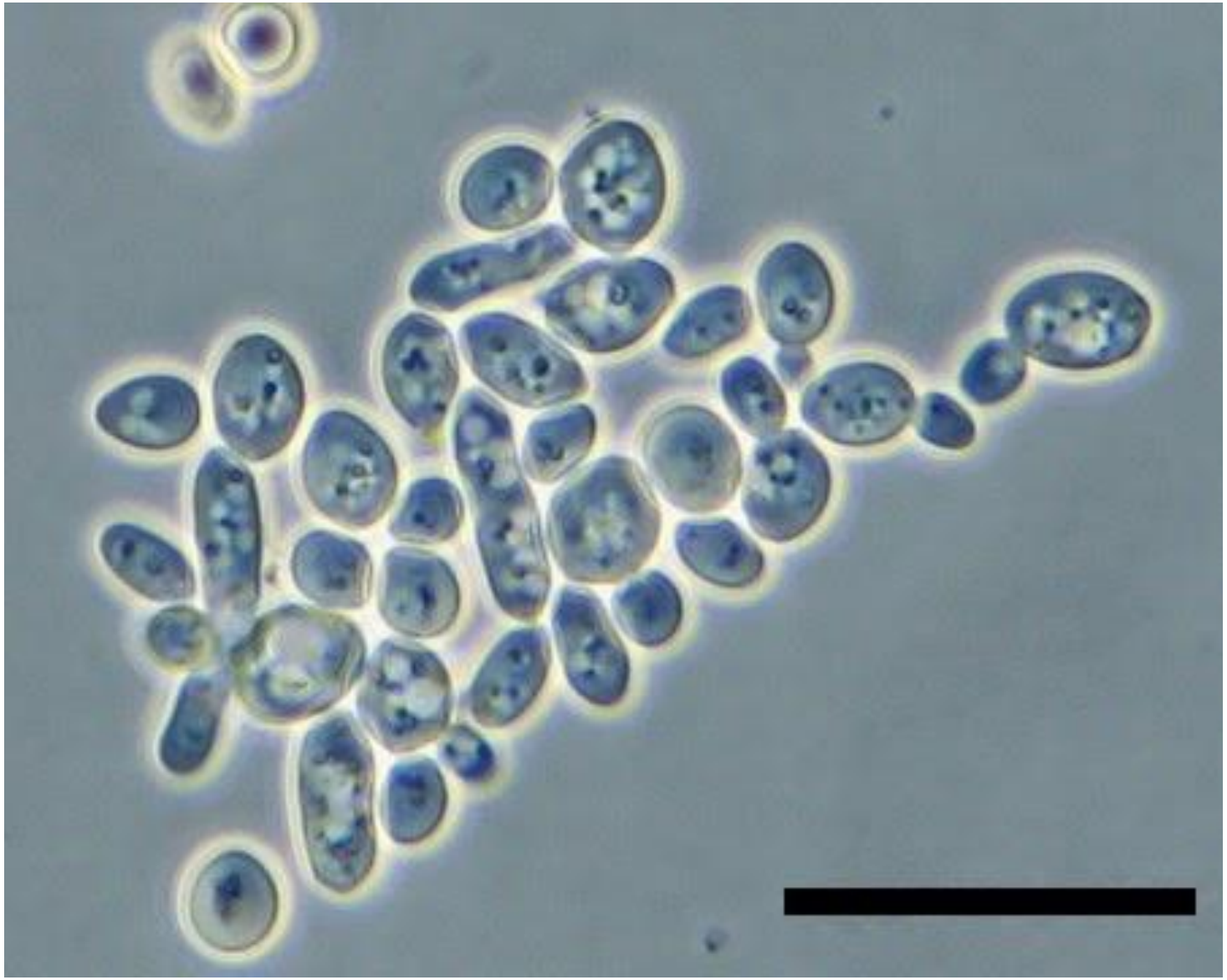


Light microscope or electron microscope?



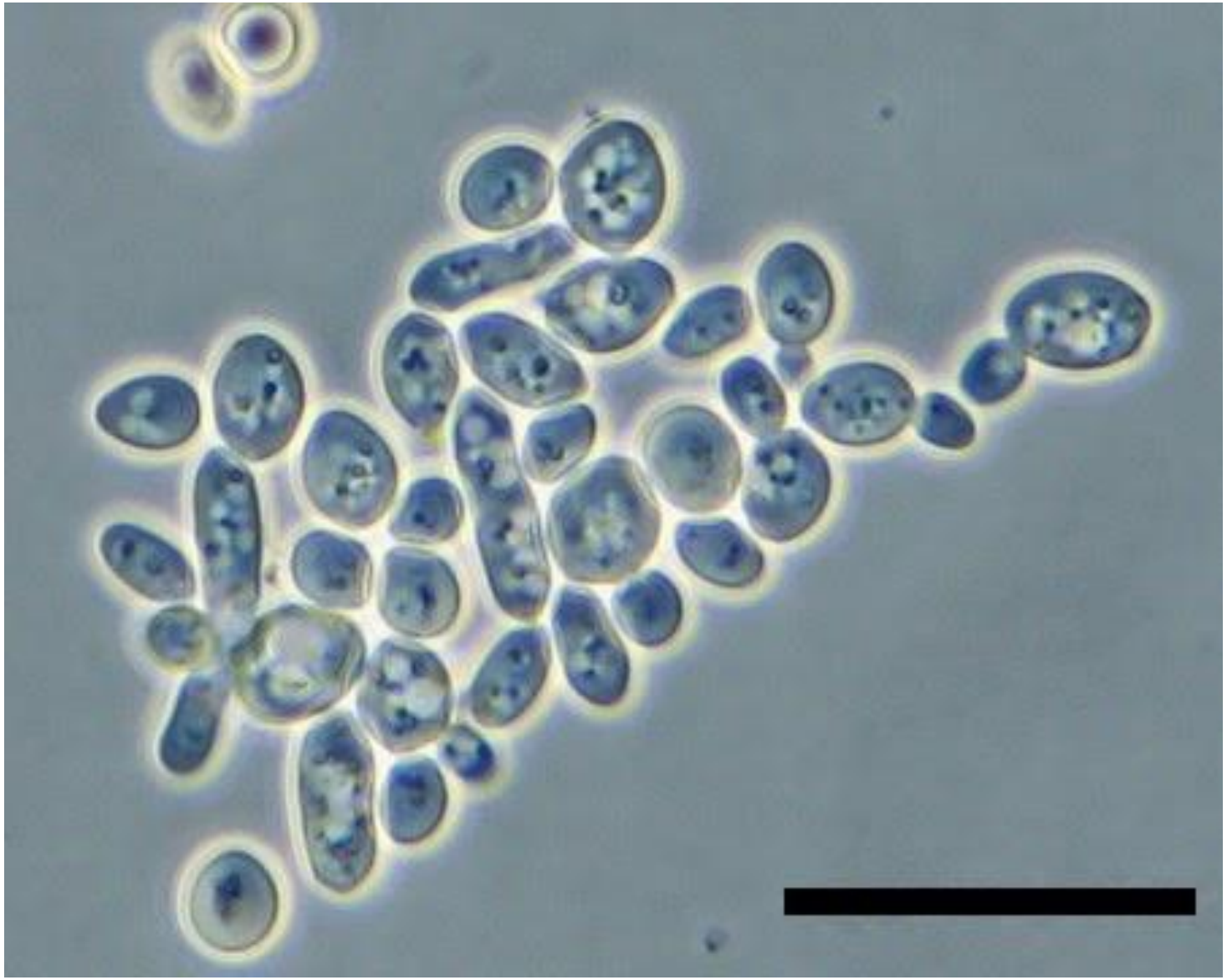
Of course, it's a light microscope image!

Light microscope

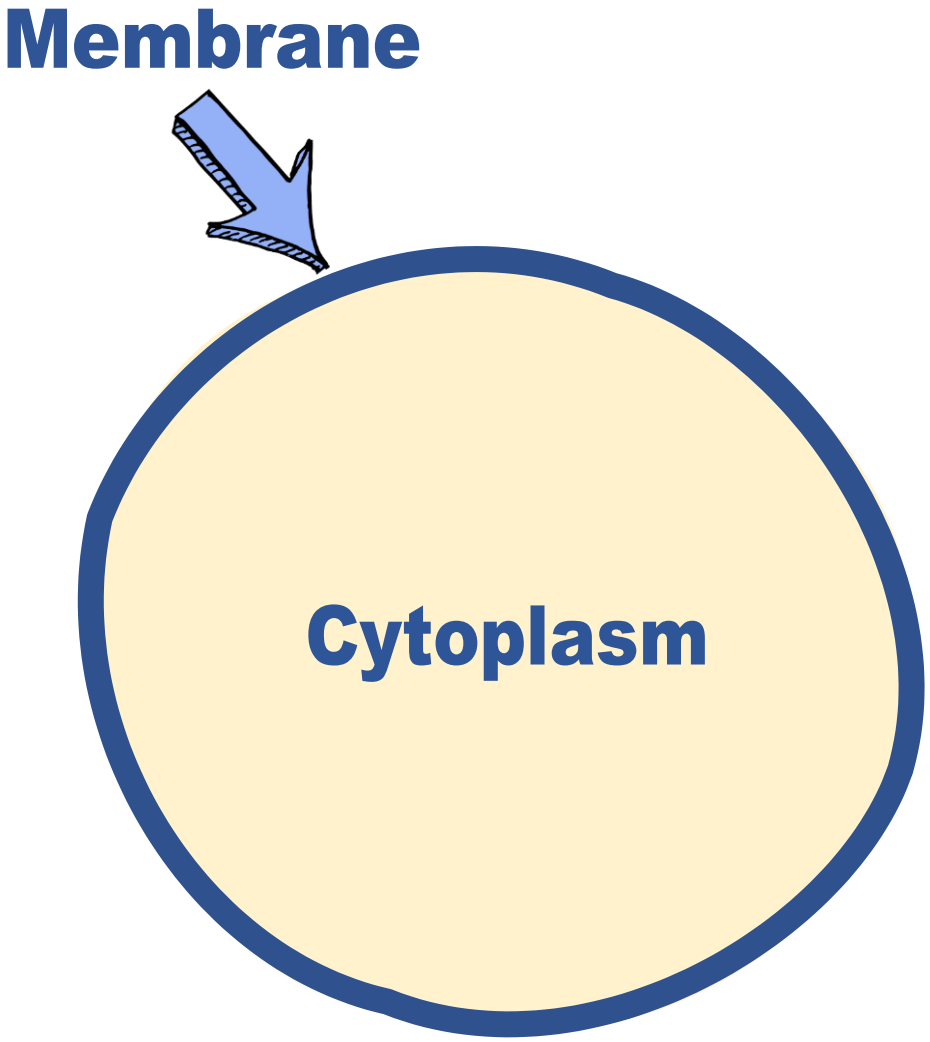


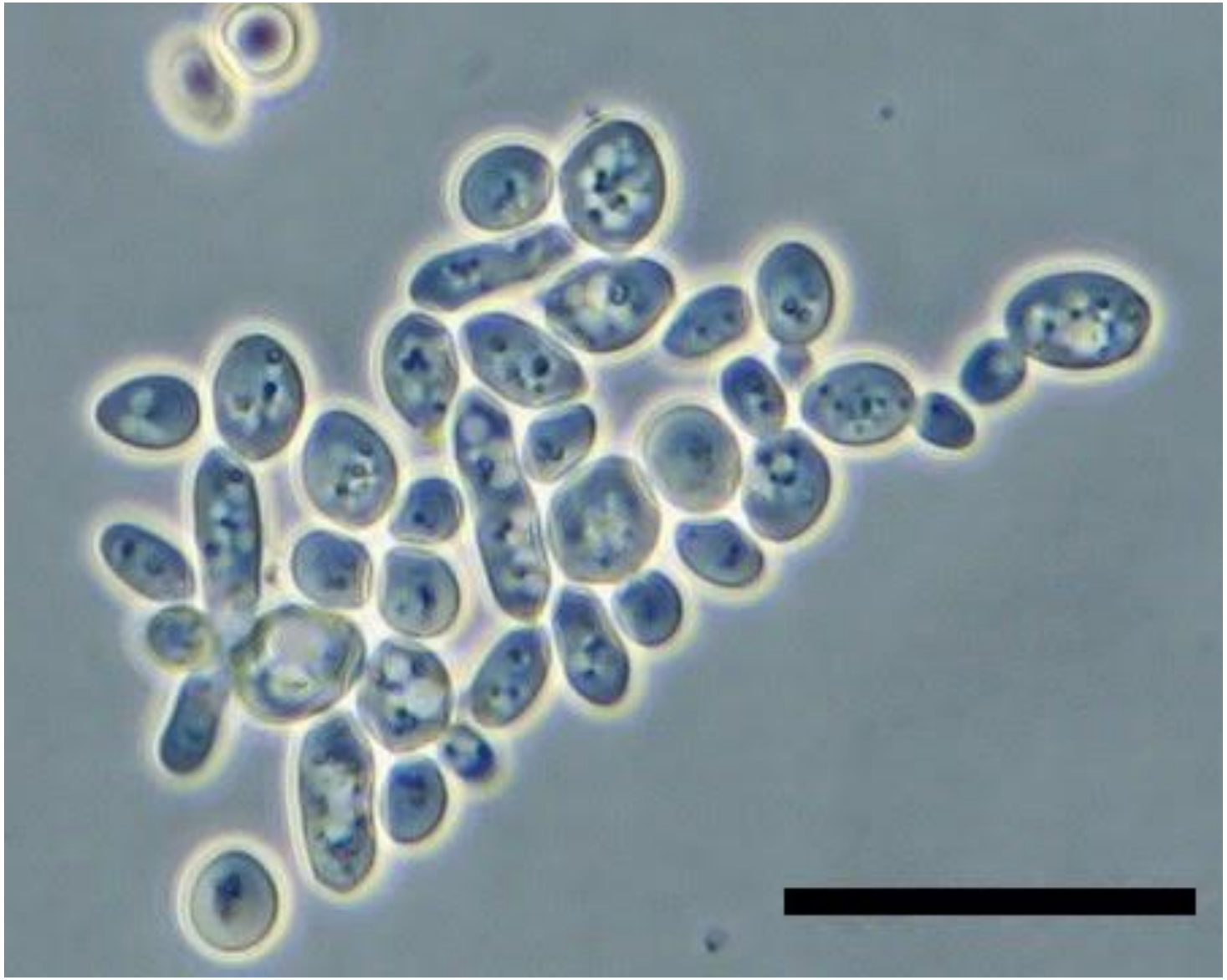
Let's start with the easiest parts!

What do you see?

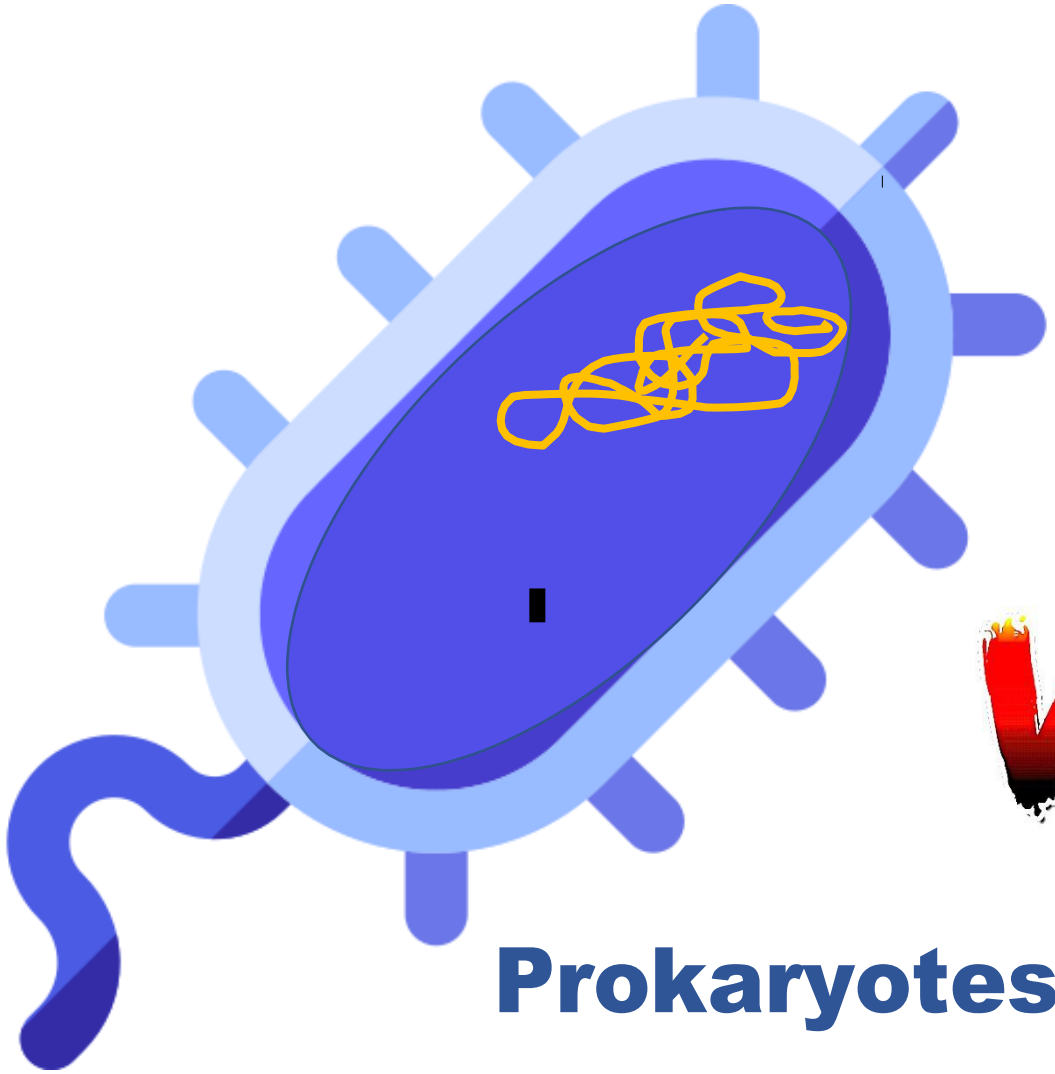


All cells have cytoplasm and membrane





What about the DNA?

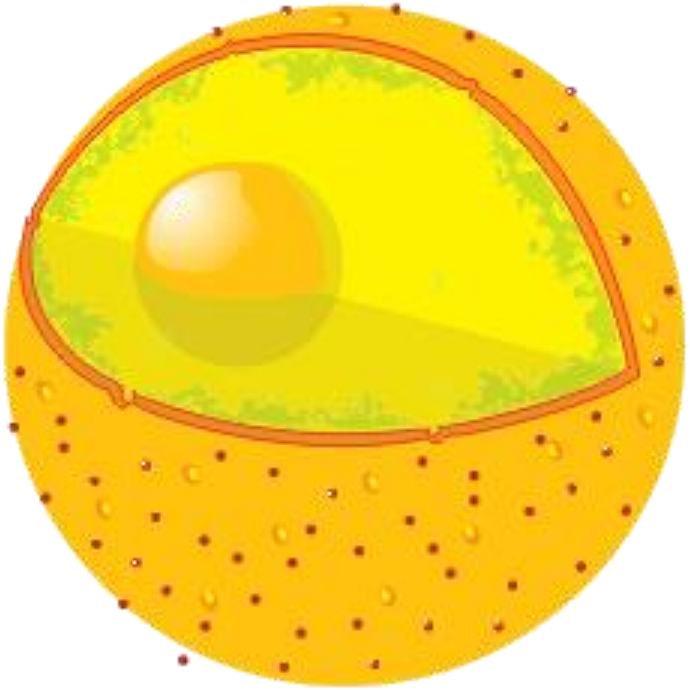


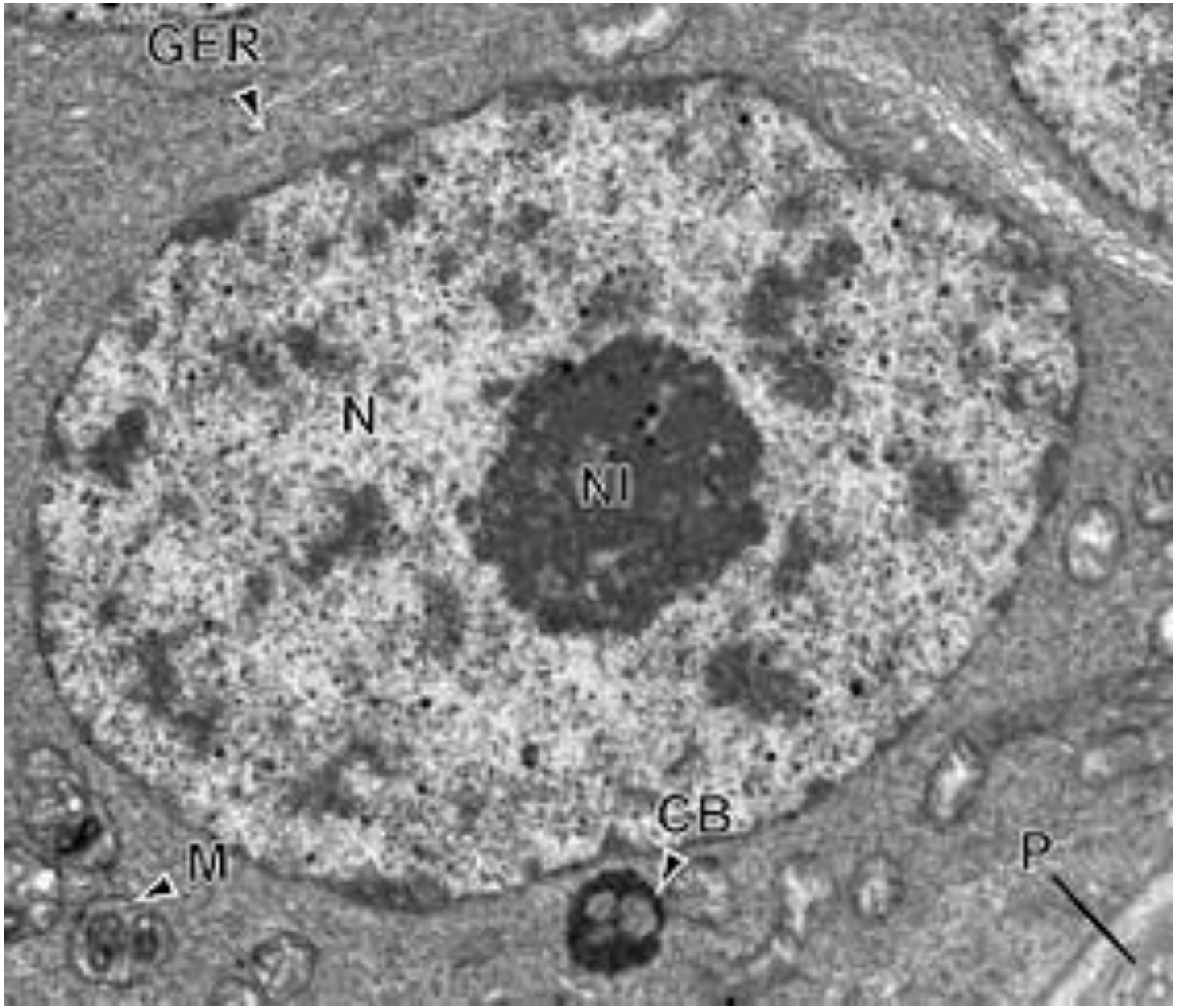
Prokaryotes

VS

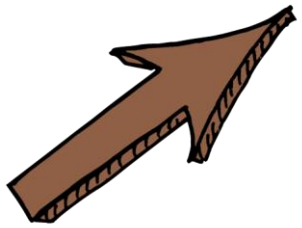
Eukaryotes

Nucleus

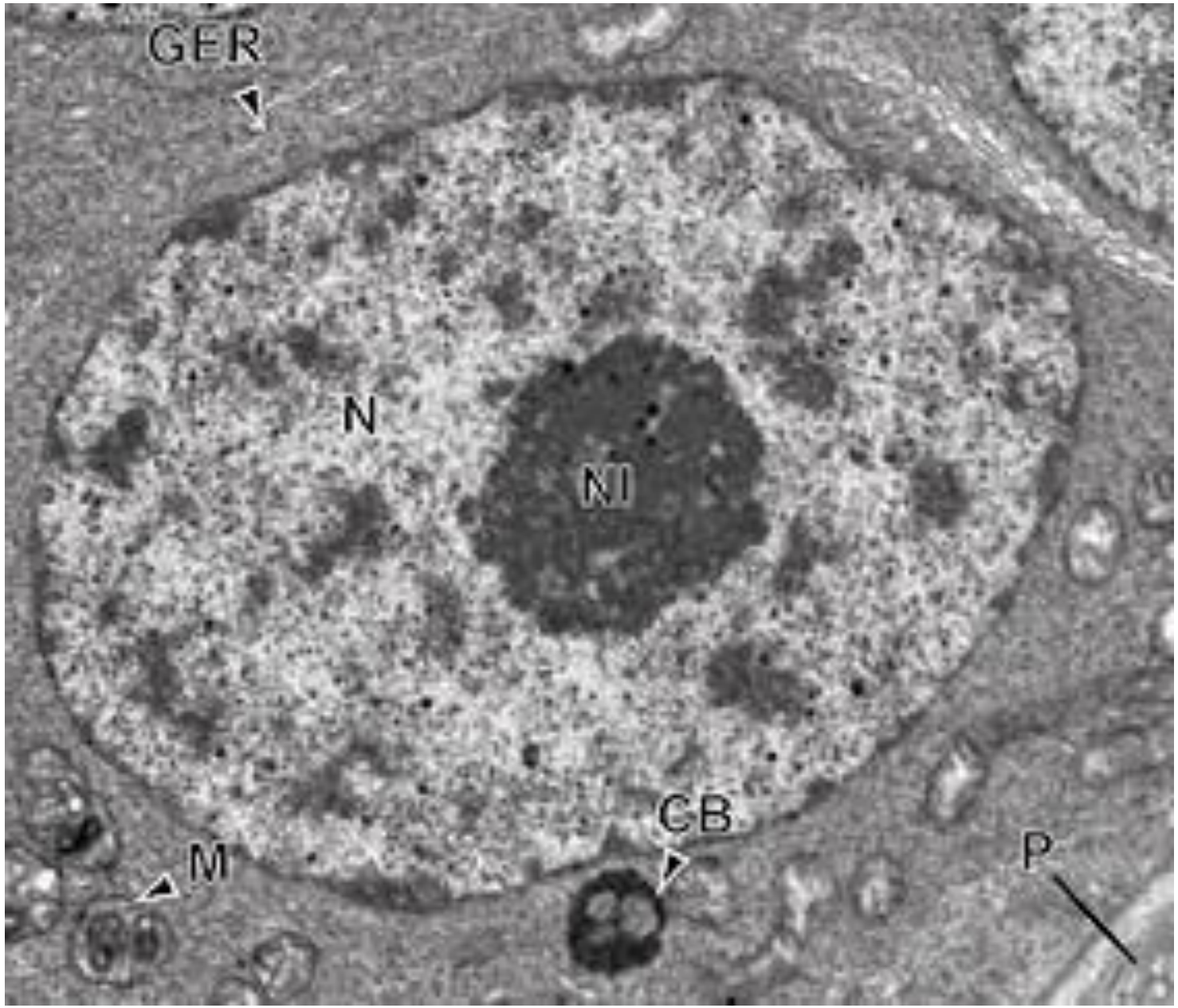




Nucleus

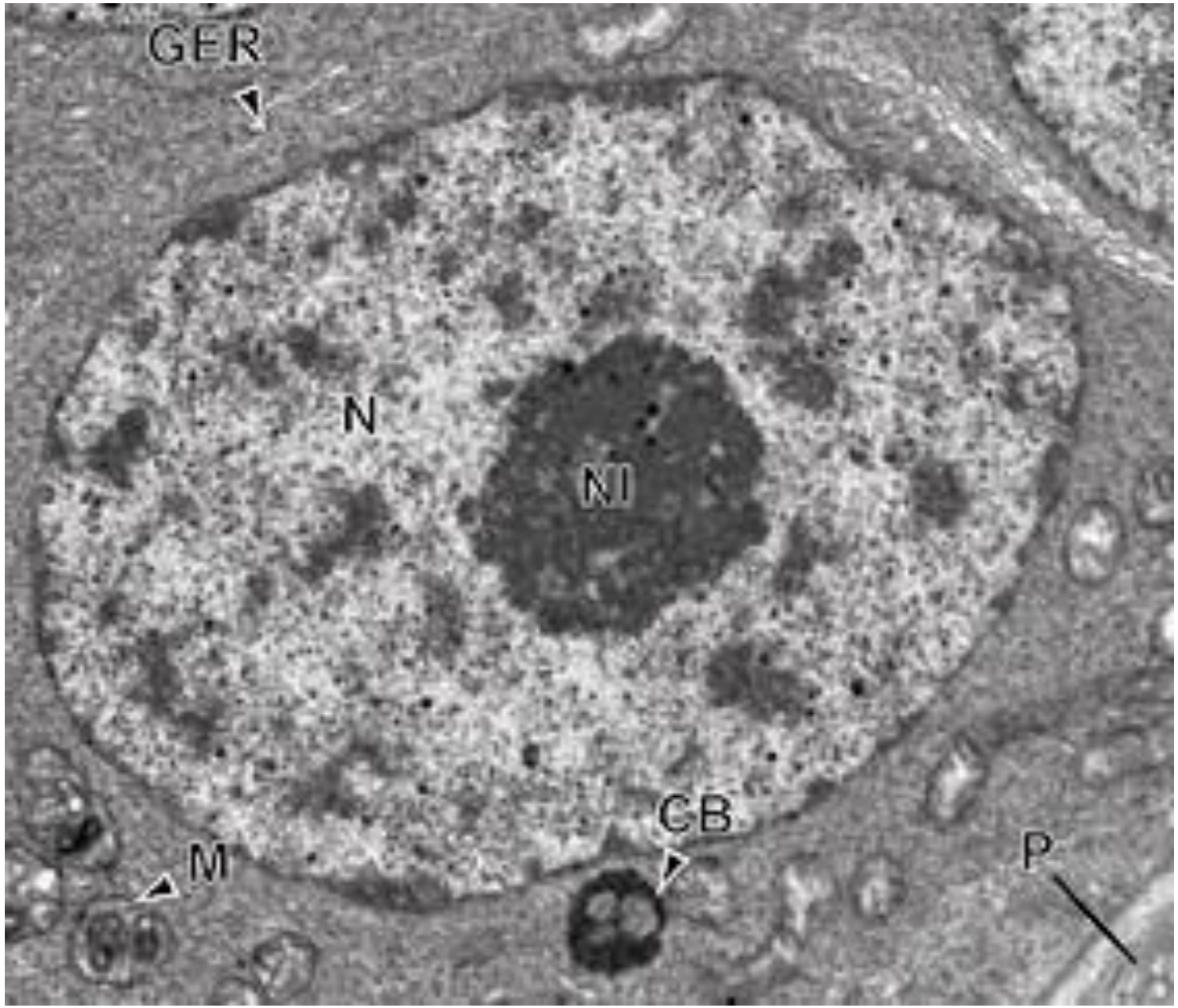


Light microscope or electron microscope?

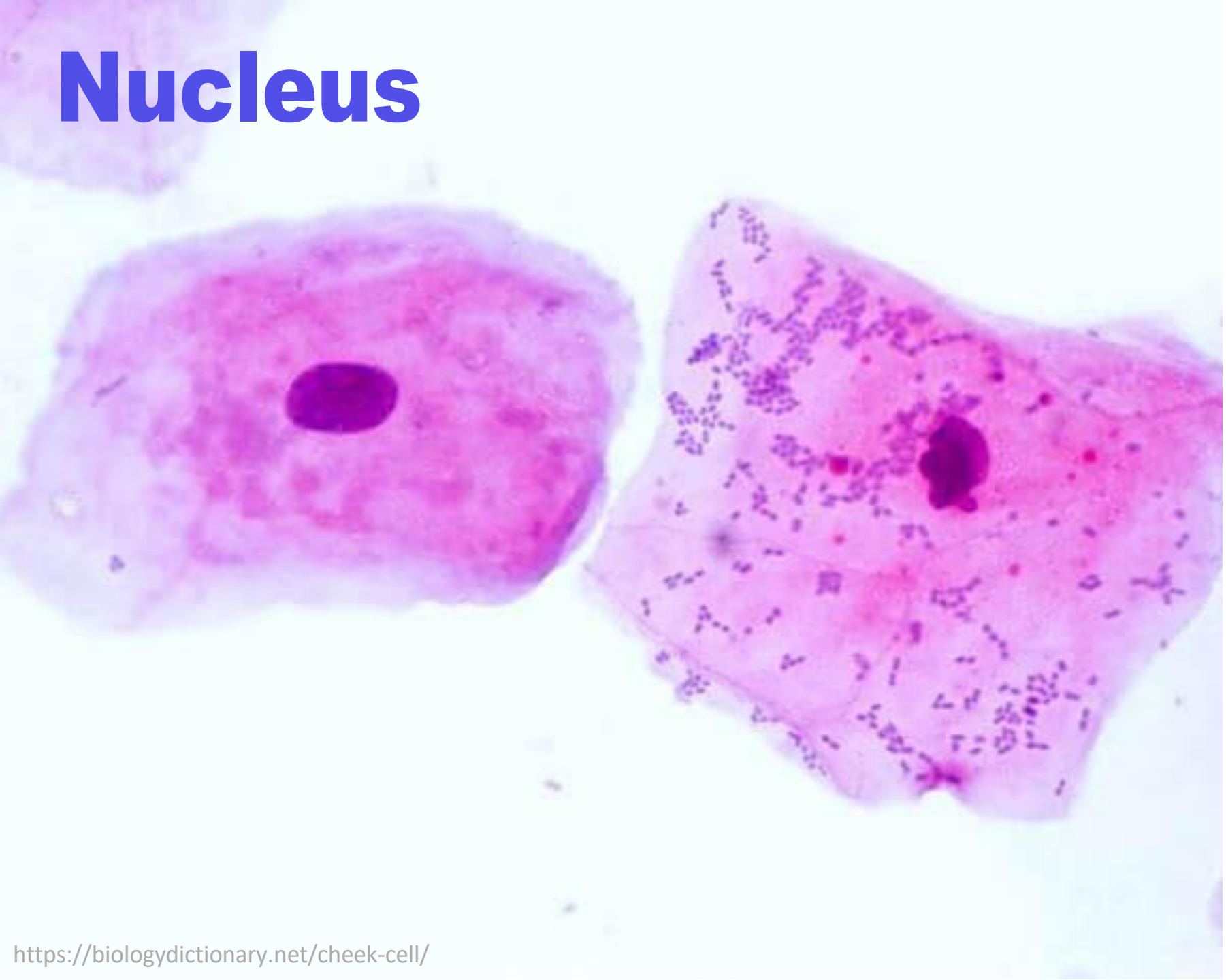


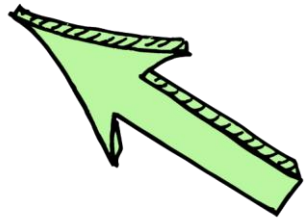
Nucleus

Electron microscope



Nucleus





Light microscope or electron microscope?

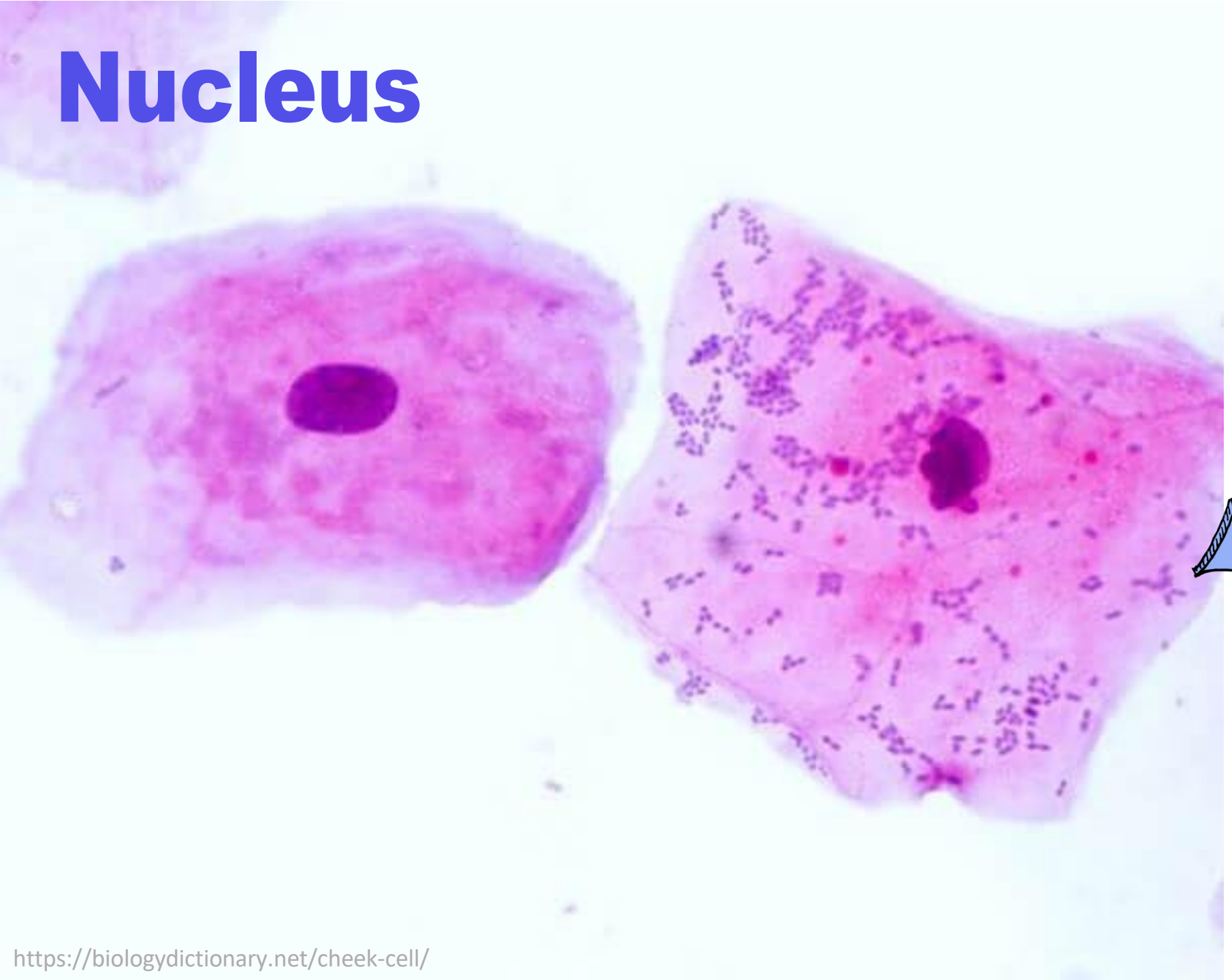
https://biologydictionary.net/cheek-cell/

Nucleus

https://biologydictionary.net/cheek-cell/

Light microscope

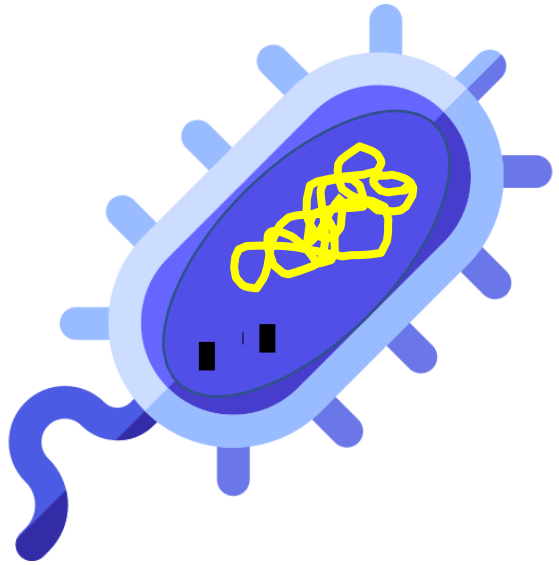
Nucleus



What are those tiny things?

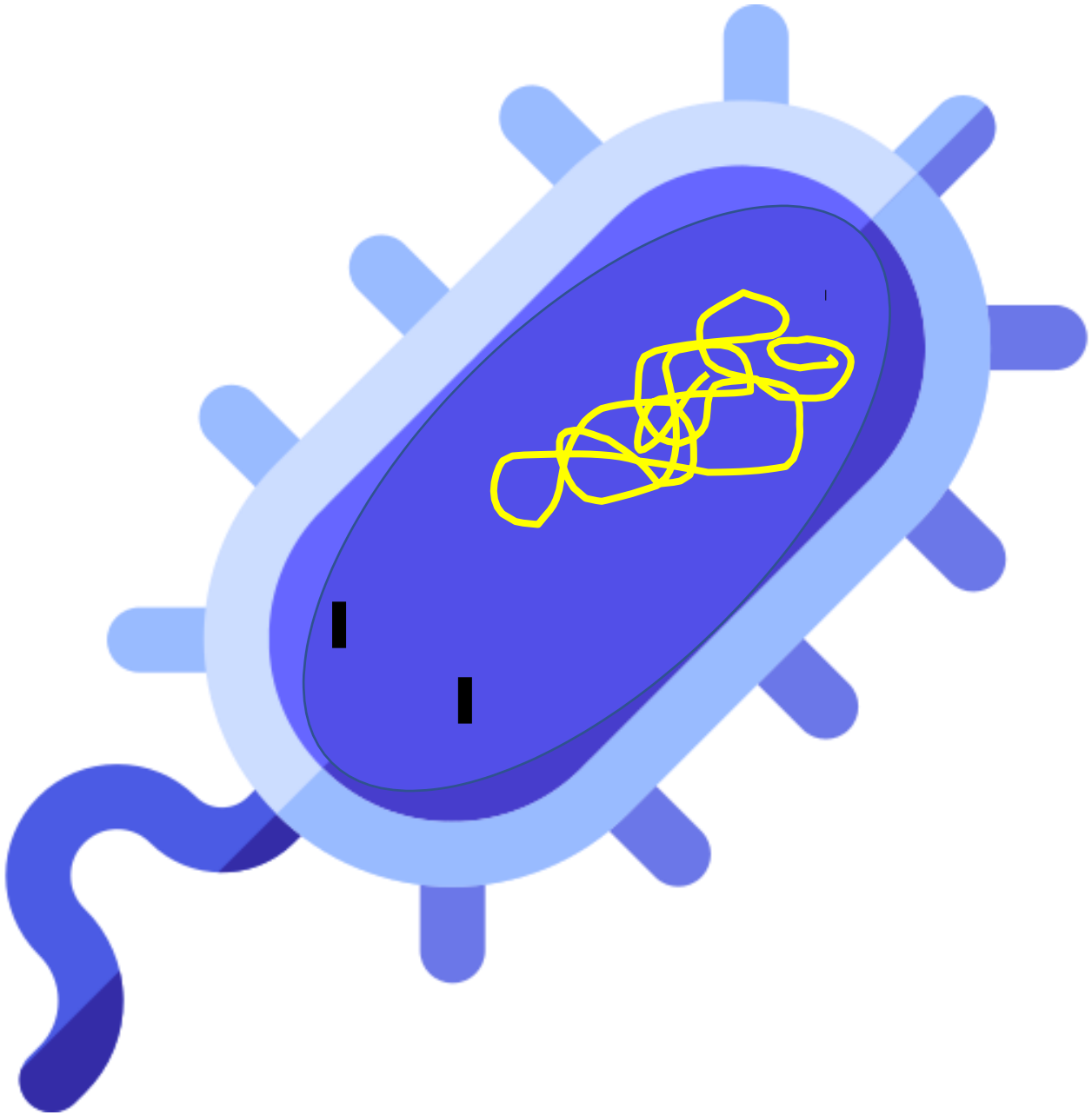
https://biologydictionary.net/cheek-cell/

https://biologydictionary.net/cheek-cell/



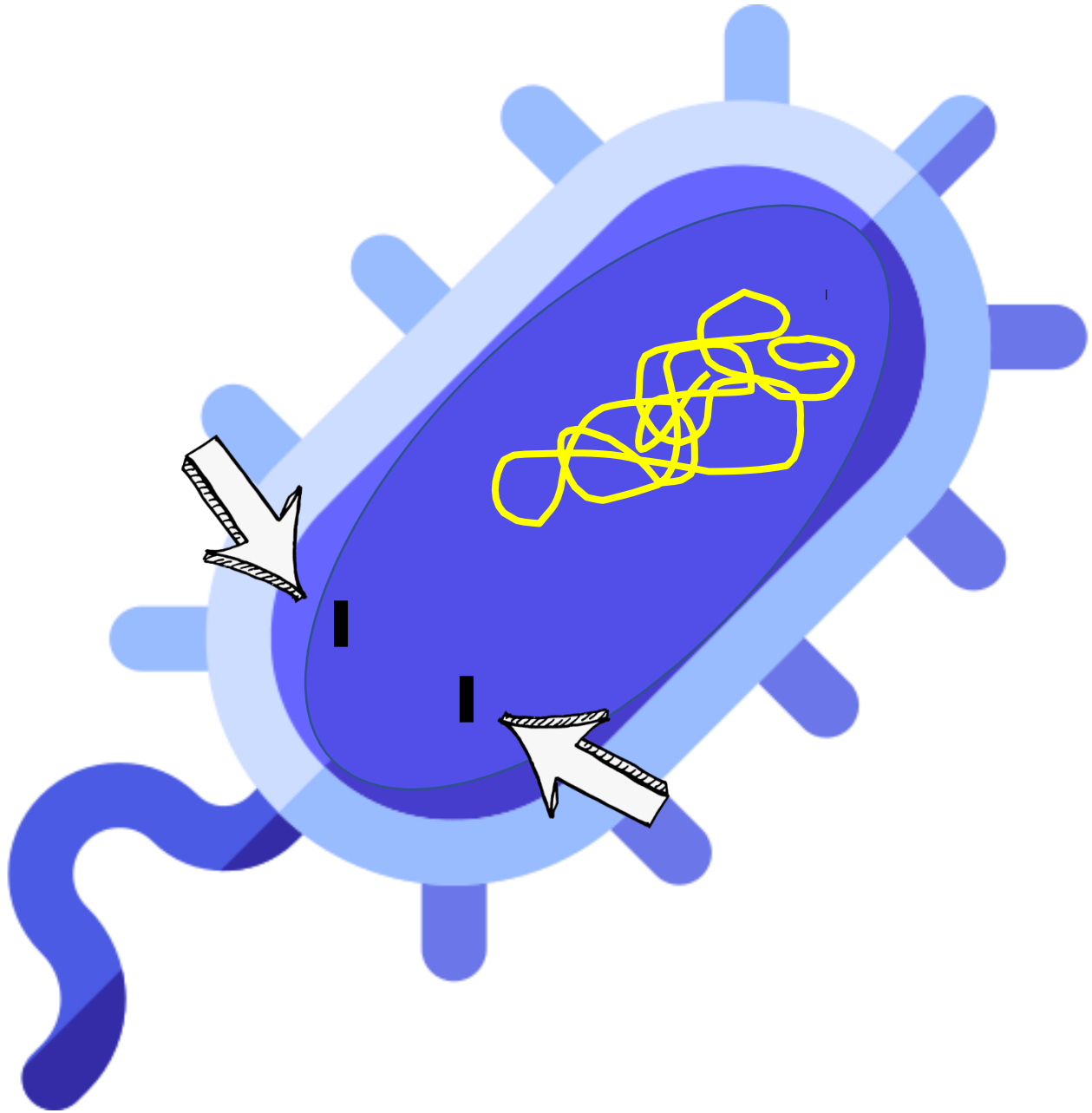
Bacteria are prokaryotes which are way smaller than eukaryotes

Remember that prokaryotes doesn't have either a nucleus or organelles such as chloroplasts or mitochondria

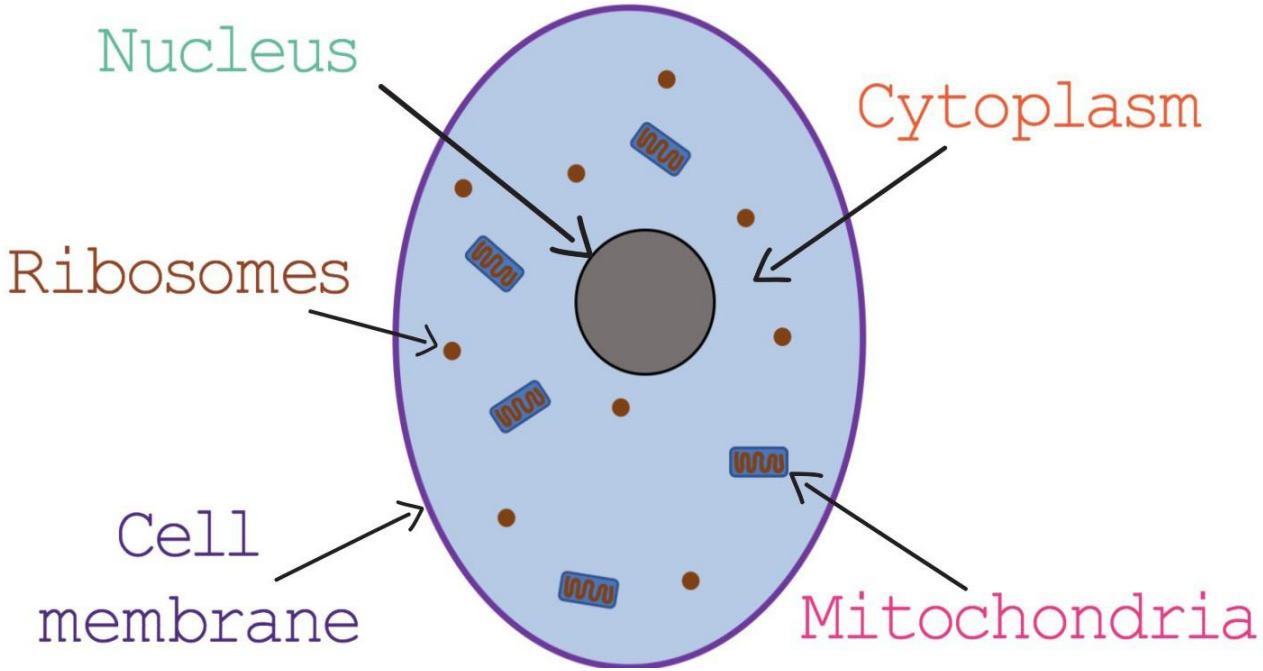


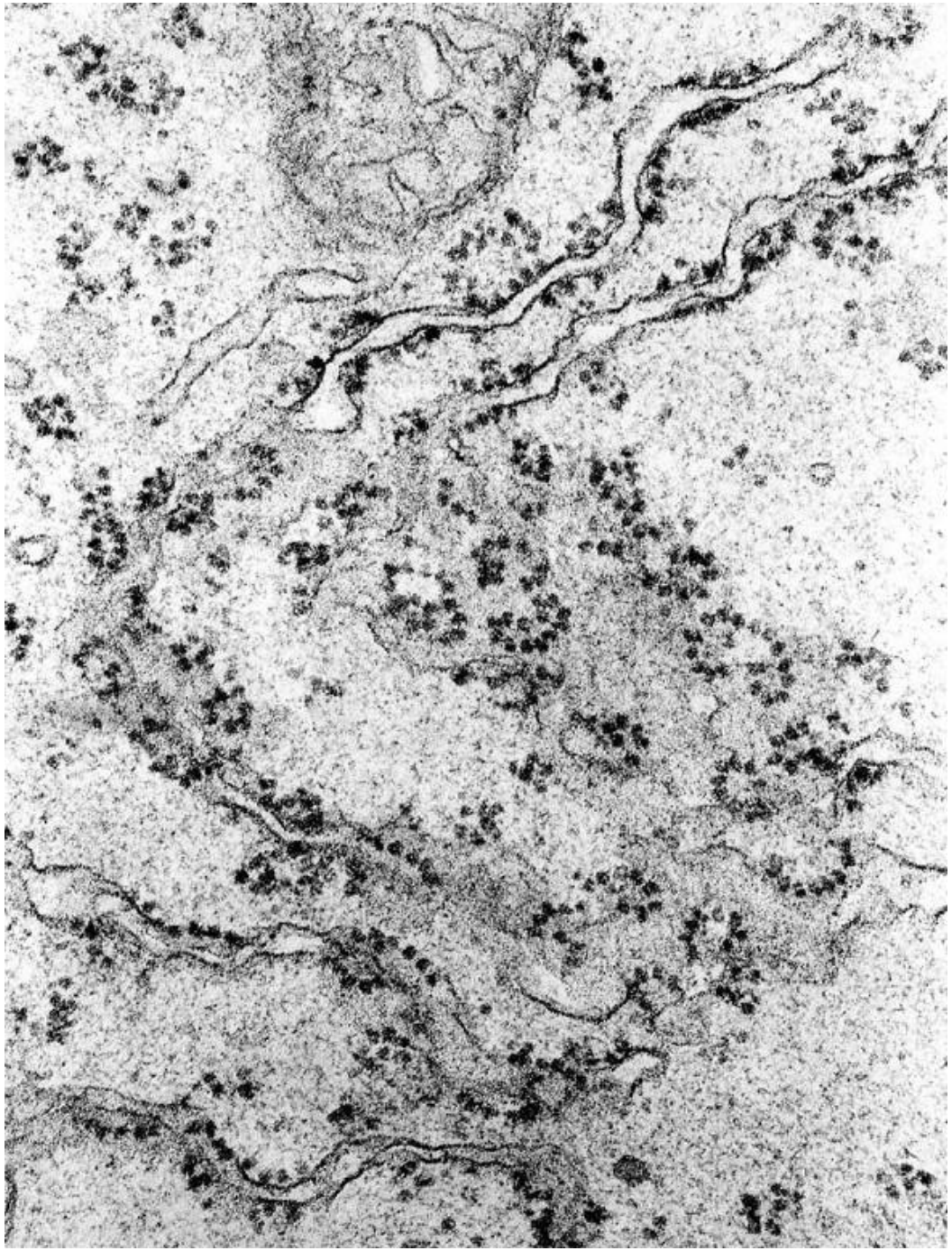
But prokaryotes also have ribosomes...

So do eukaryotes!



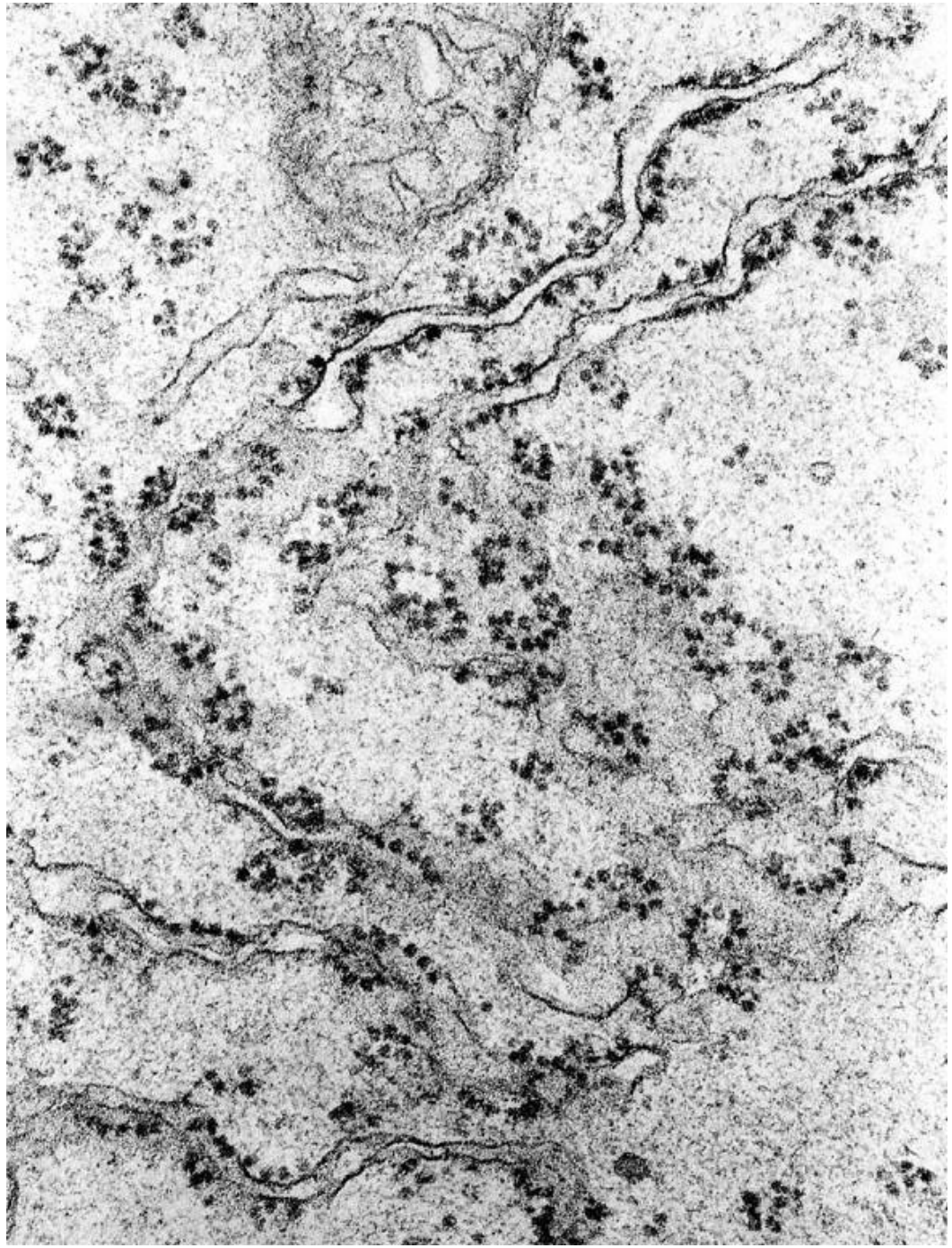
Ribosomes





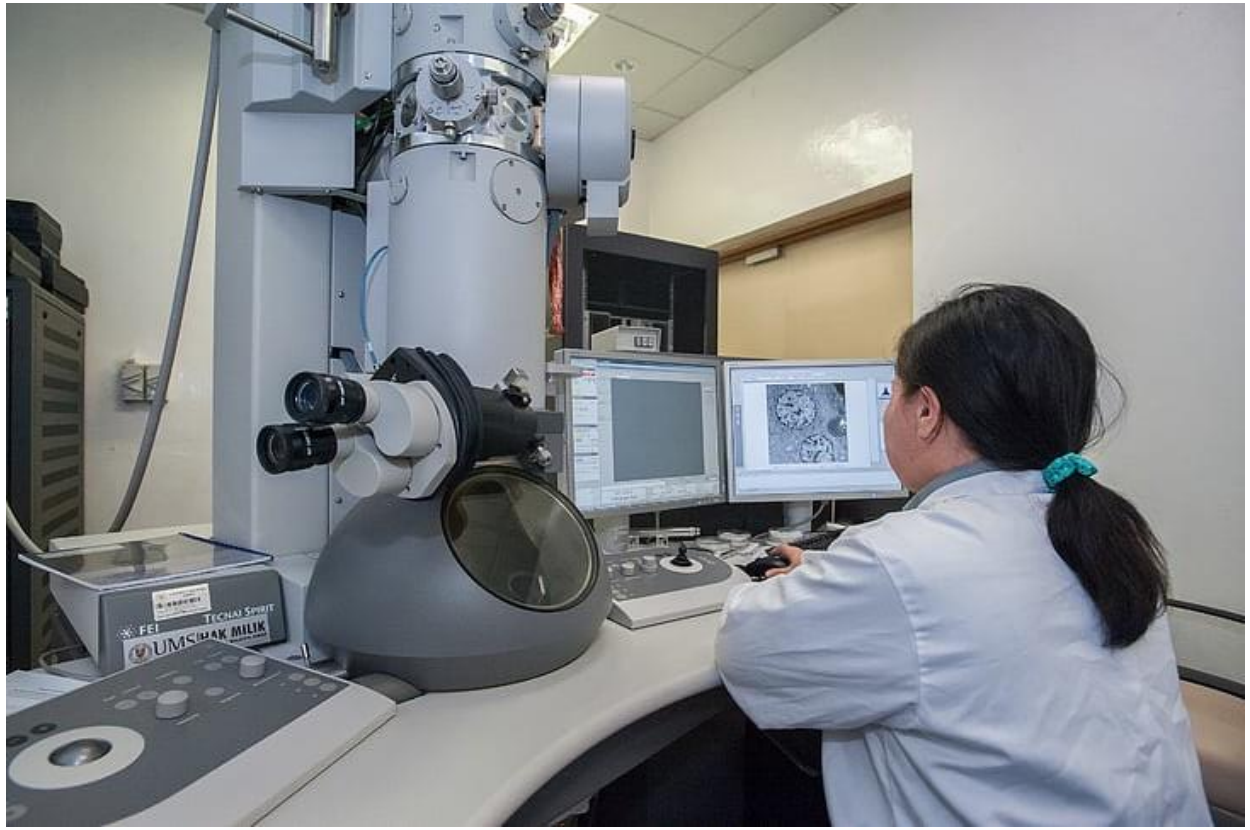
Ribosomes

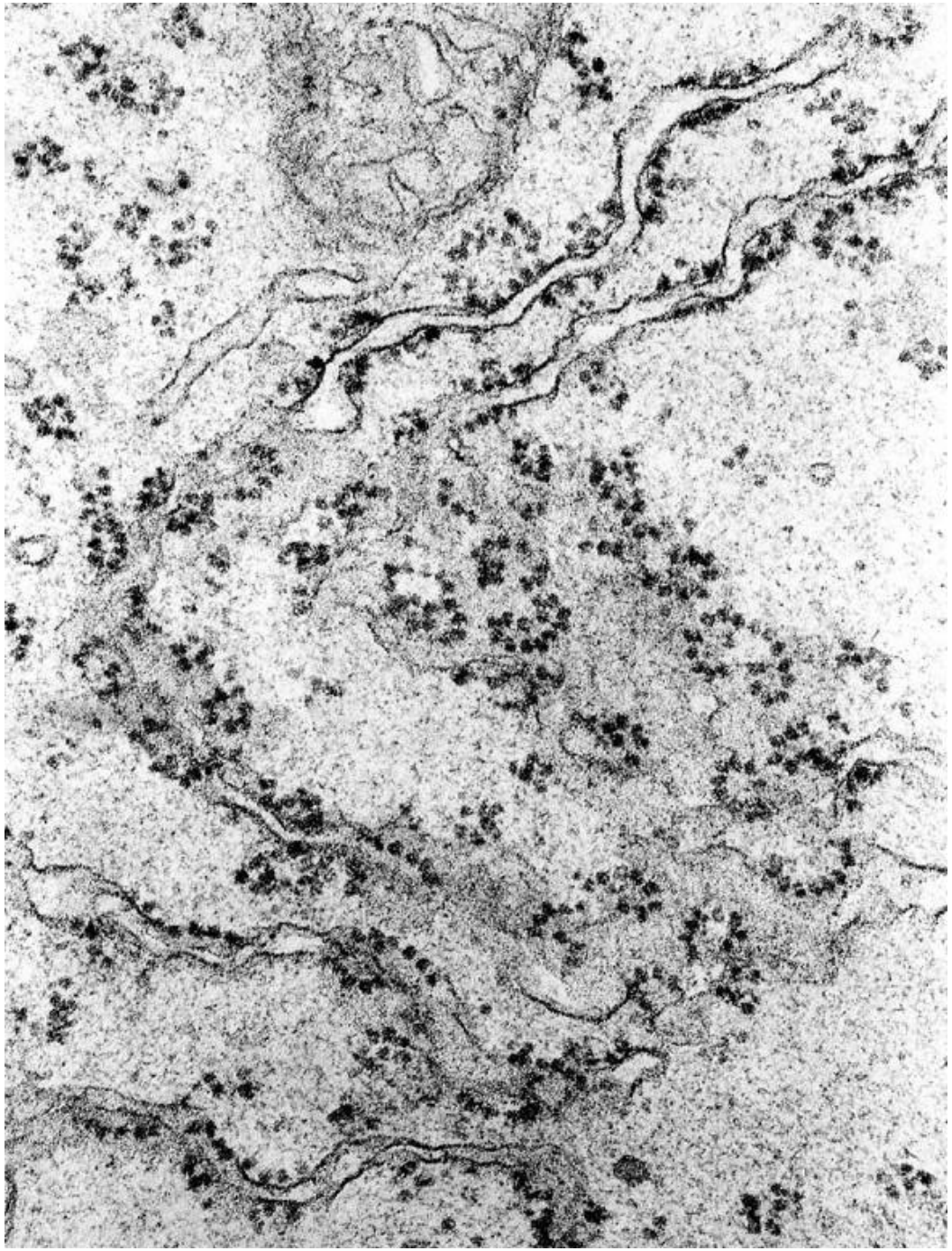
Light microscope or electron microscope?



Ribosomes

Electron microscope

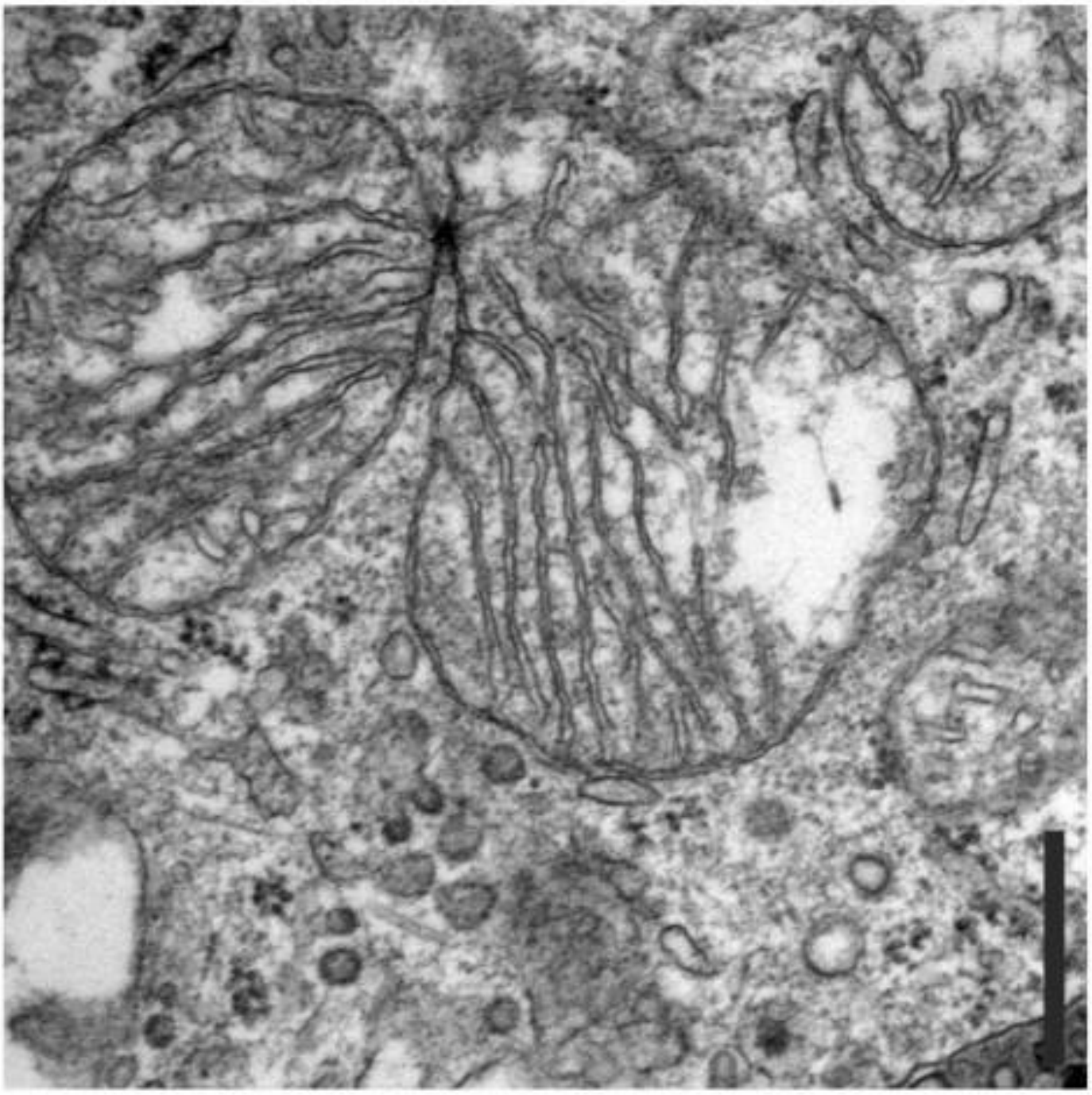




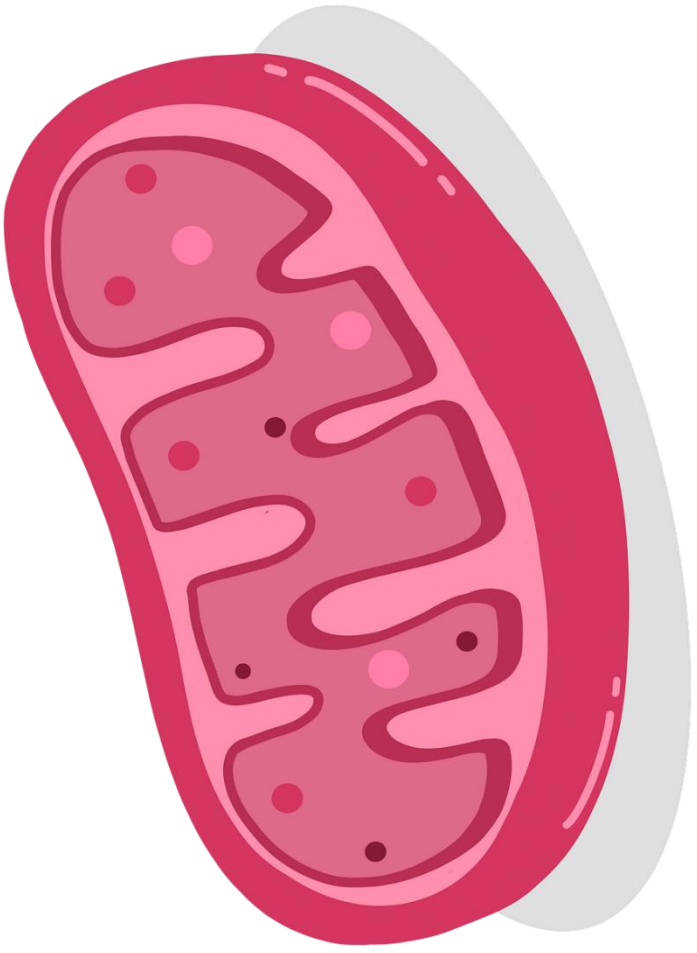
Chris Hawes, The Research School of Biology & Molecular Sciences, Oxford Brookes University, Oxford, UK

It's time to study other eukaryote organelles that both animal and plant cells have

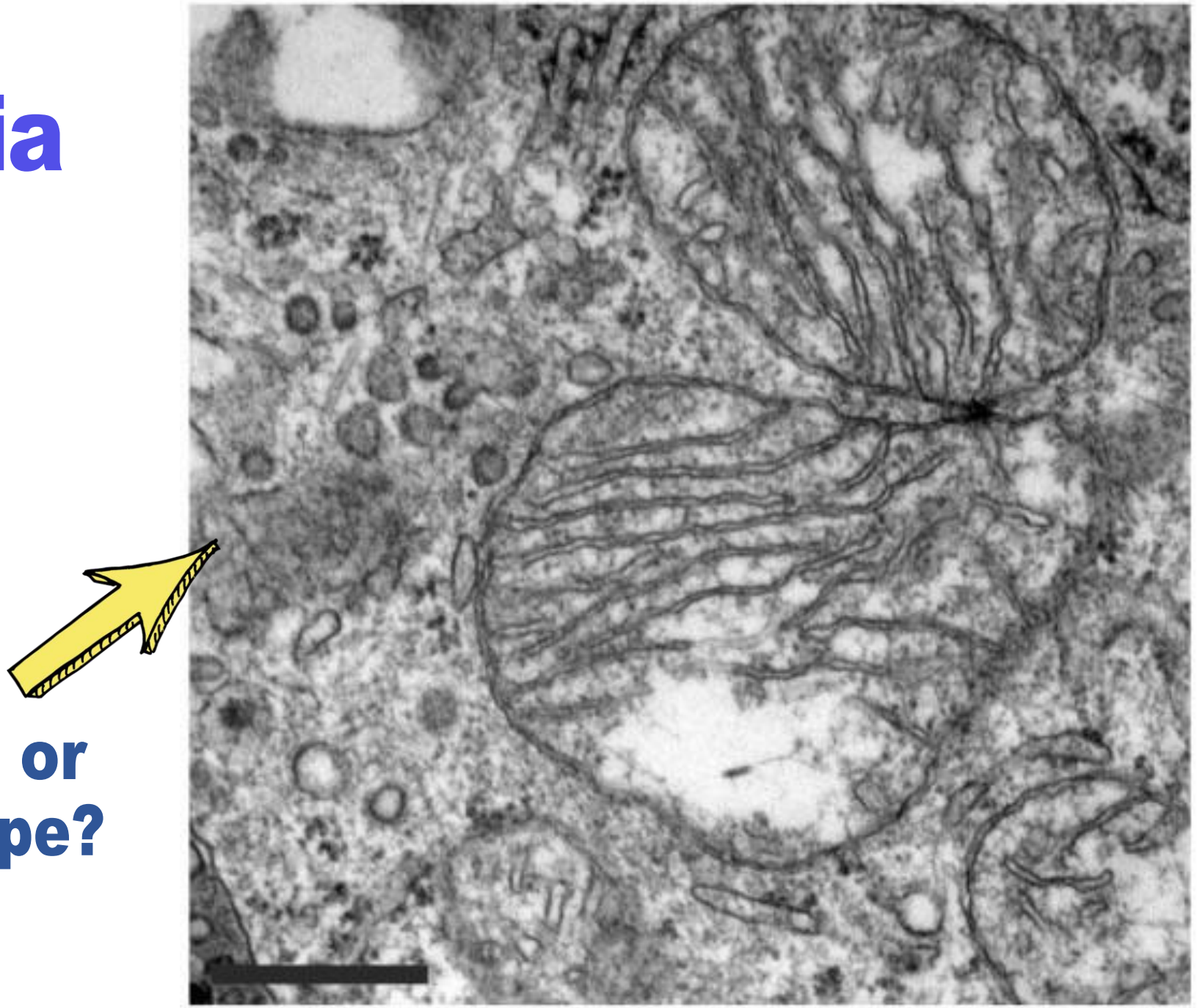
Do you know any?



Mitochondria



Mitochondria

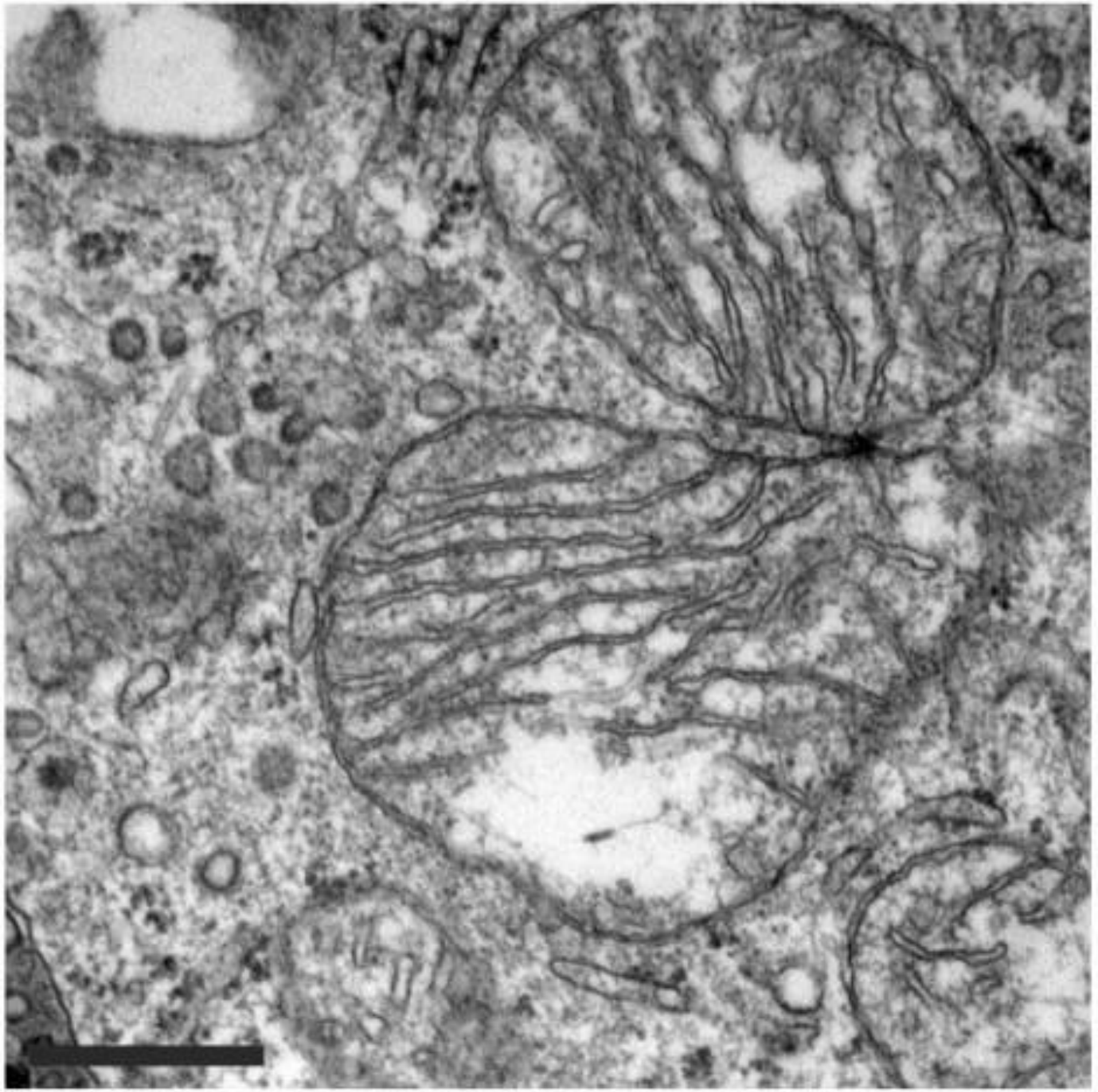


Böhler P, et al. CC BY 4.0 via Wikimedia Commons

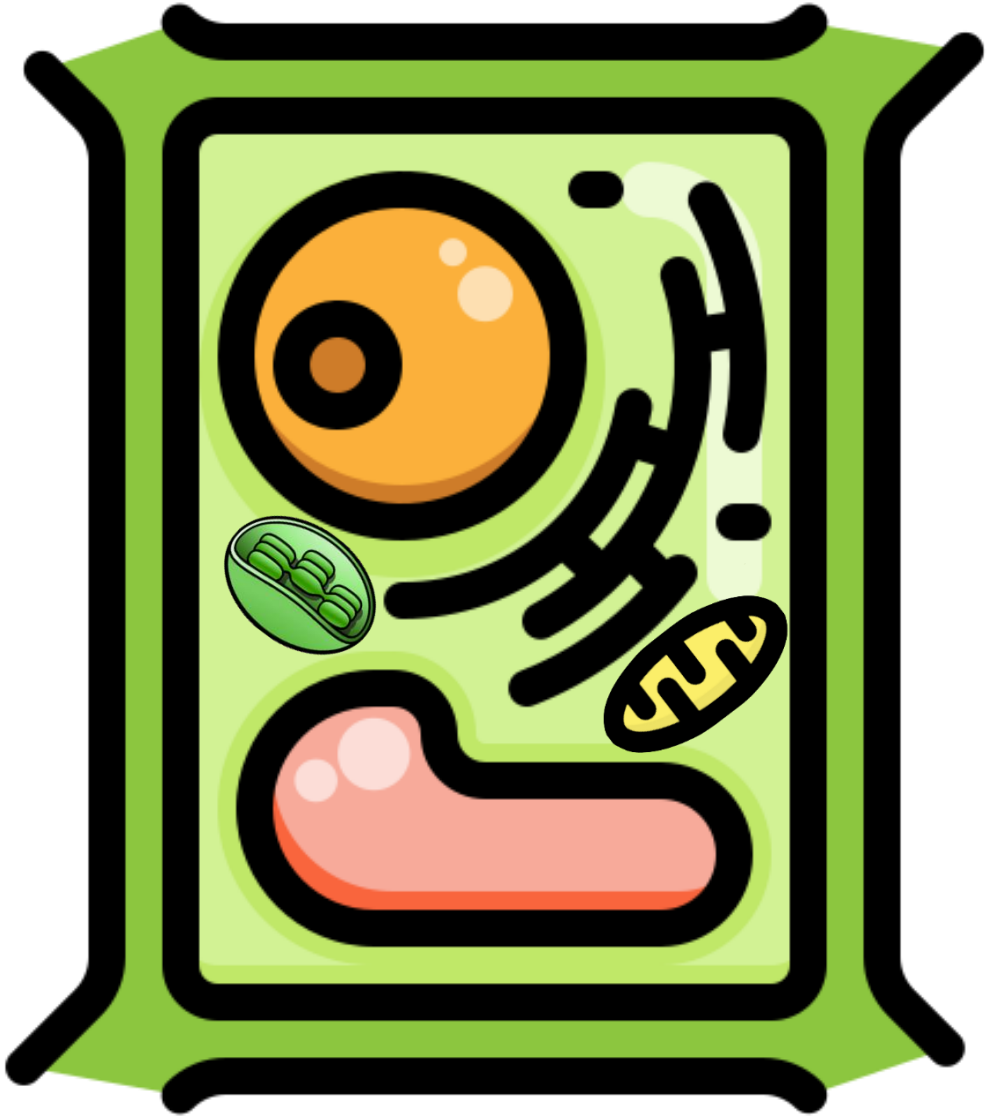
Light microscope or electron microscope?

Mitochondria

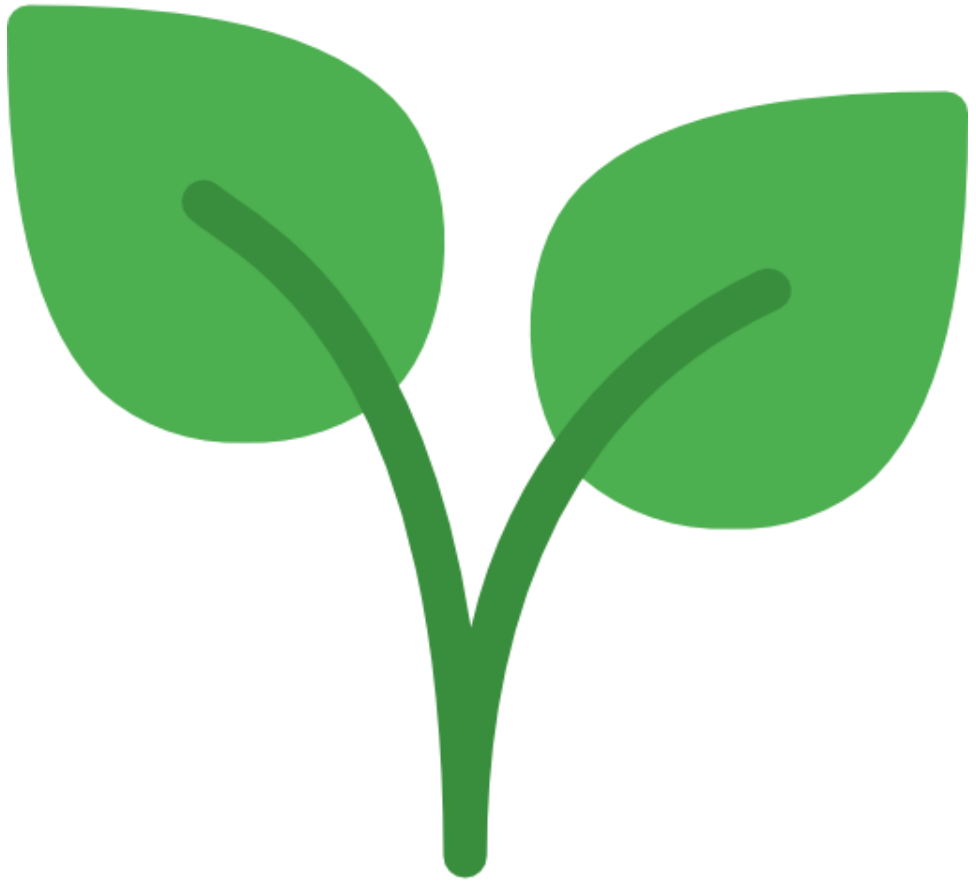
Electron microscope



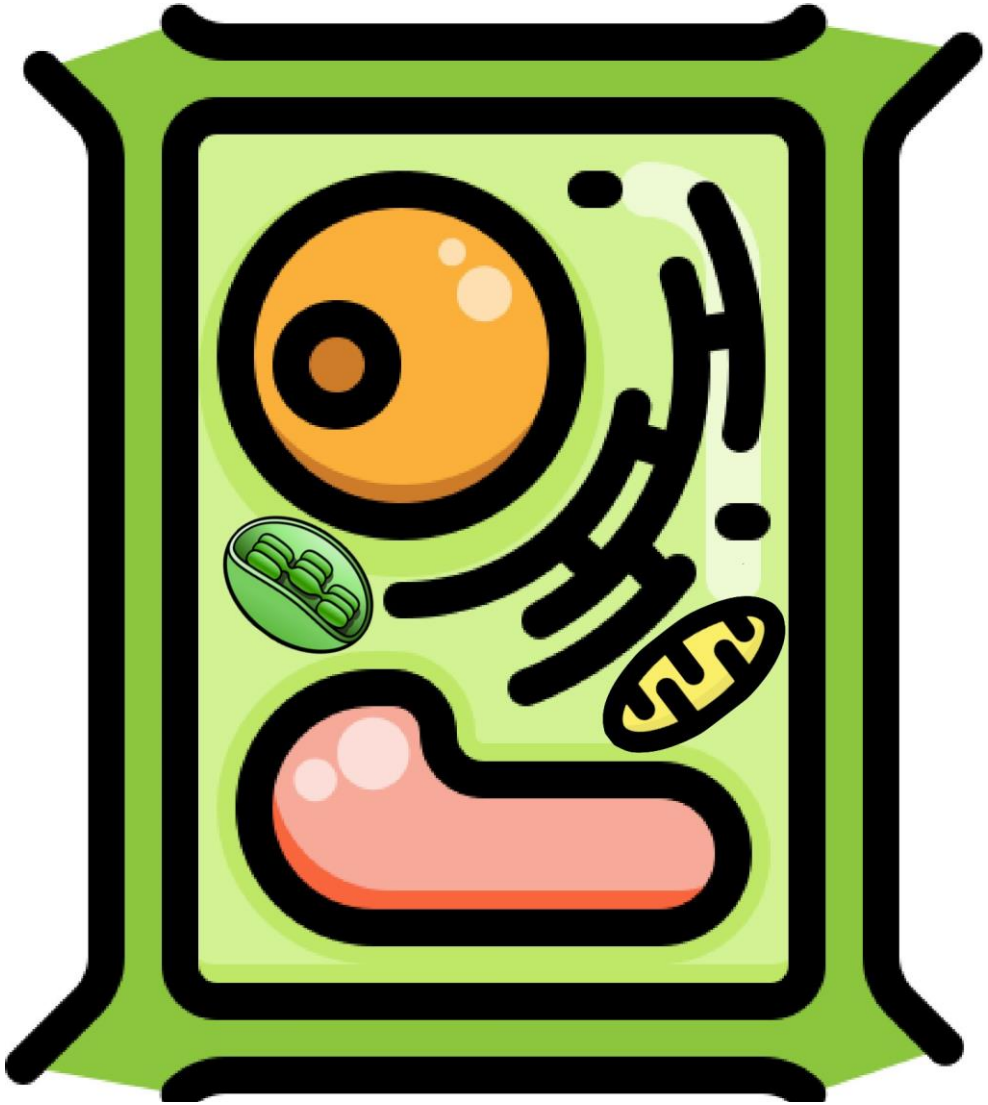
Find the mitochondria in these cells!

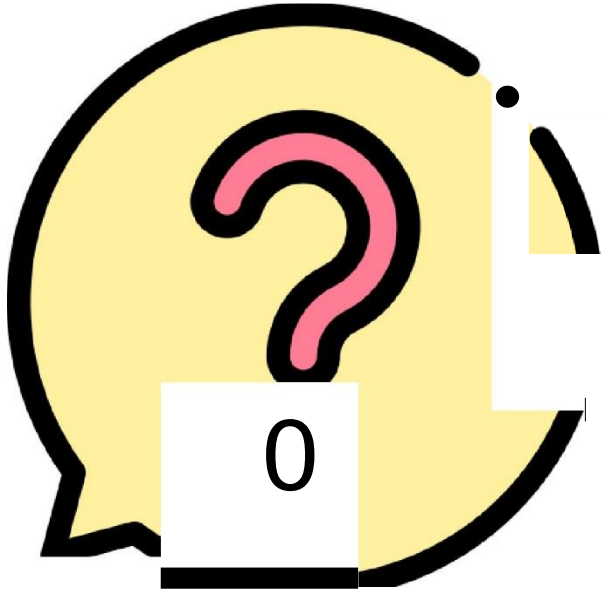


Finally, let's see the organelles which are only present in plant cells



Do you know any?

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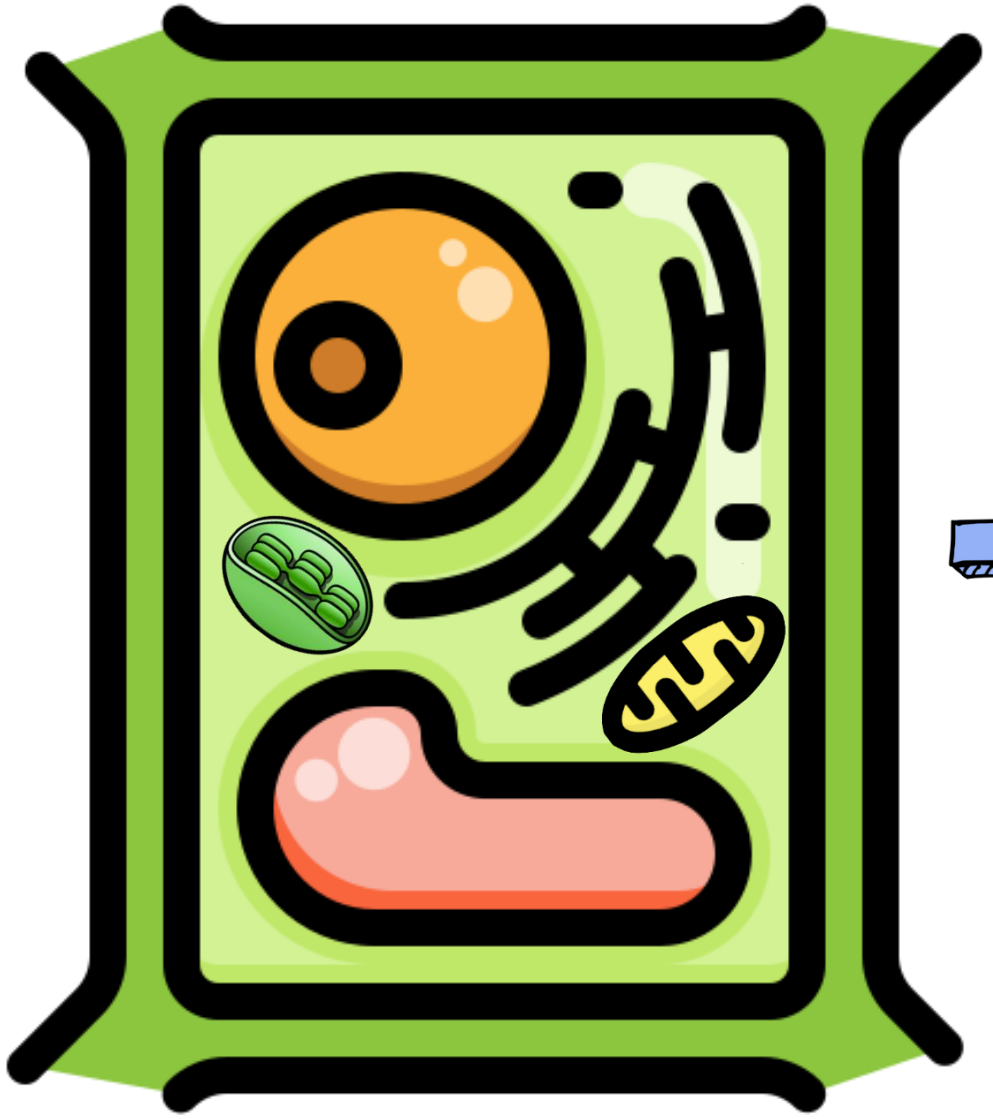
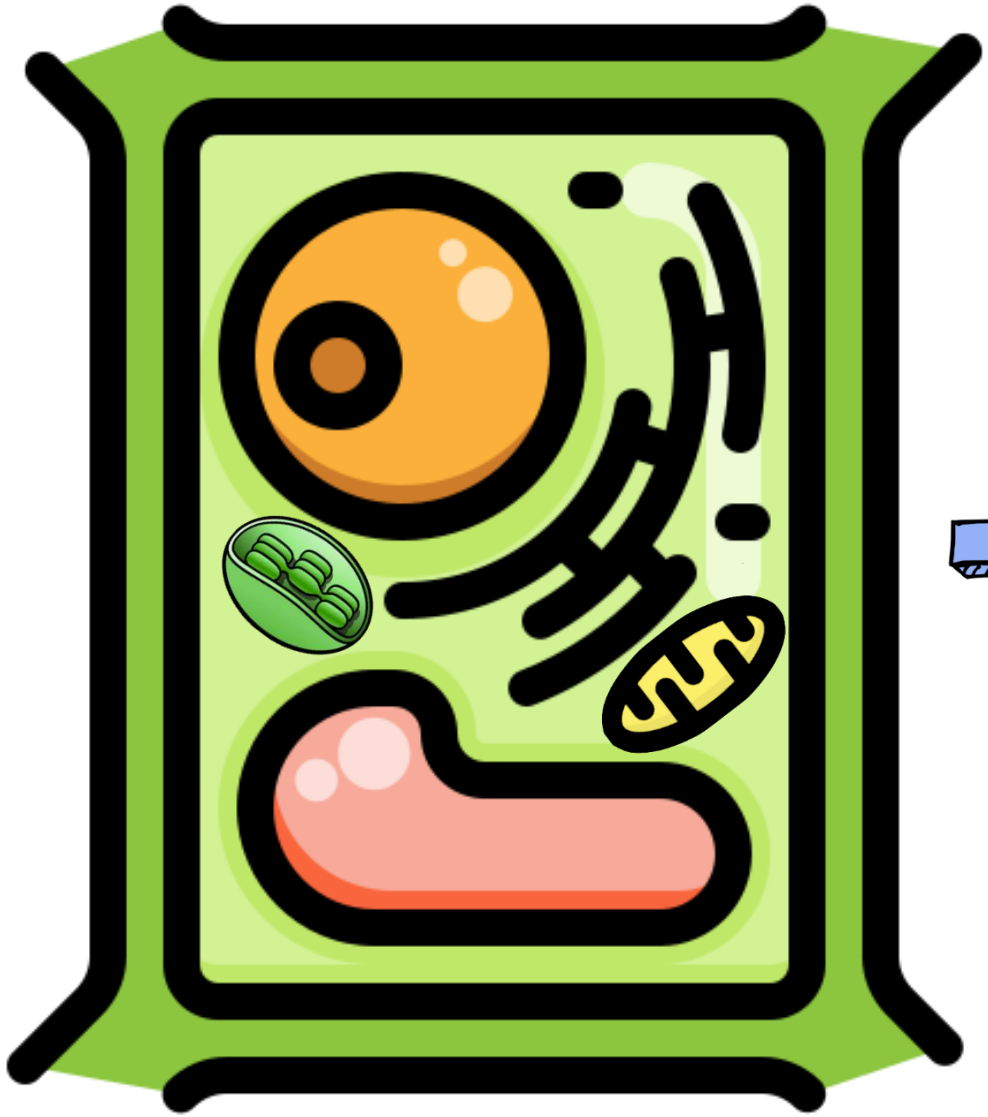
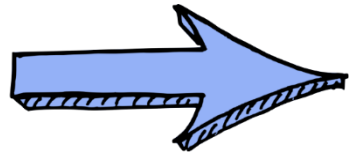


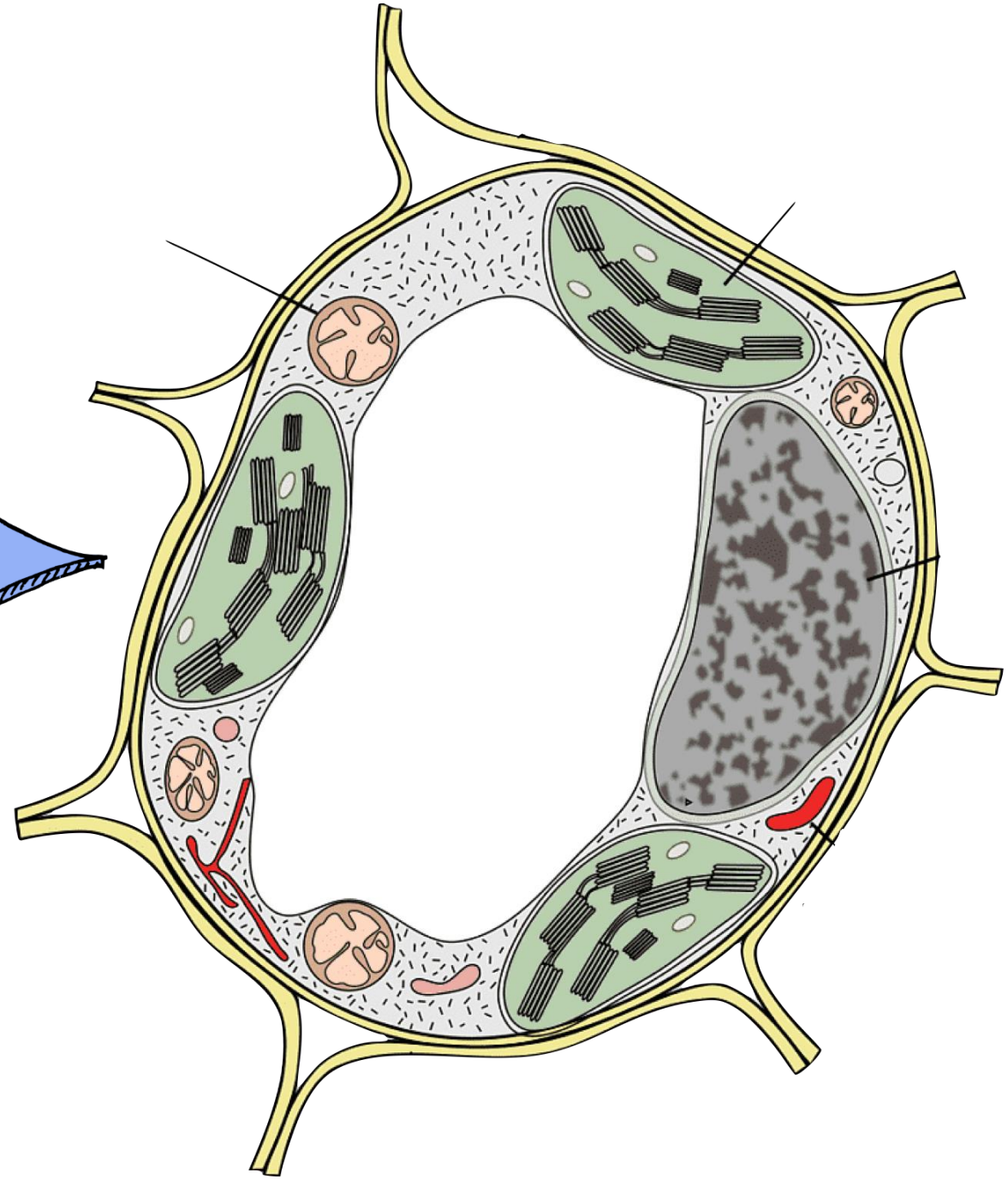
cell wall

chloroplasts

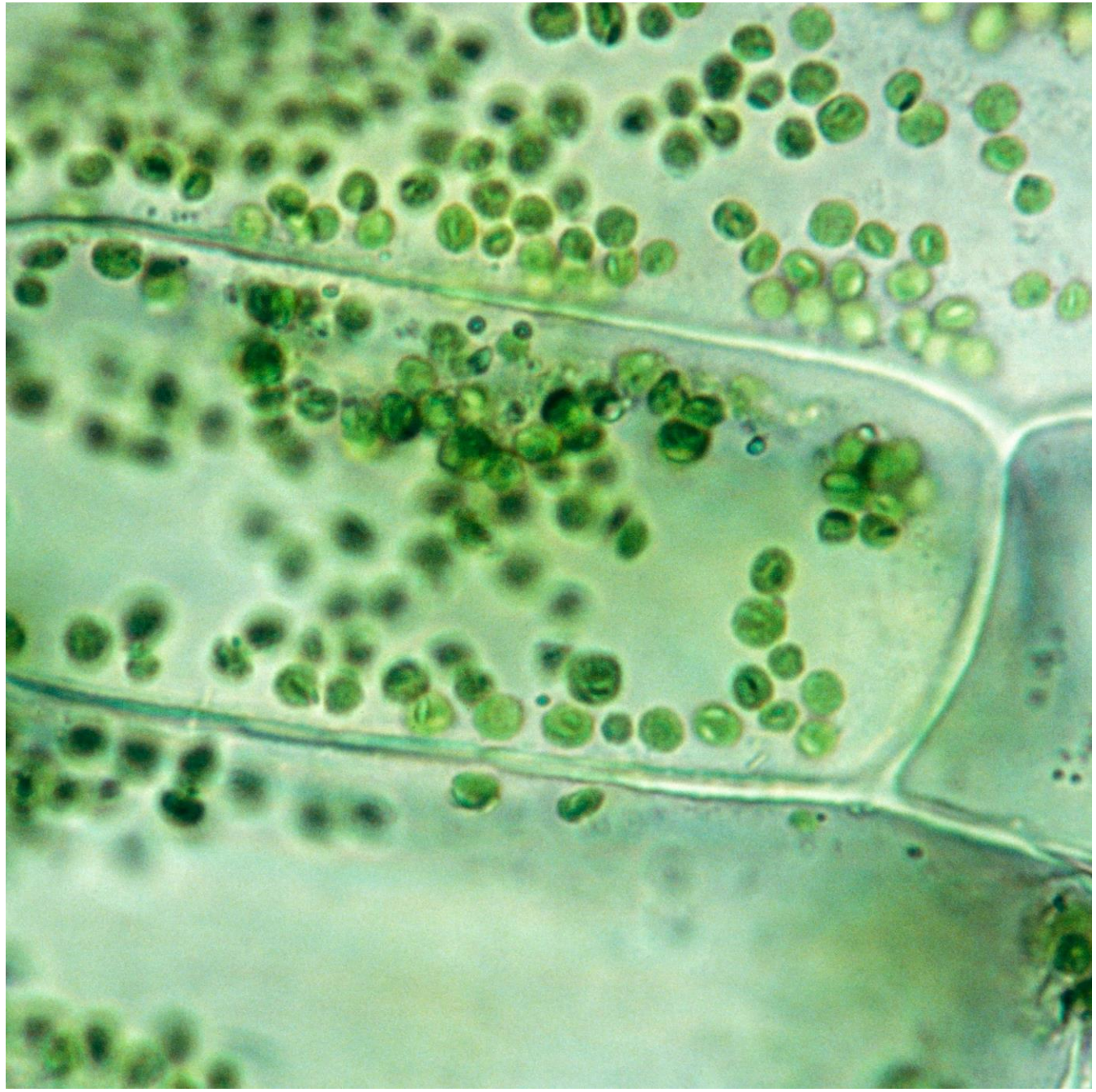
central vacuole





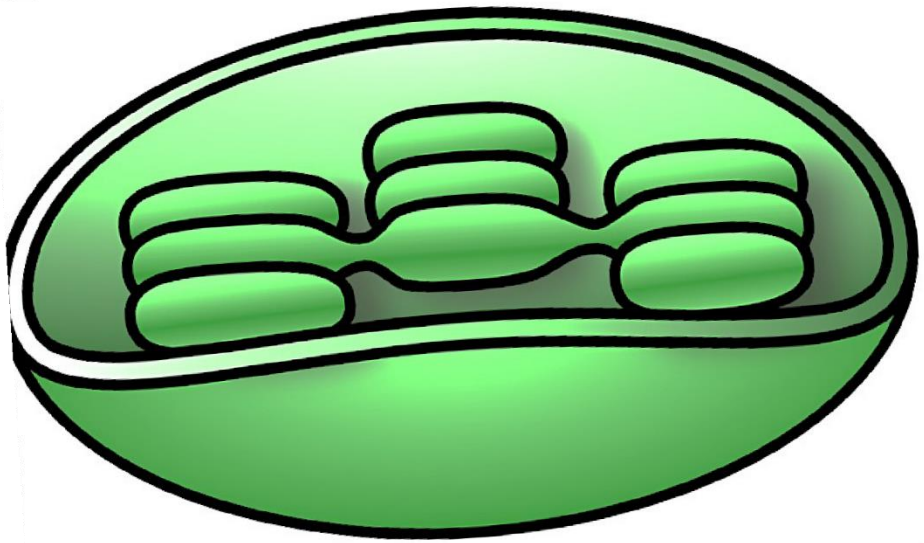


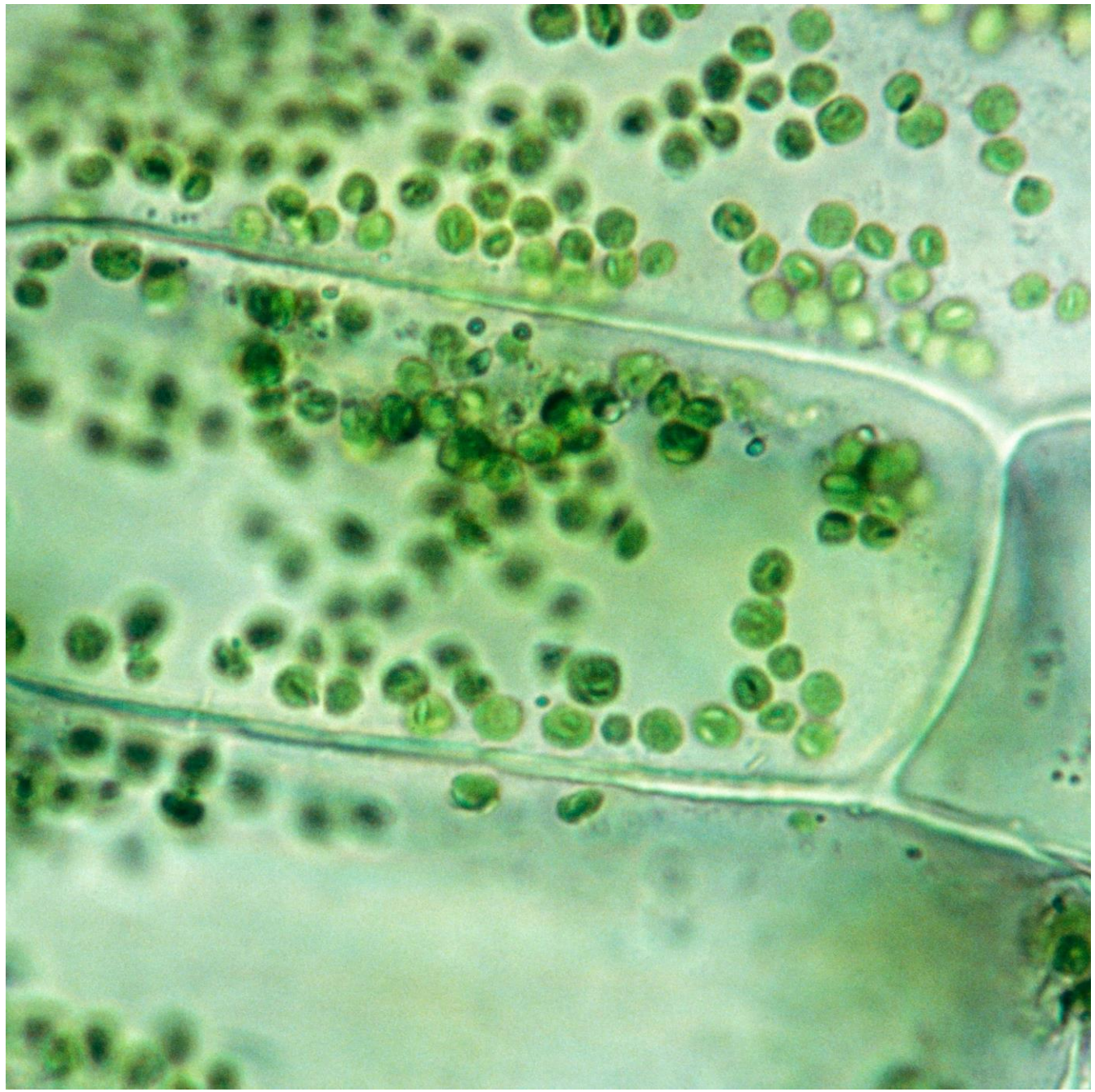
Cell wall



Ed Reschke / Getty Images

Chloroplasts





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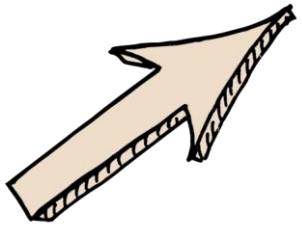
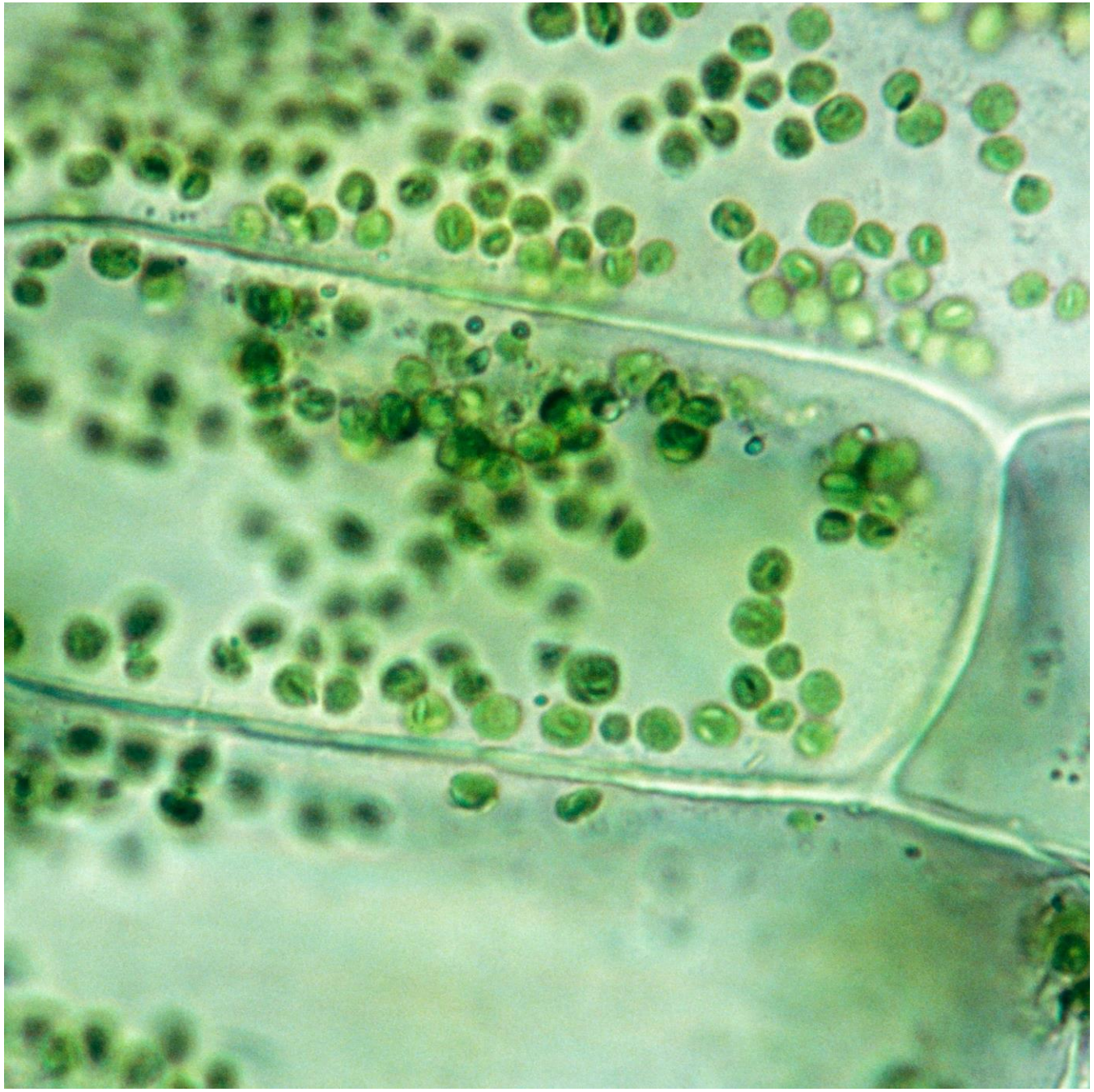
Chloroplasts



Light microscope or electron microscope?



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Chloroplasts

Light microscope

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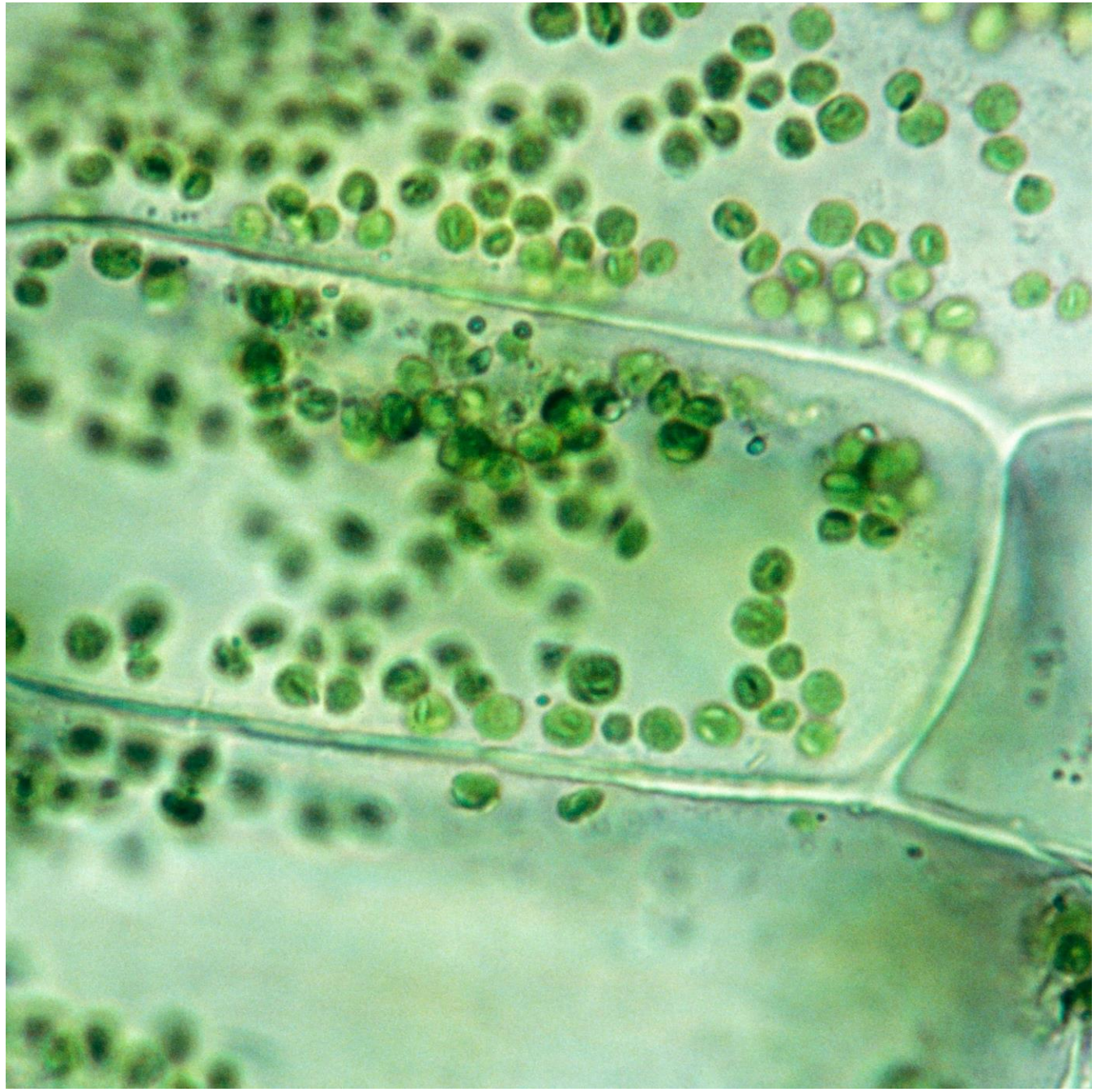

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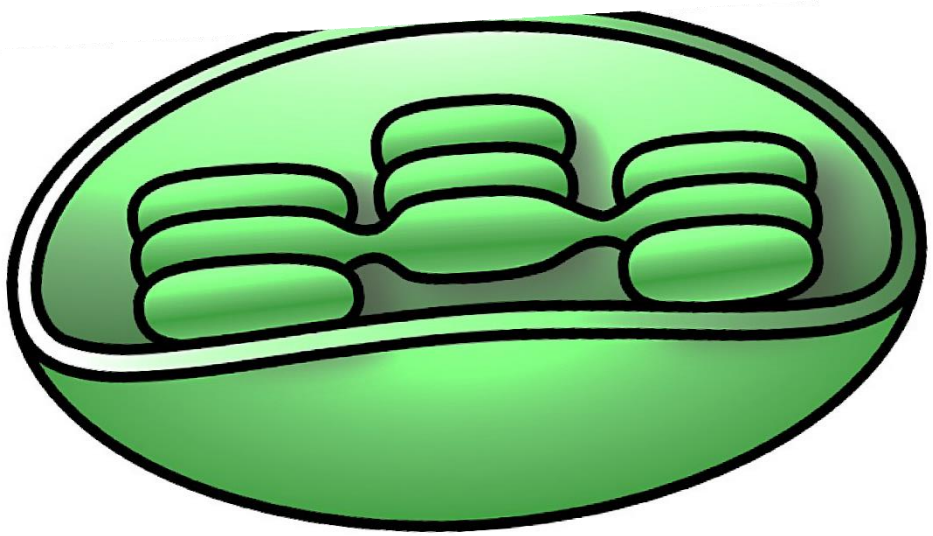
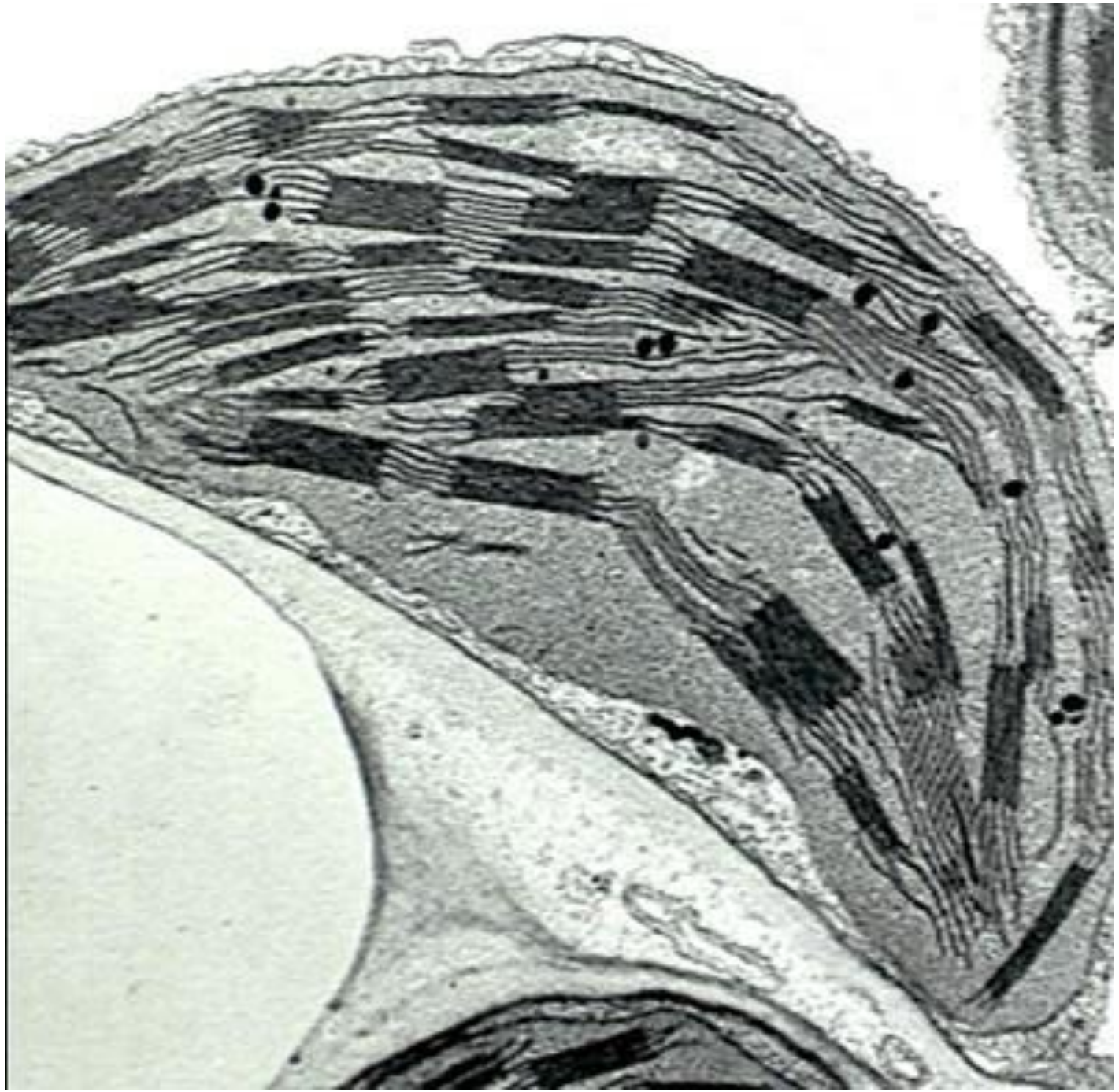
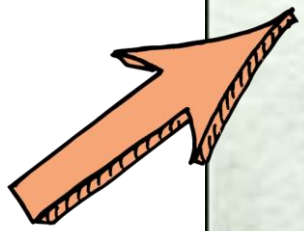
Chloroplasts

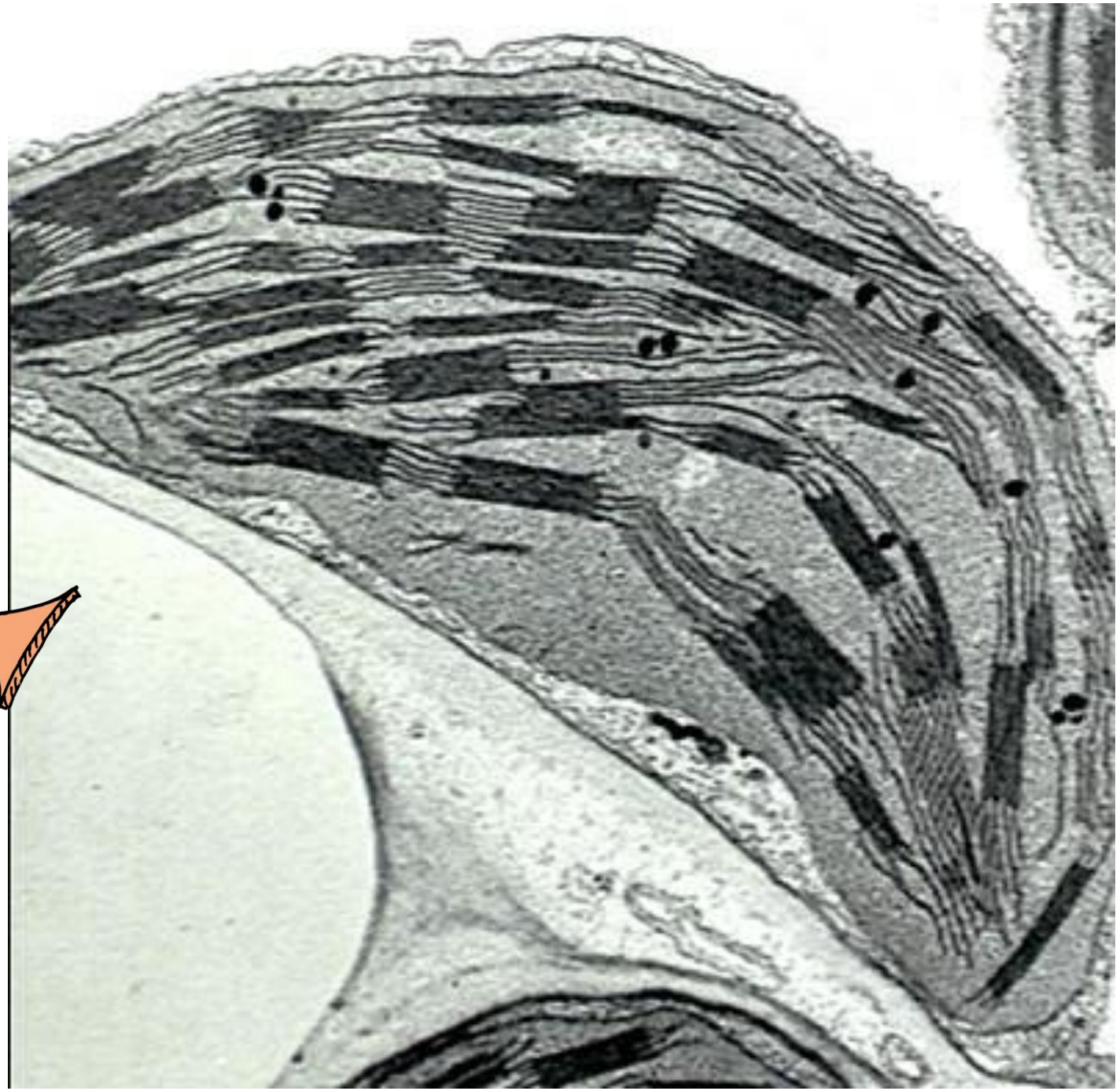




http://faculty.collin.edu/

Chloroplasts





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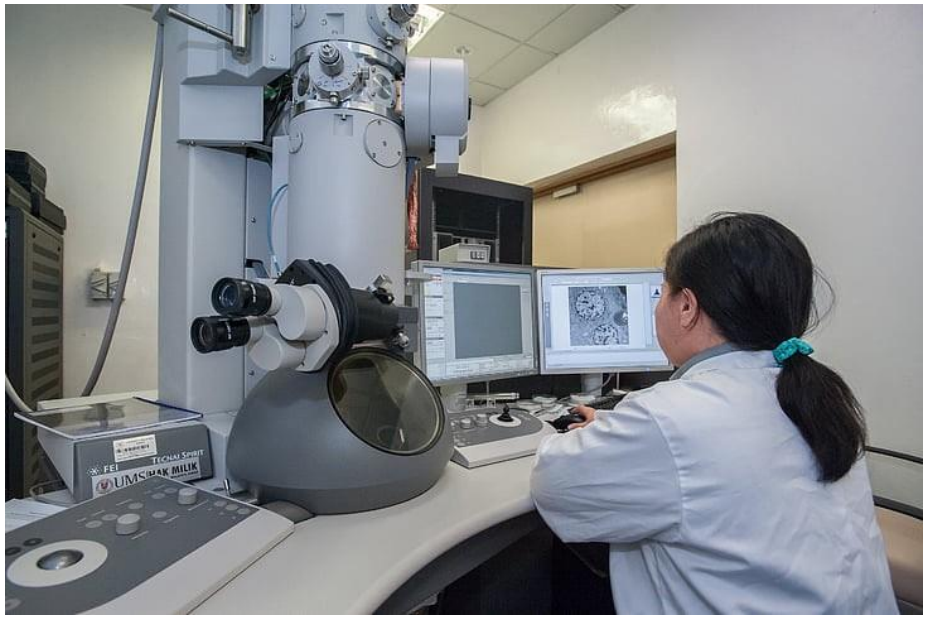
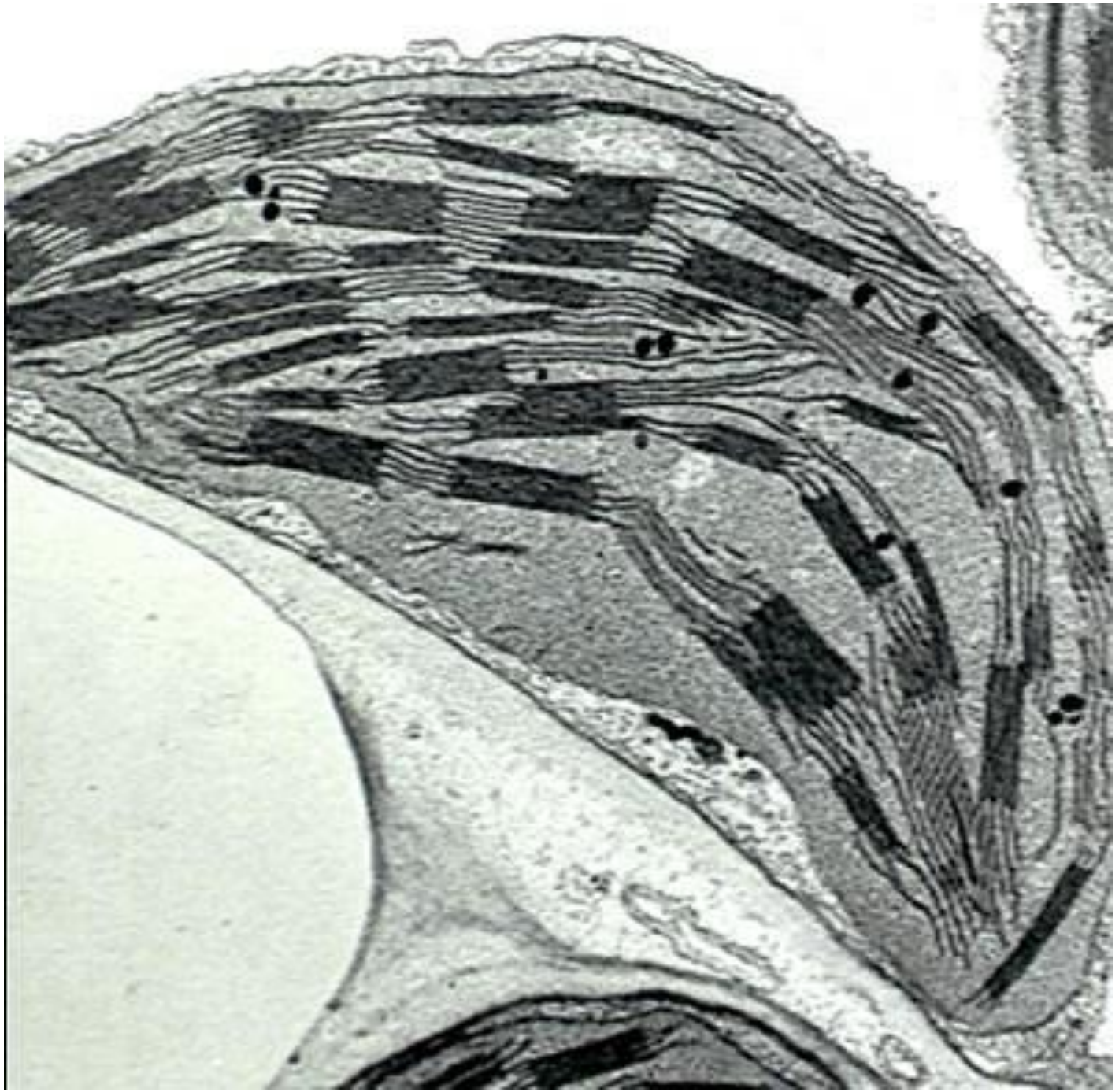
Chloroplasts

Electron microscope





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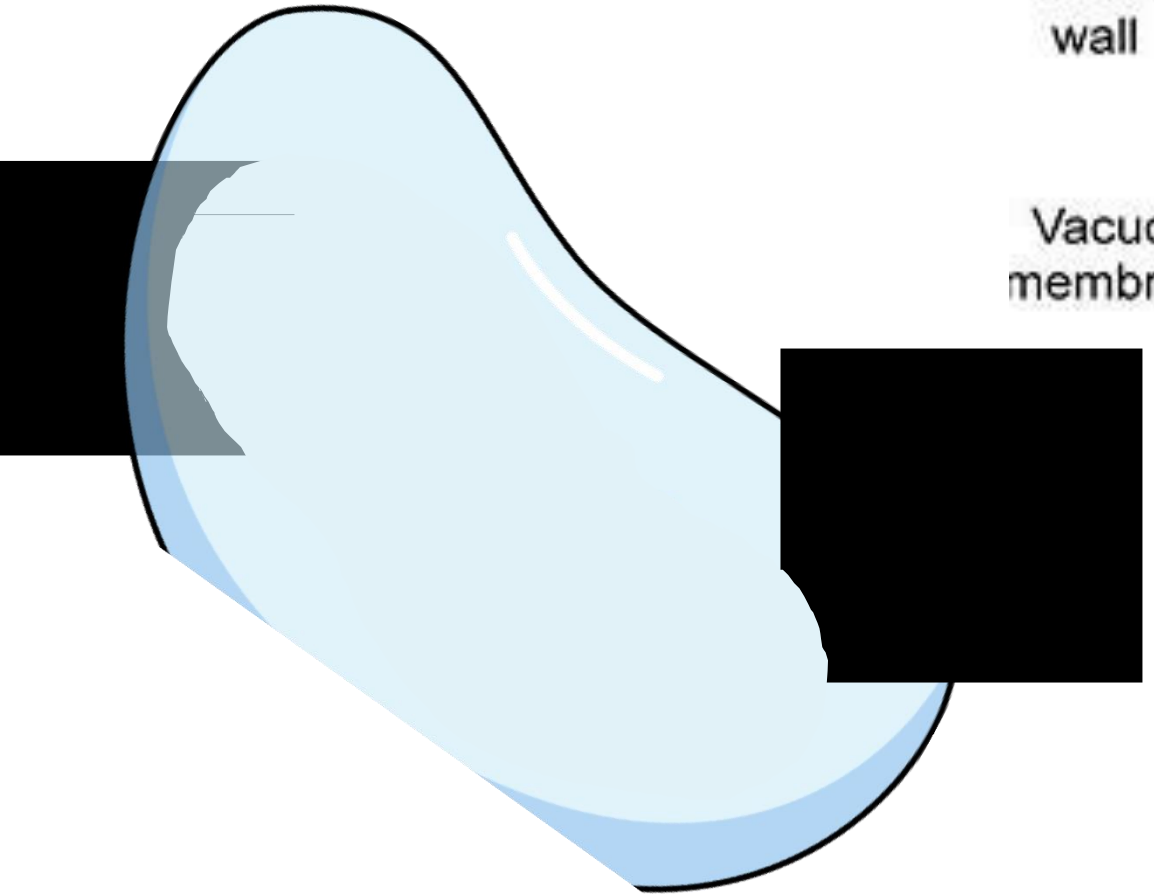
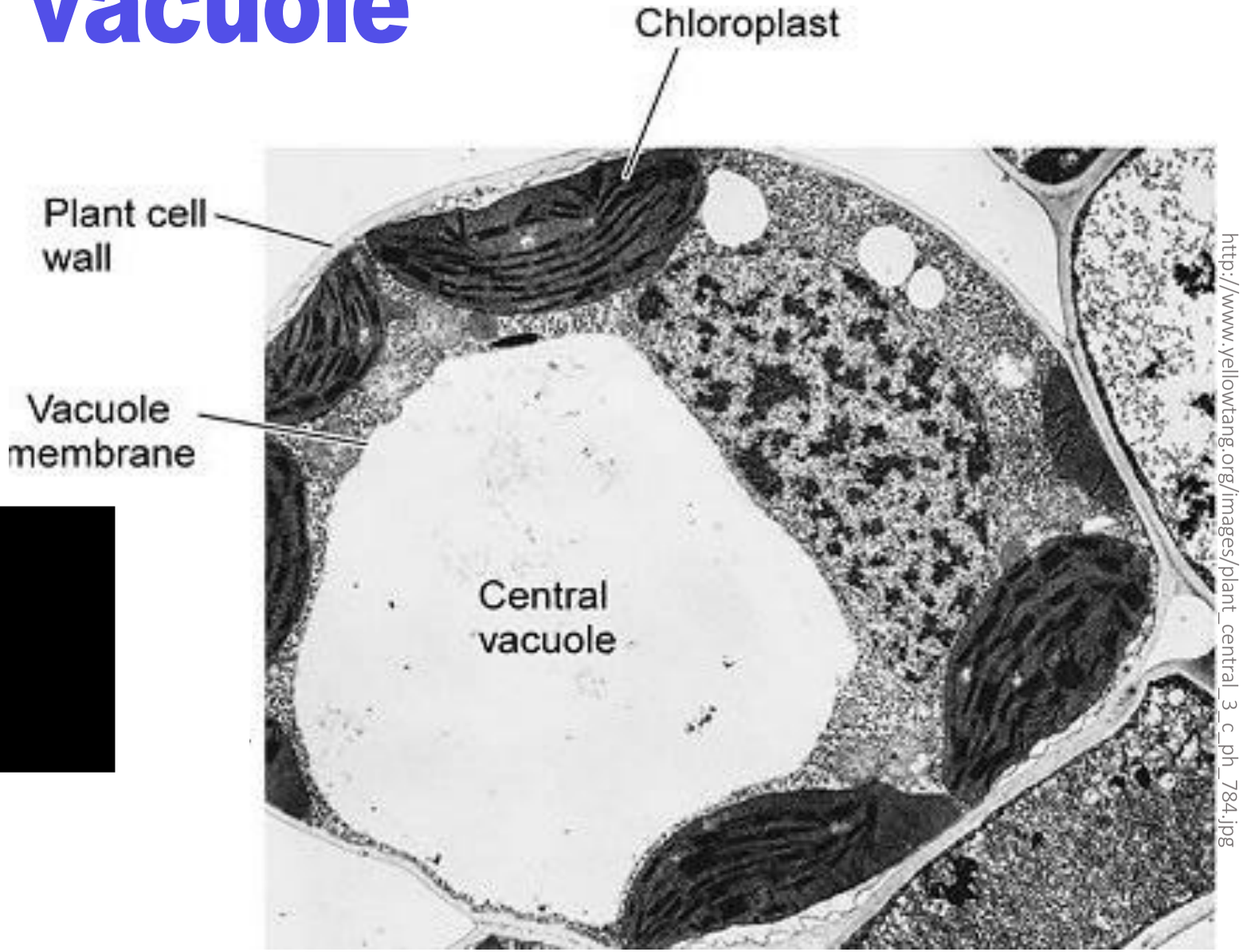
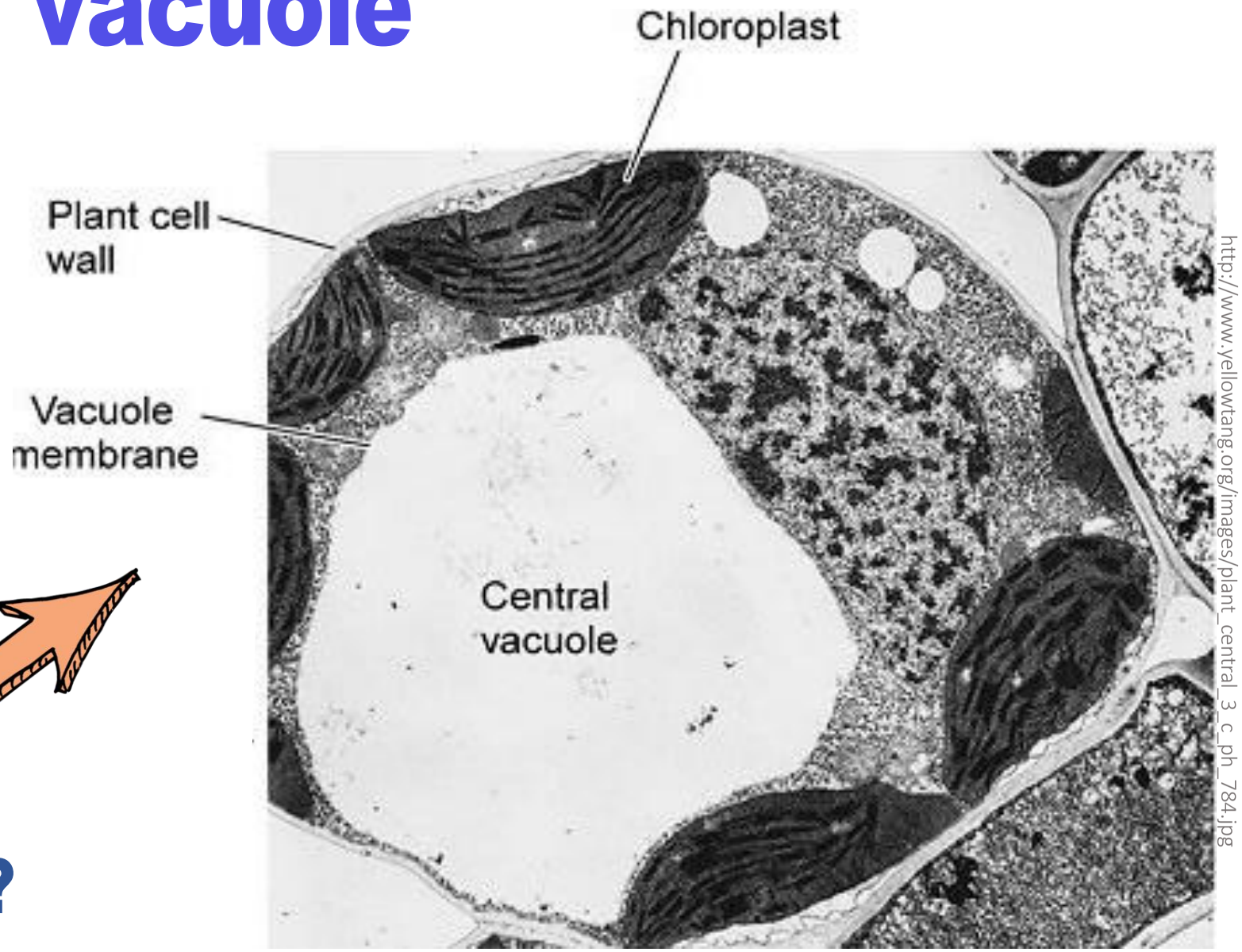
Large central vacuole





http://www.yellowtang.org/images/plant_central_3_c_ph_784.jpg

Large central vacuole



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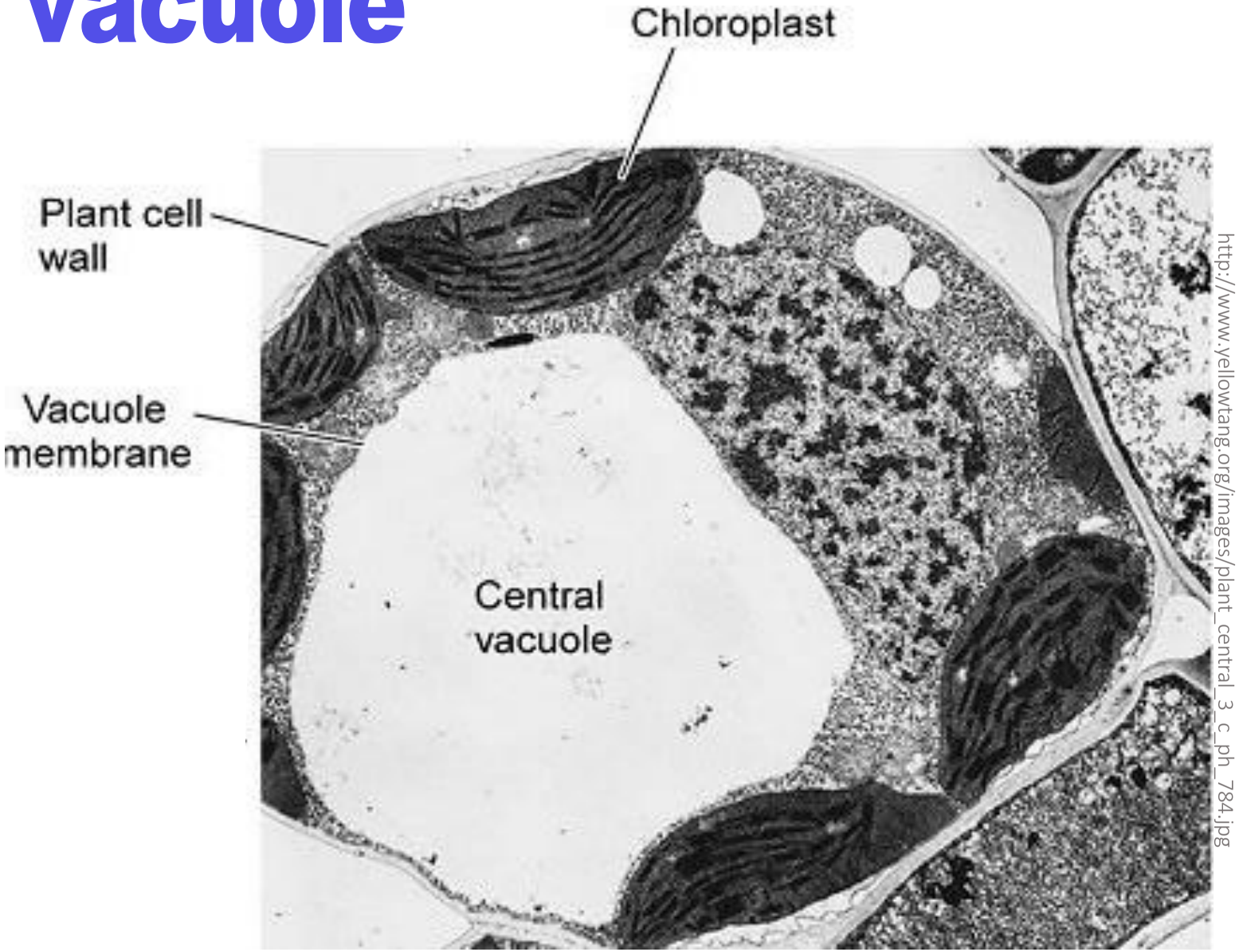
Light microscope or electron microscope?

Large central vacuole

Electron microscope



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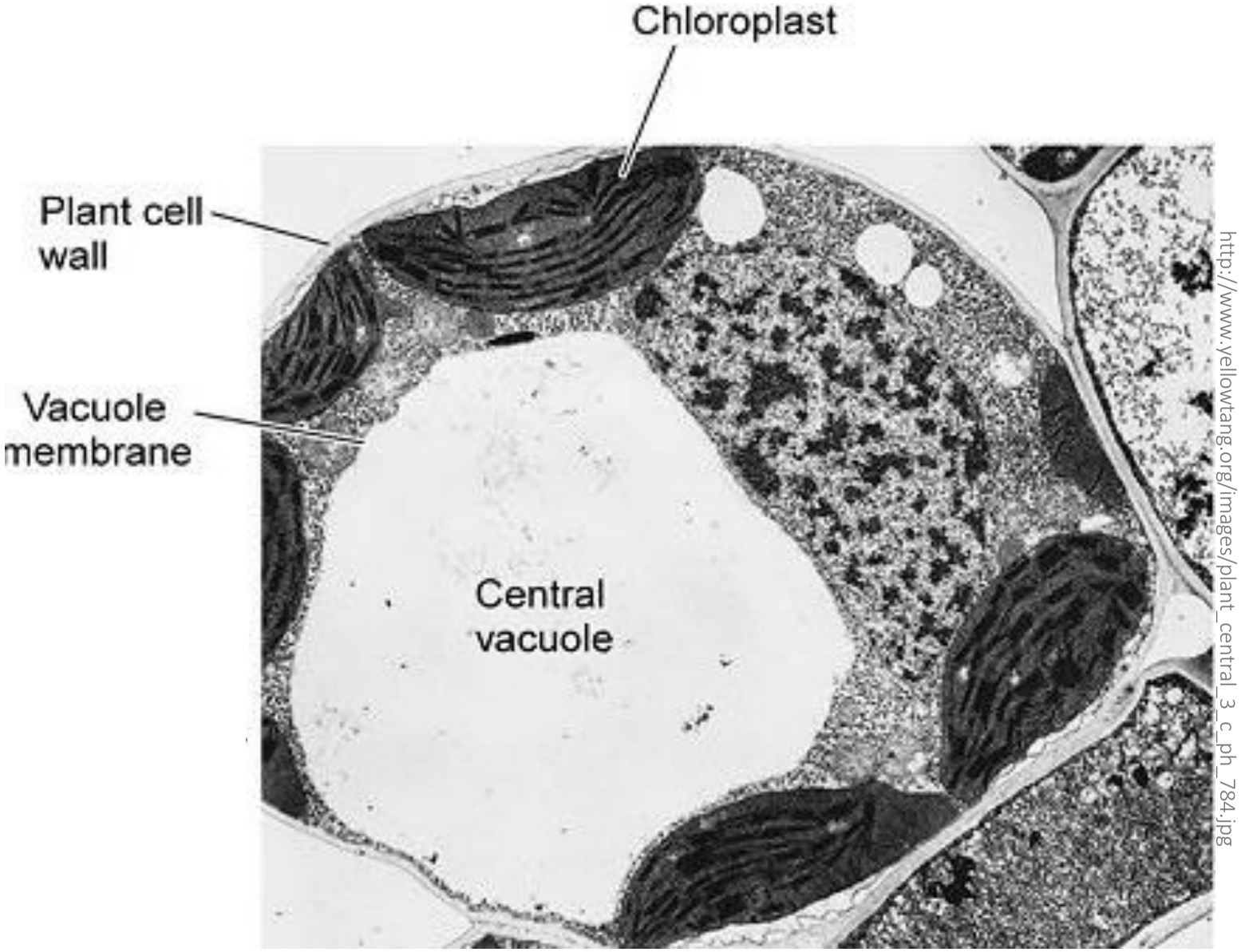
Can you name other cell parts in this plant cell?



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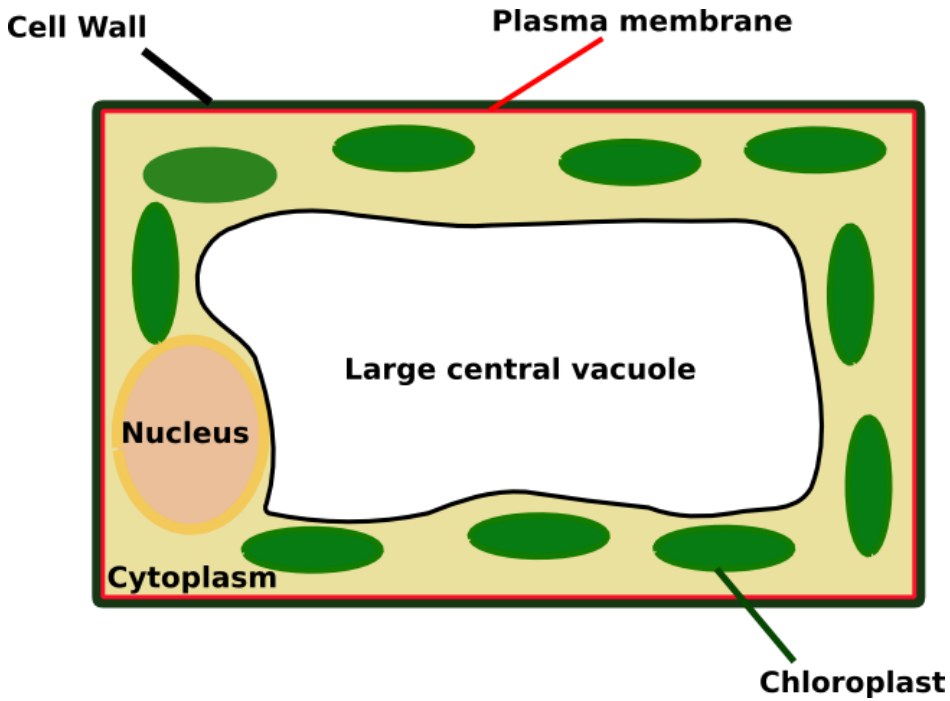
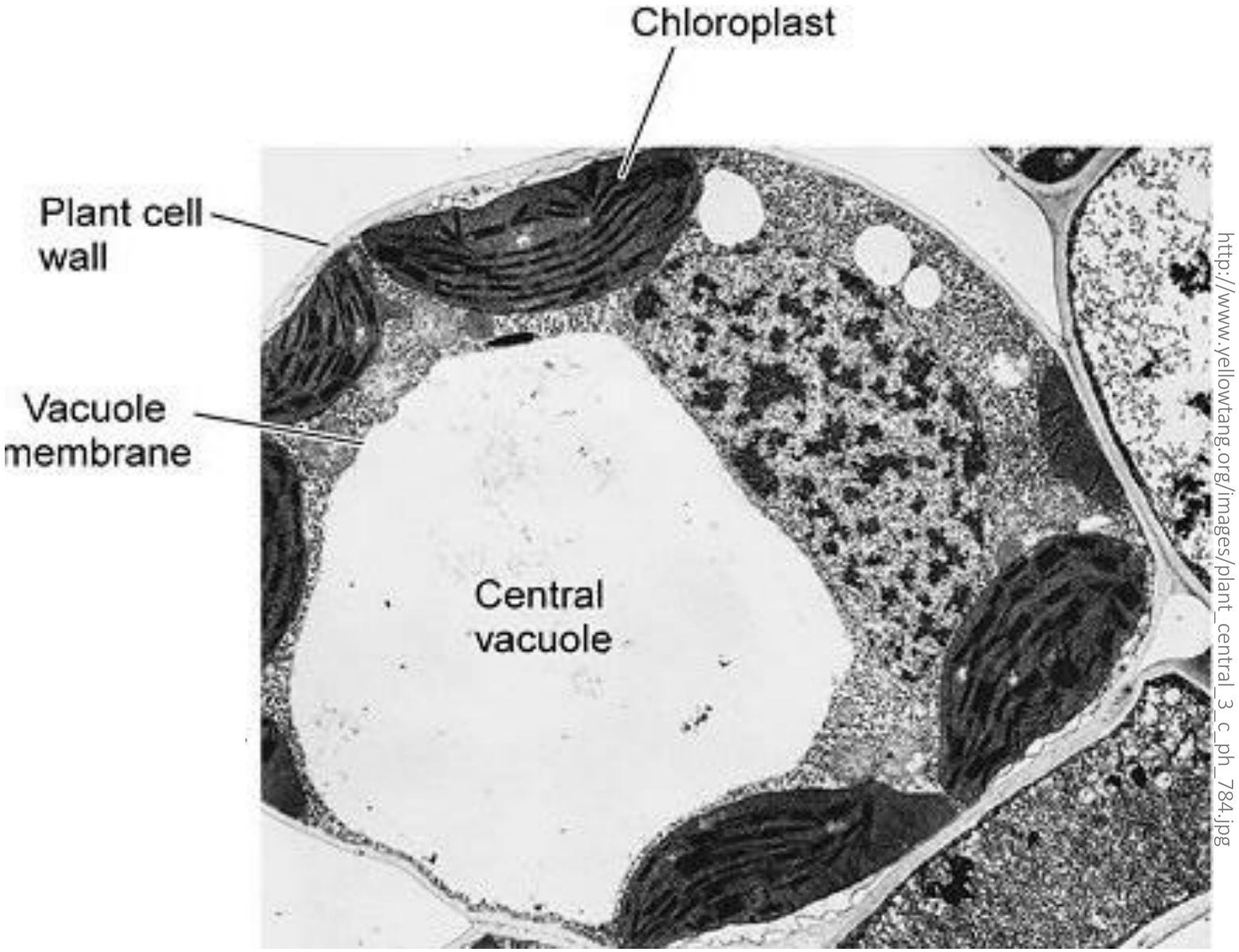
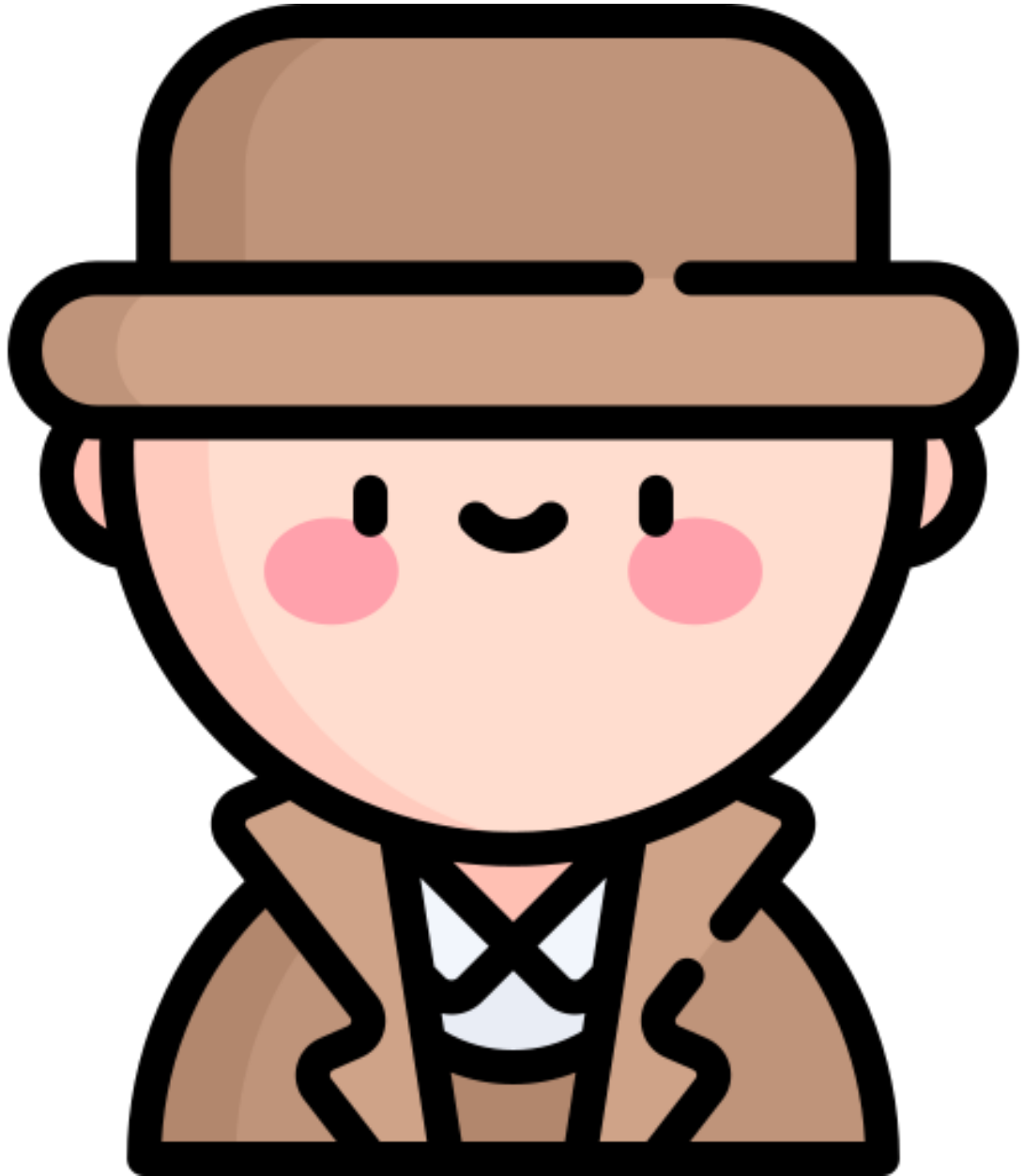




http://www.yellowtang.org/images/plant_central_3_c_ph_784.jpg

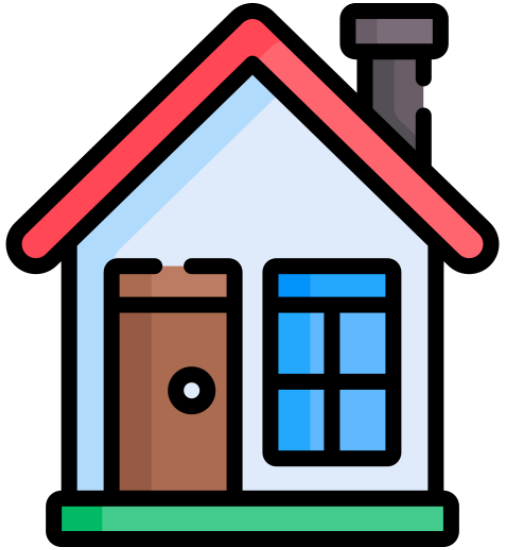
Are you ready to become a Crime Scene Investigator?



Recently, there have been three cases of burglary in your neighborhood

HOUSE A

HOUSE B



HOUSE C

CLASSIFIED

A CSI agent was called to examine all three crime scenes (houses A, B and C) and collect evidence (biological material)

It seems that perpetrators used gloves but some cells have been found and collected

CLASSIFIED

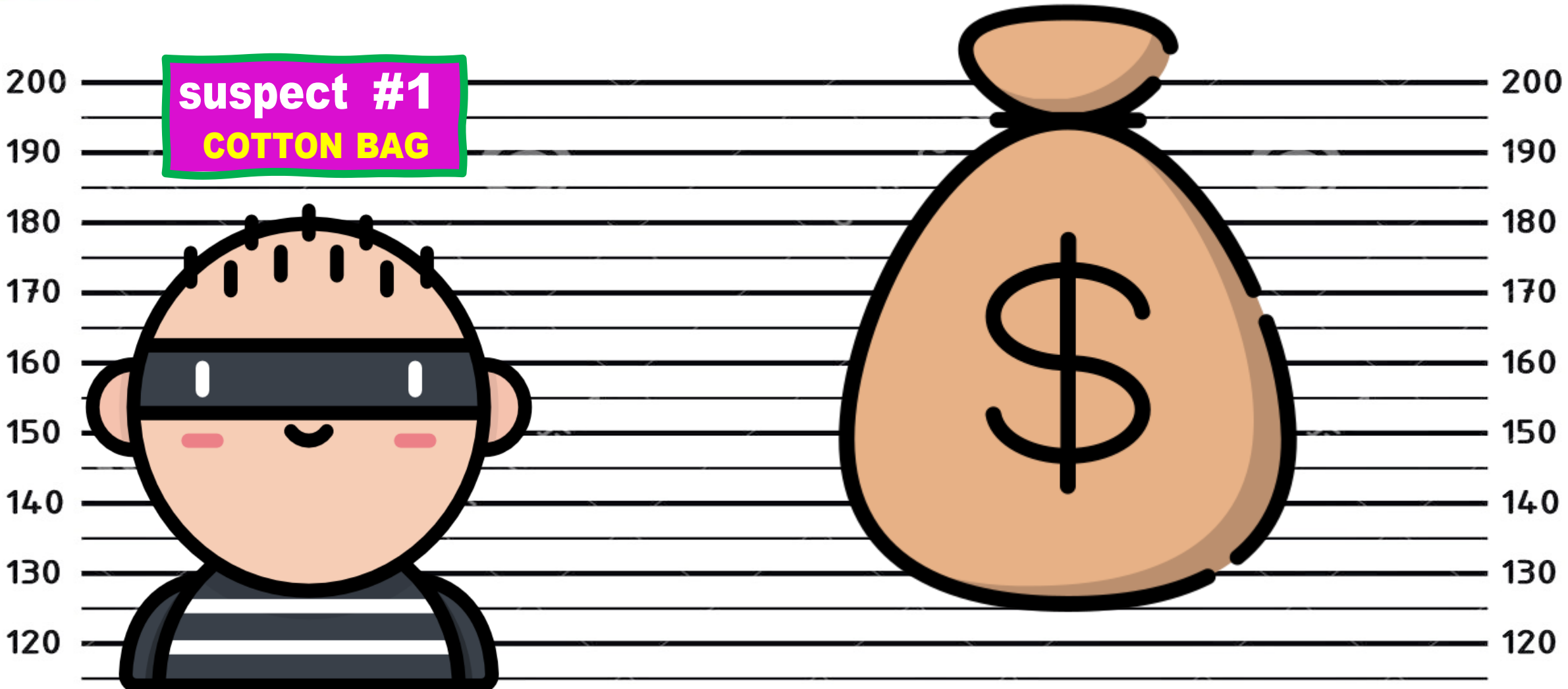
The cells come from the bags that thieves used to carry the spoils of the robbery out of the houses A, B and C.

CLASSIFIED

Based on witness statements, Police know that always two burglars broke into each house

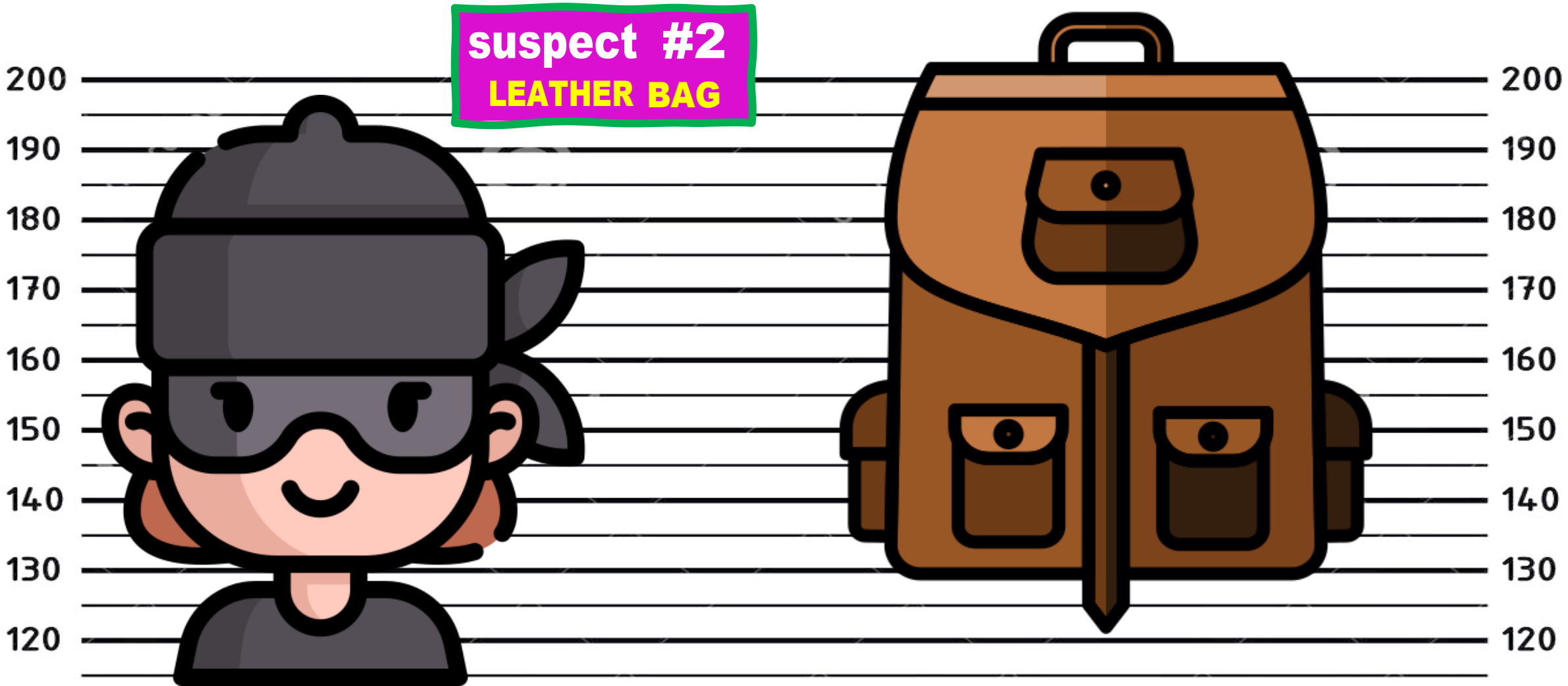
CLASSIFIED

Suspect # 1 used a cotton bag



CLASSIFIED

Suspect # 2 used a leather bag

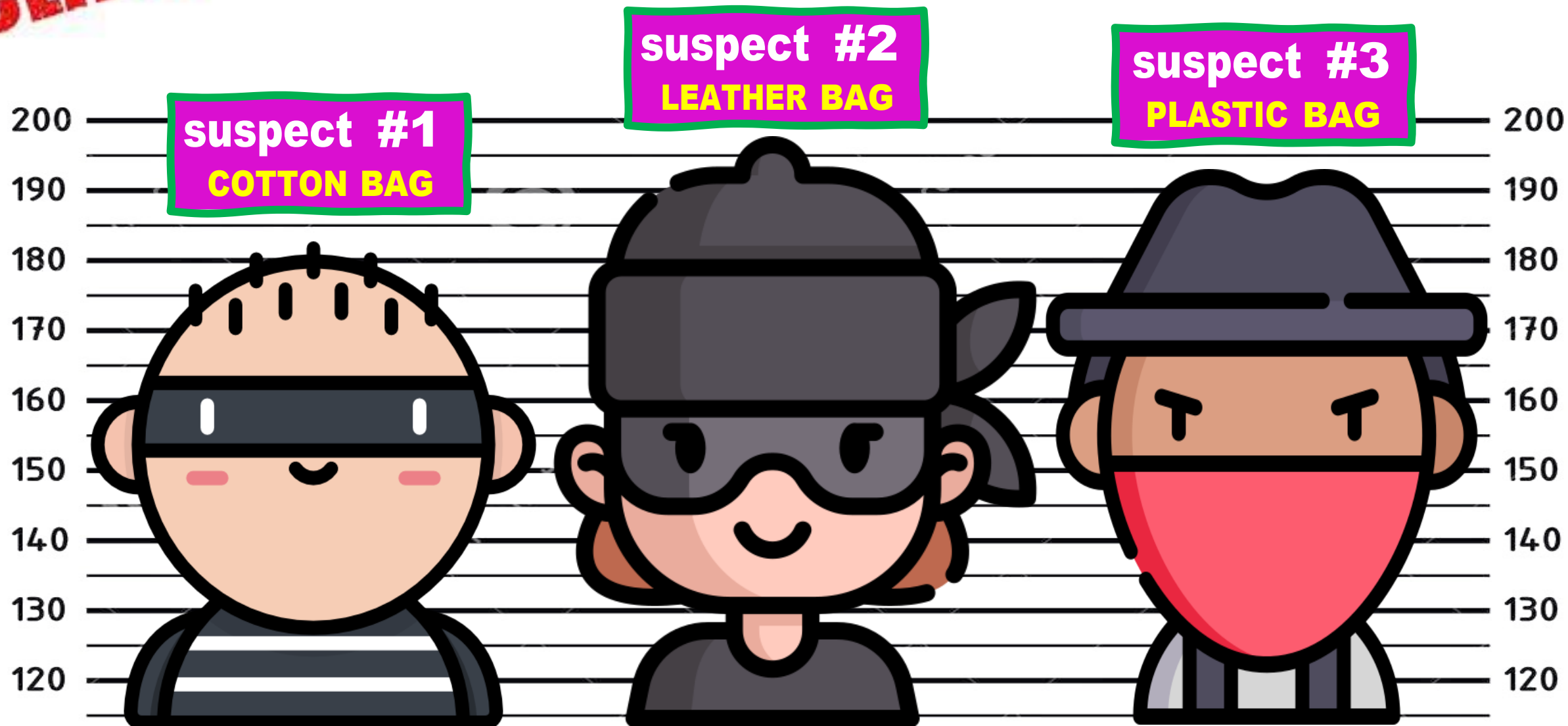


CLASSIFIED

Suspect # 3 used a plastic bag

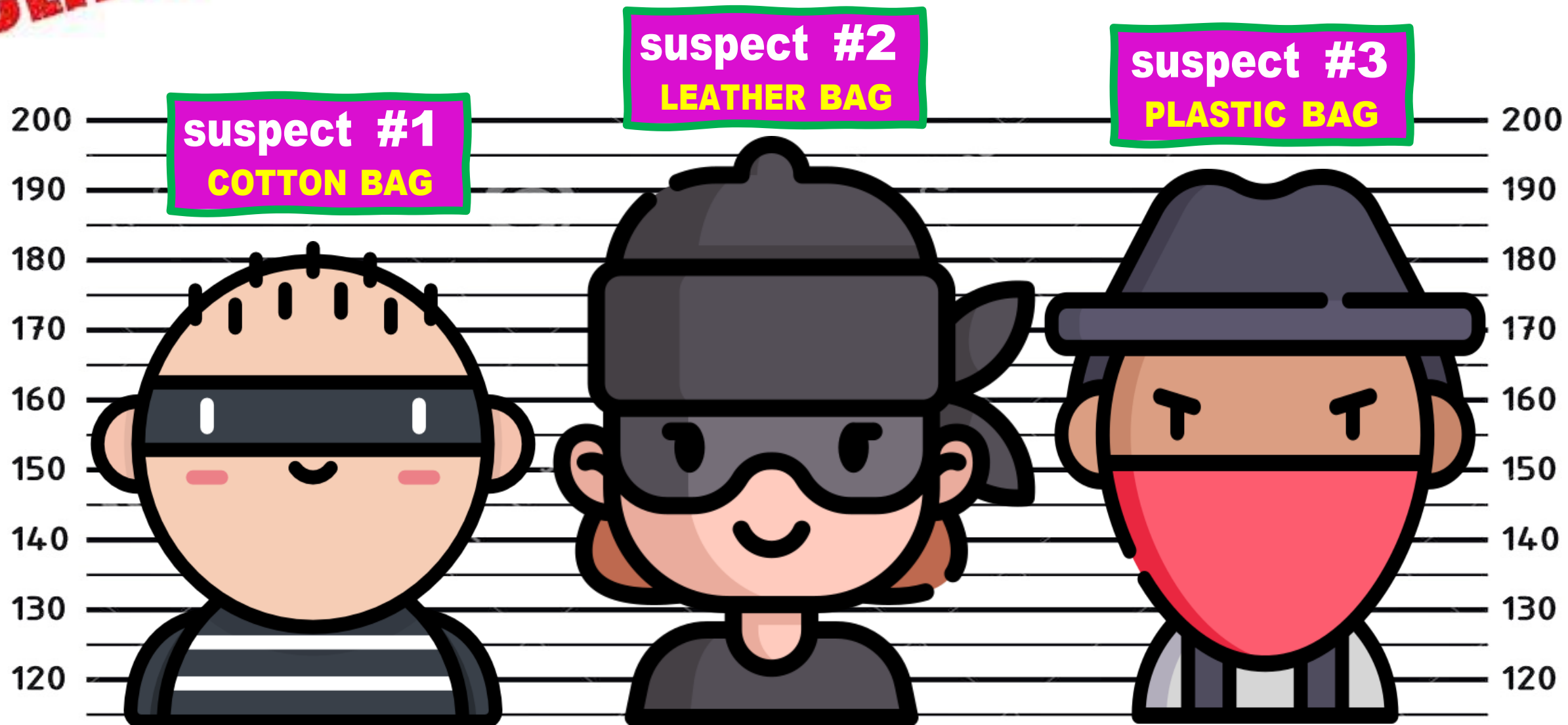
CLASSIFIED

The three main suspects are:



CLASSIFIED

What kind of cells could their bags leave behind?



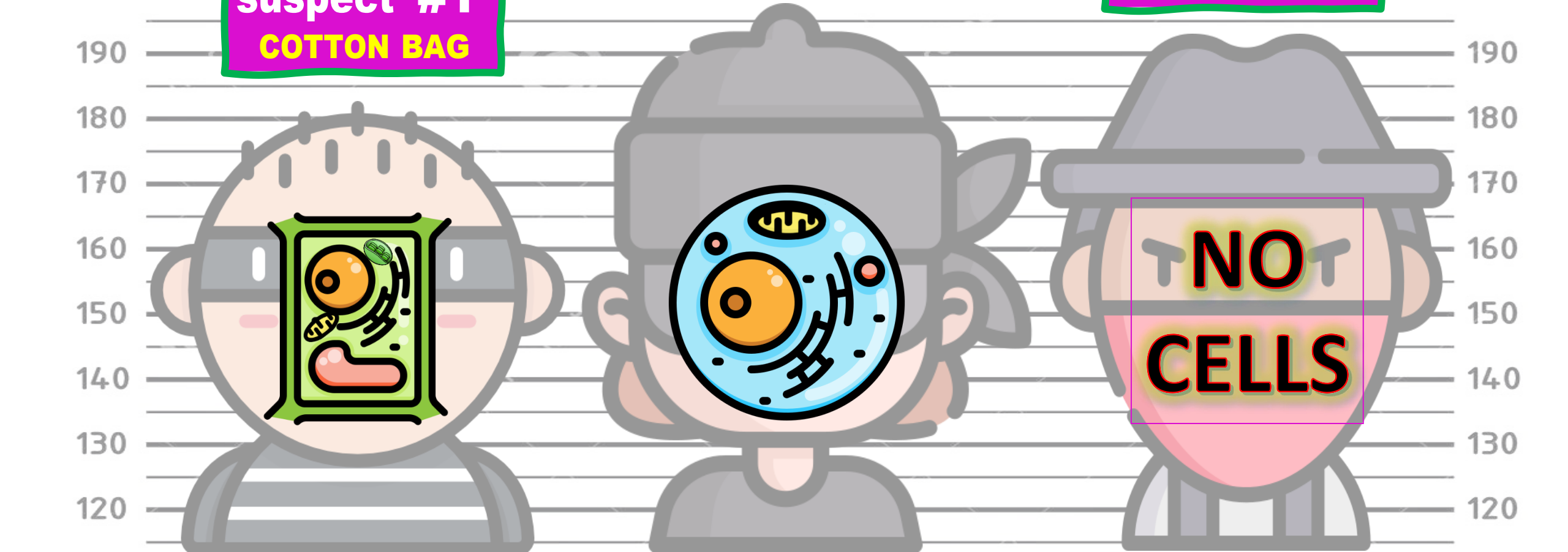
CLASSIFIED

What kind of cells could their bags leave behind?

suspect #1
COTTON BAG

suspect #2
LEATHER BAG

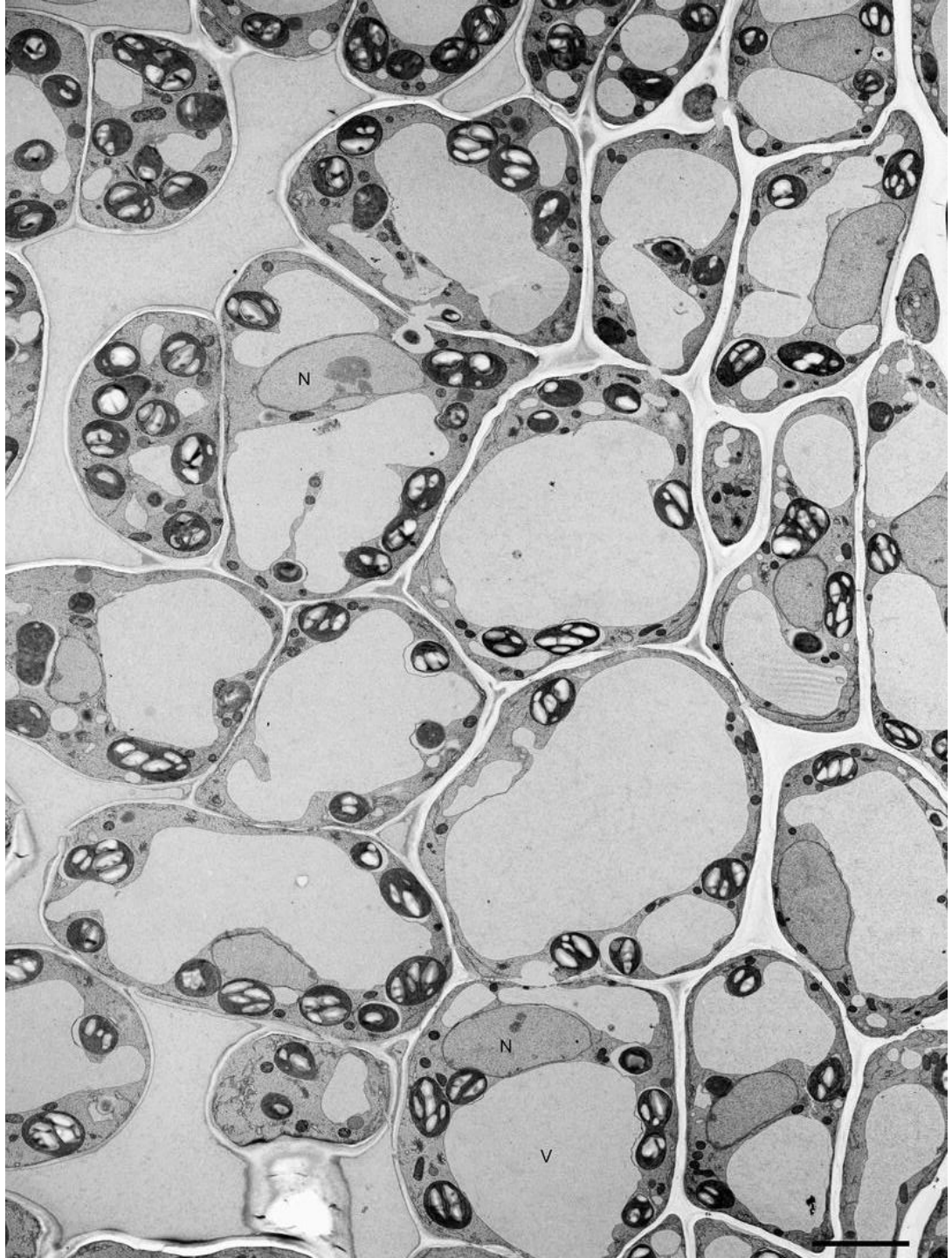
suspect #3
PLASTIC BAG



CLASSIFIED

Let's study the evidence found in house A to find out which two of the suspects broke into that house

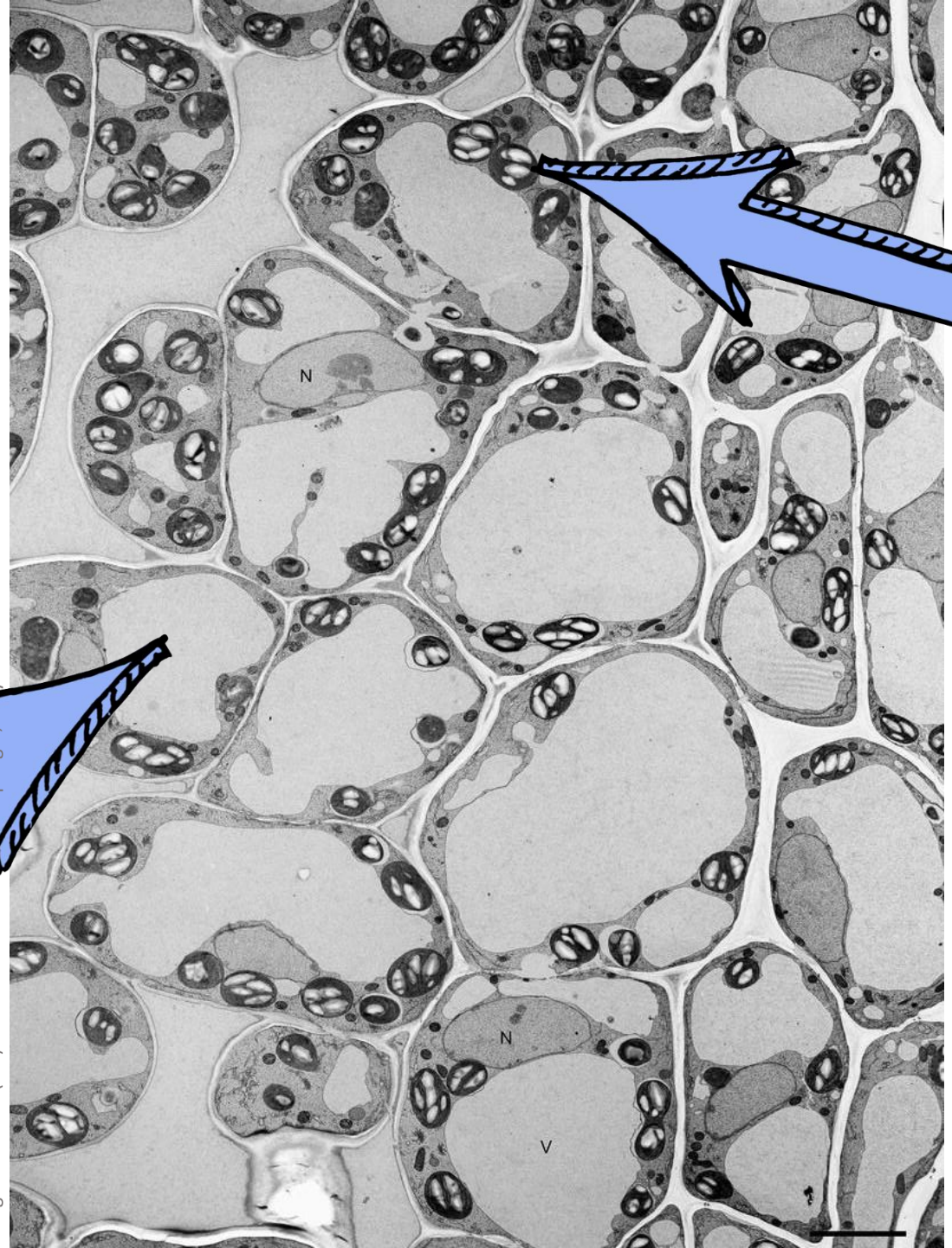
HOUSE A



FUENTE: Noguchi T., Hayashi Y. (2014) Vacuoles and Storage Organelles. In: Noguchi T. et al. (eds) Atlas of Plant Cell Structure. Springer, Tokyo.

CRIME EVIDENCE #01

CLASSIFIED



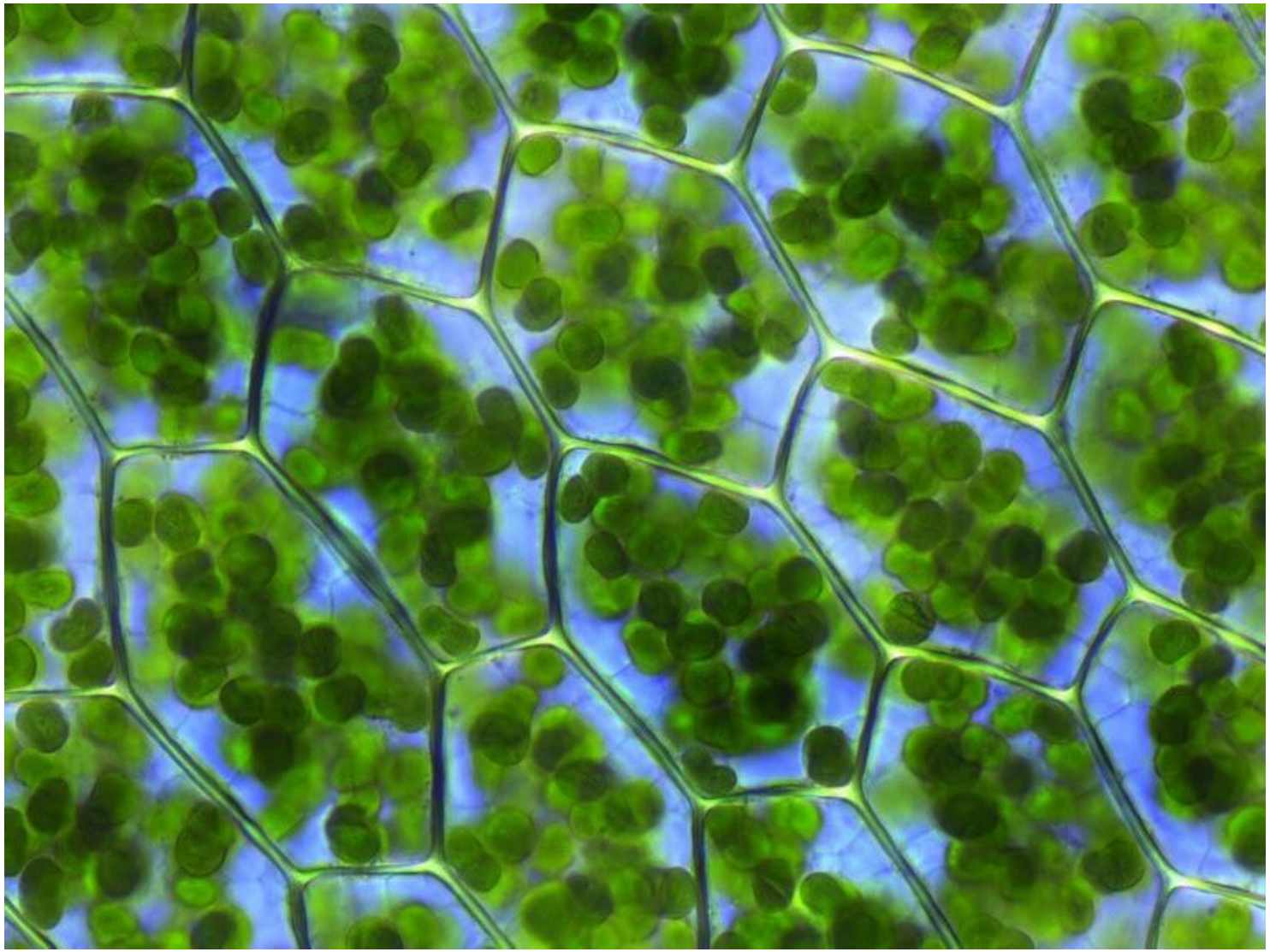
chloroplasts

large central vacuole

FUENTE: Noguchi T., Hayashi Y. (2014) Vacuoles and Storage Organelles. In: Noguchi T. et al. (eds) Atlas of Plant Cell Structure. Springer, Tokyo.

CRIME EVIDENCE #05

CLASSIFIED



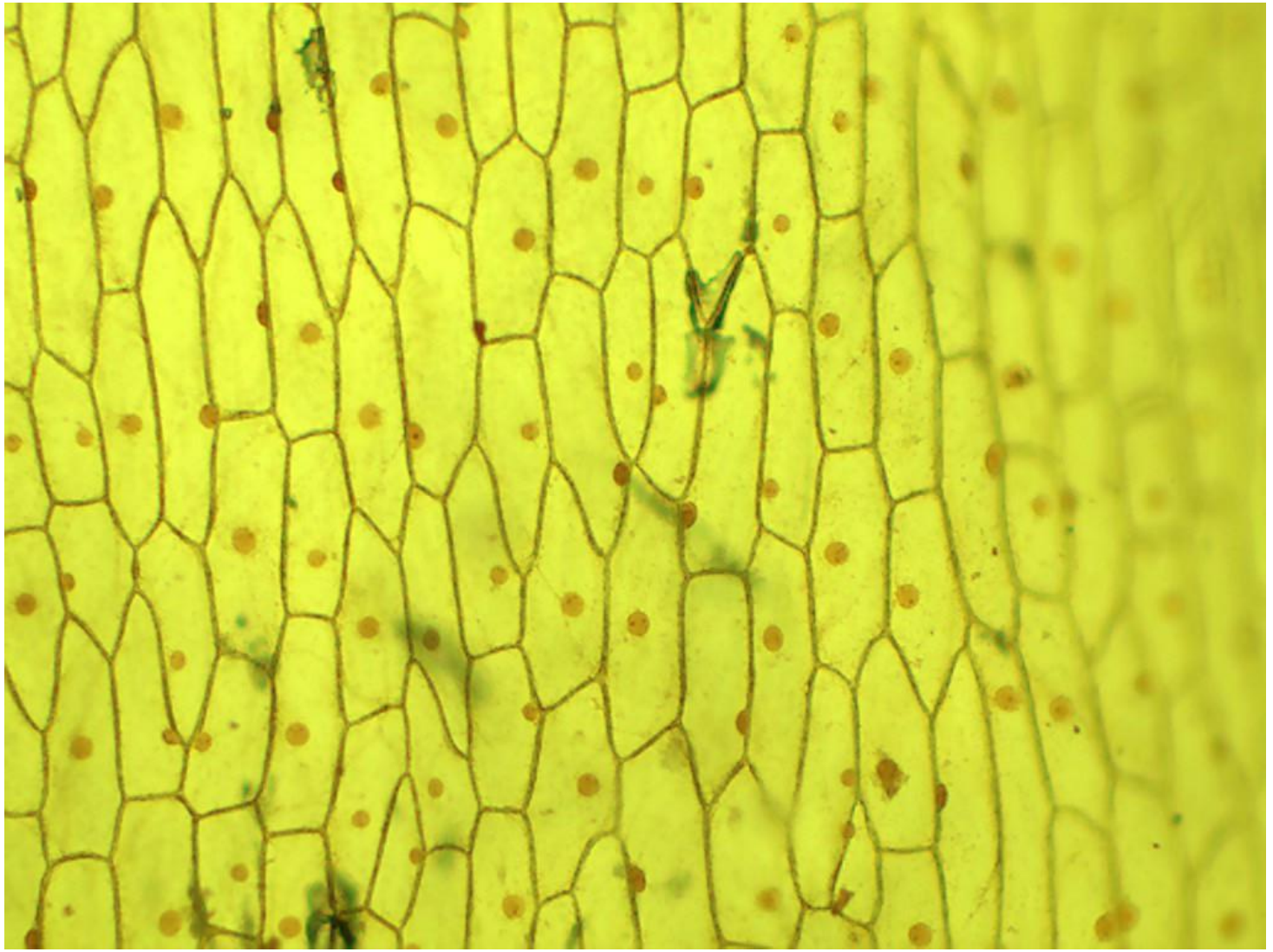
FUENTE:Kristian Peters -- Fabelfroh via WIKIMEDIA COMMONS

CRIME EVIDENCE #02

CLASSIFIED

CRIME EVIDENCE #03

CLASSIFIED

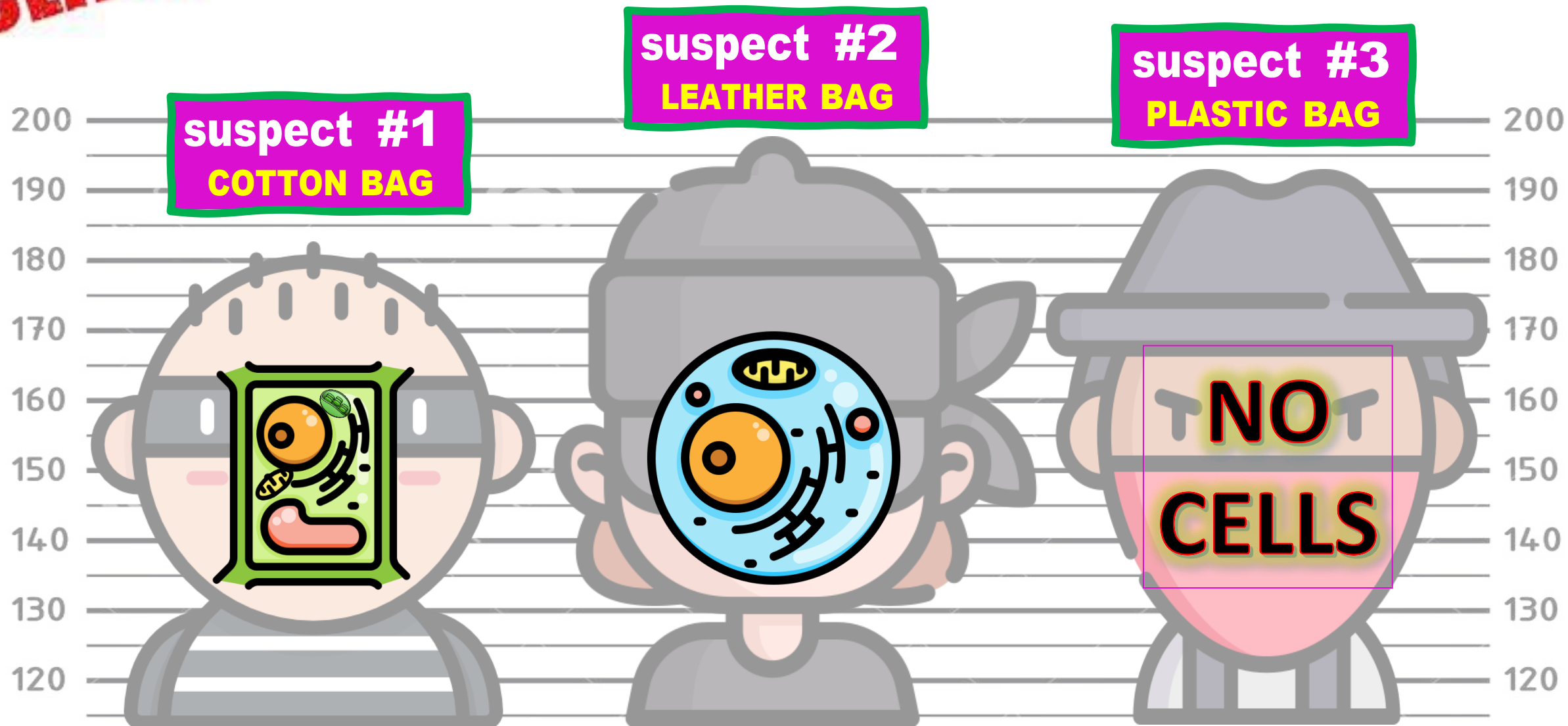


FUENTE: Mccloughlin CC -BY-SA 4.0 via WIKIMEDIA COMMONS

CRIME EVIDENCE #04

CLASSIFIED

Who are the two thieves who broke into house A?

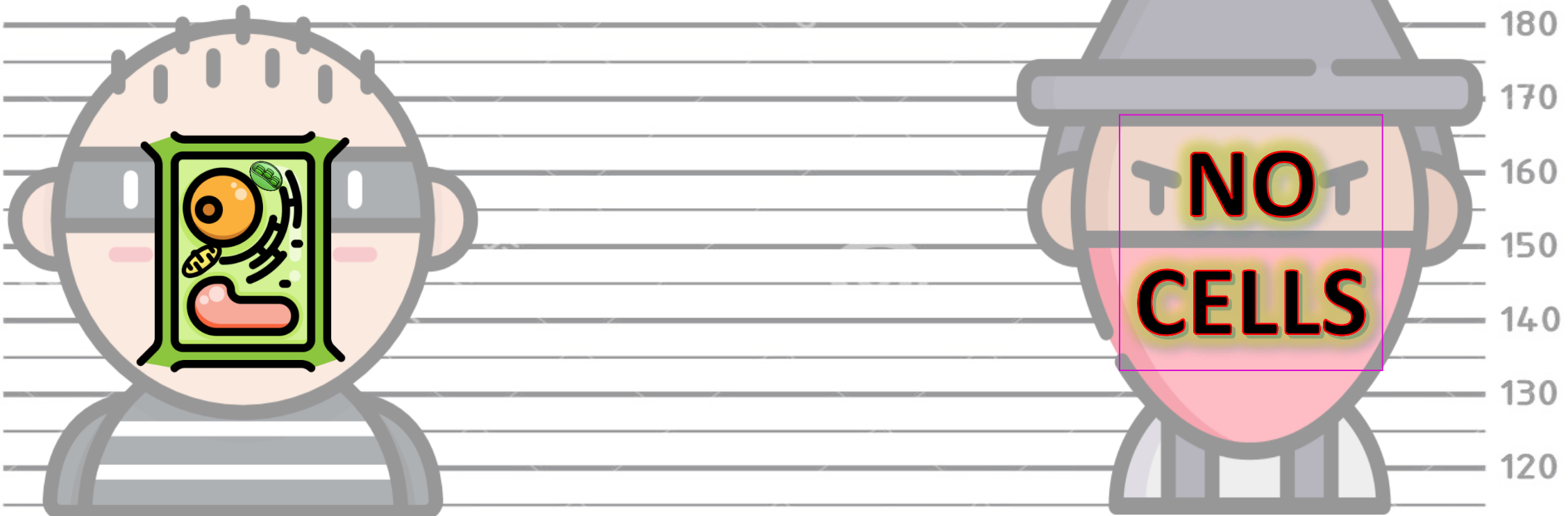


Suspect #1 and #3 broke into house A

CLASSIFIED

suspect #1
COTTON BAG

PLASTIC BAG

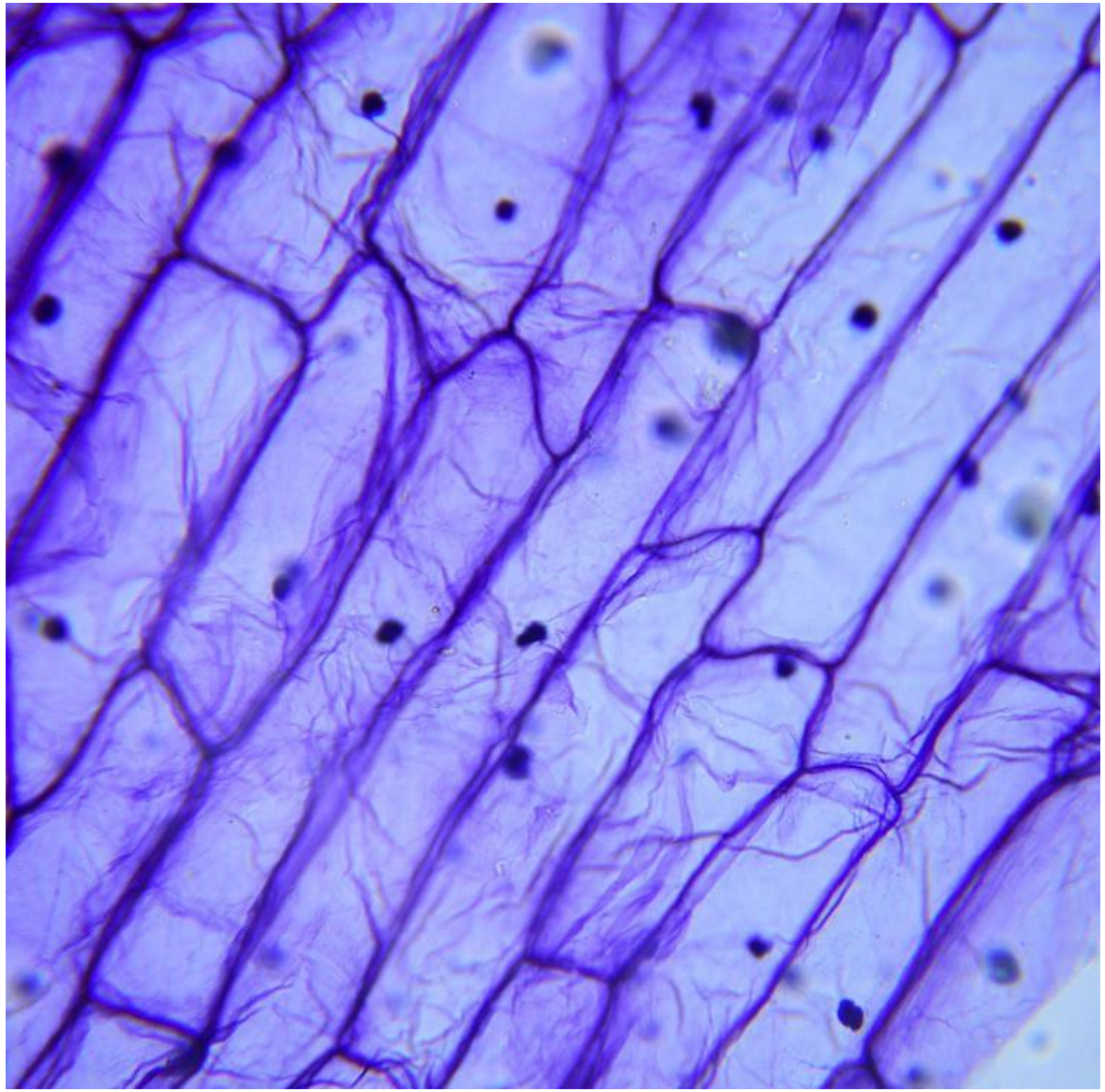


CLASSIFIED

Let's study the evidence found in house B to find out which two of the suspects broke into that house

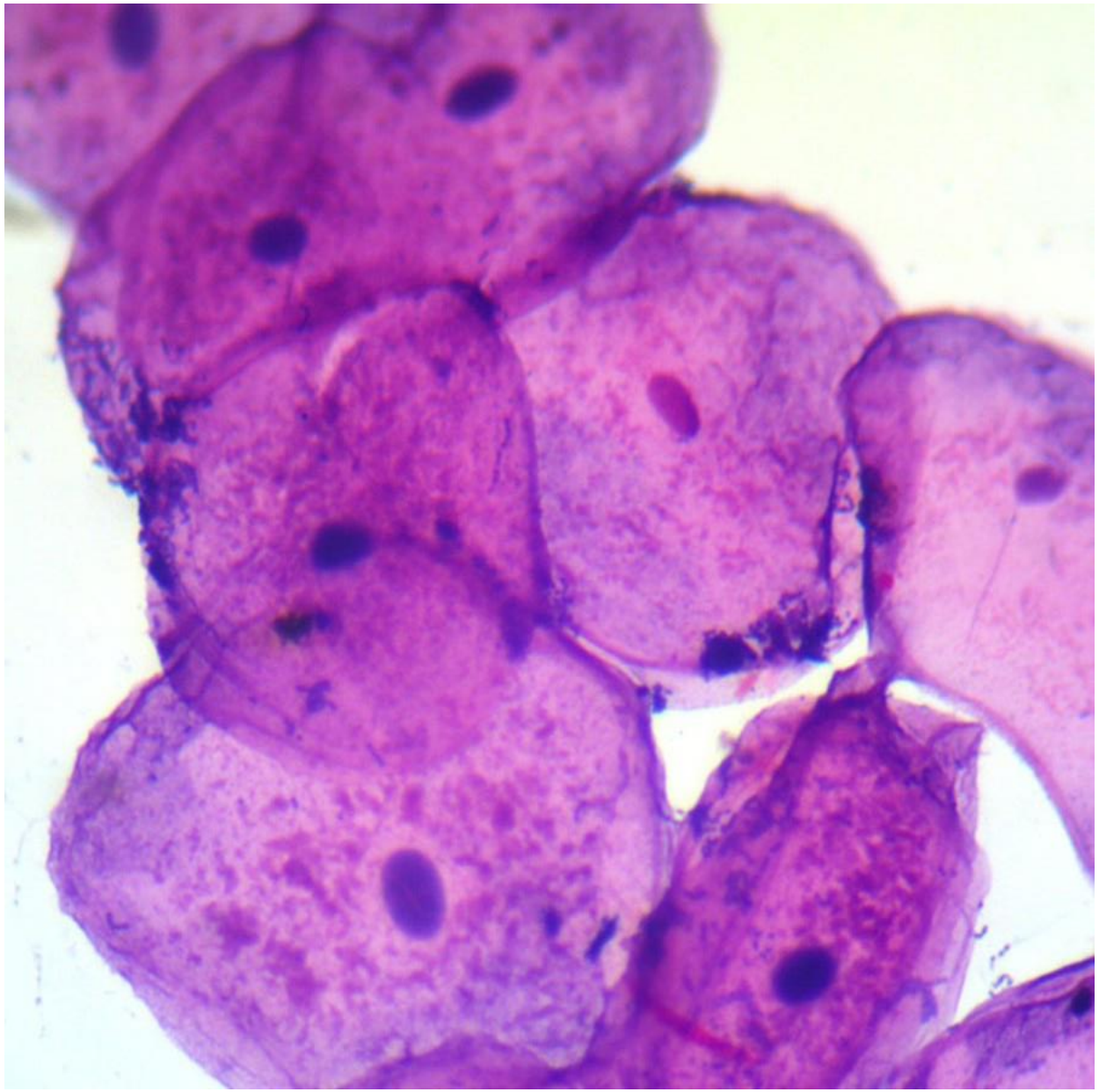
HOUSE B

CLASSIFIED



CRIME EVIDENCE #05

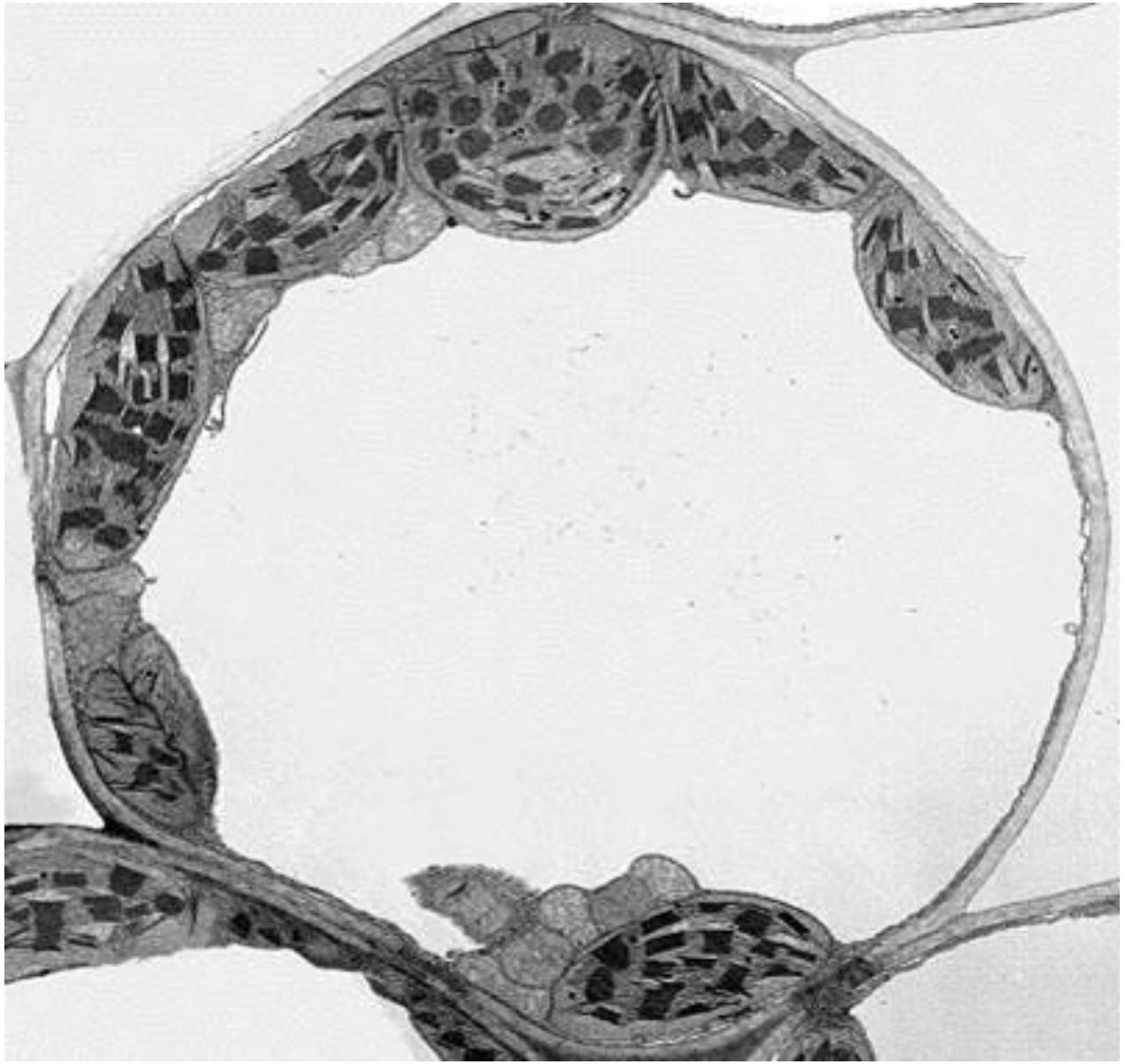
CLASSIFIED



https://www.homesciencetools.com/product/-squamous-epithelium-slide-smear/

CRIME EVIDENCE #06

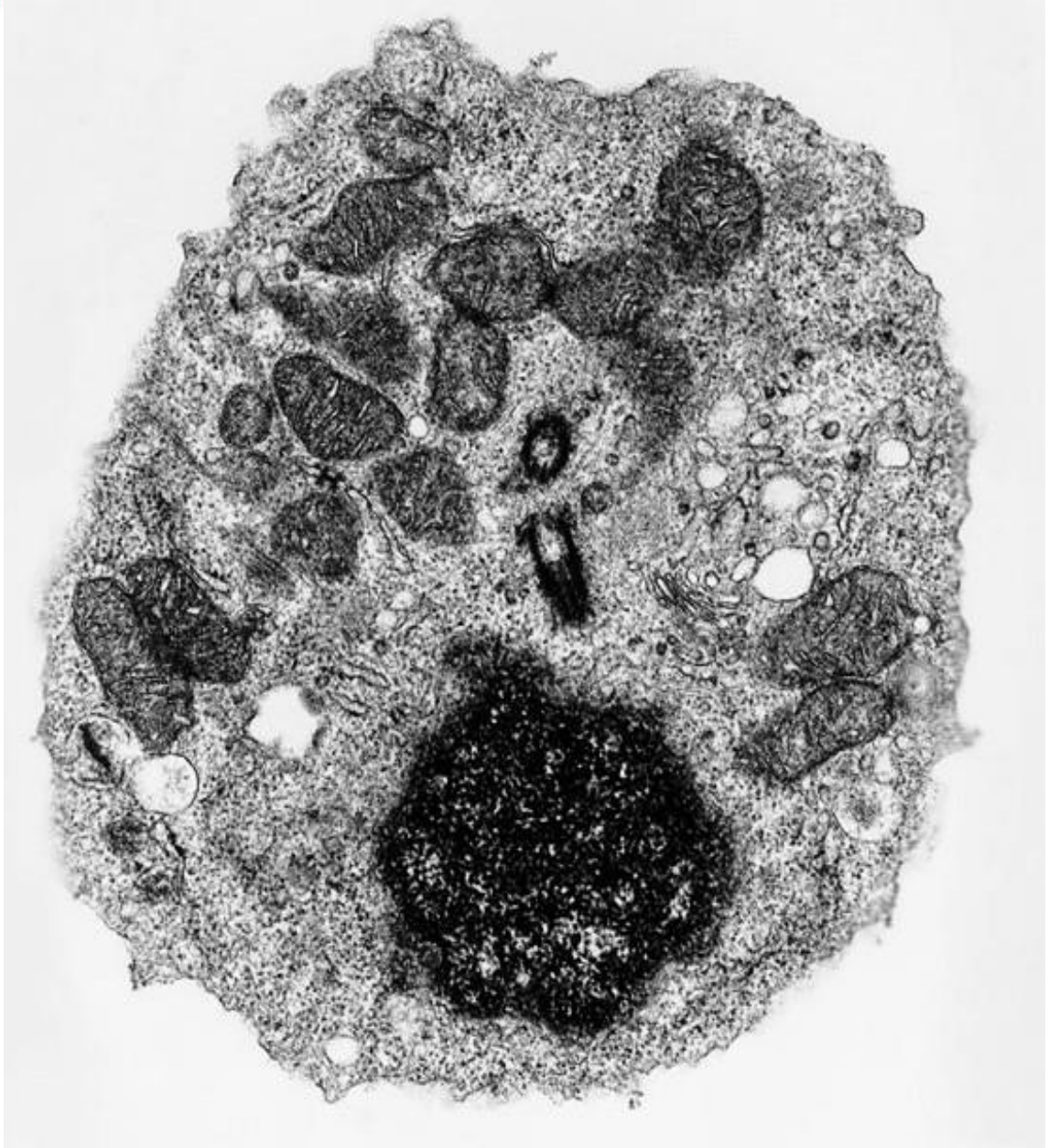
CLASSIFIED



FUENTE: www.quia.com

CRIME EVIDENCE #07

CLASSIFIED

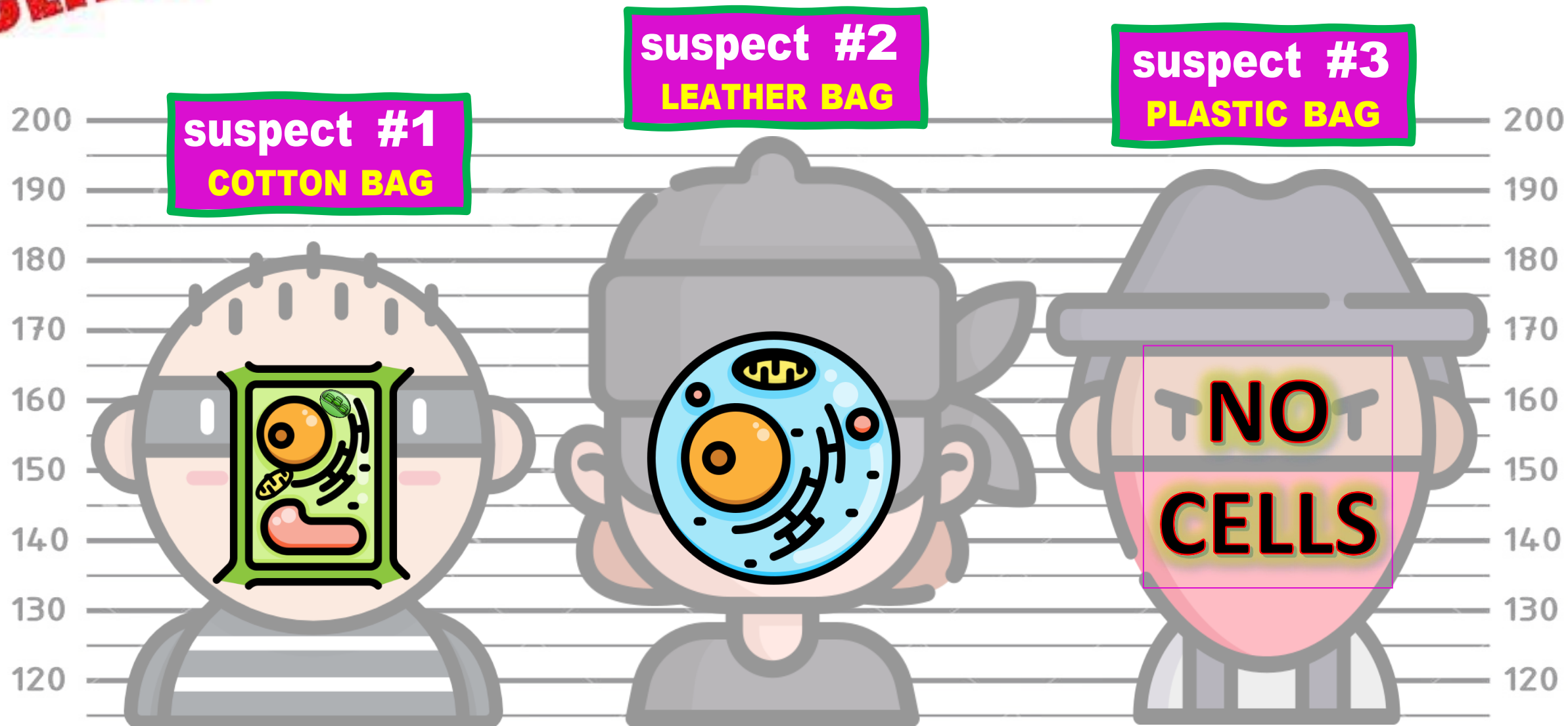


CRIME EVIDENCE #08

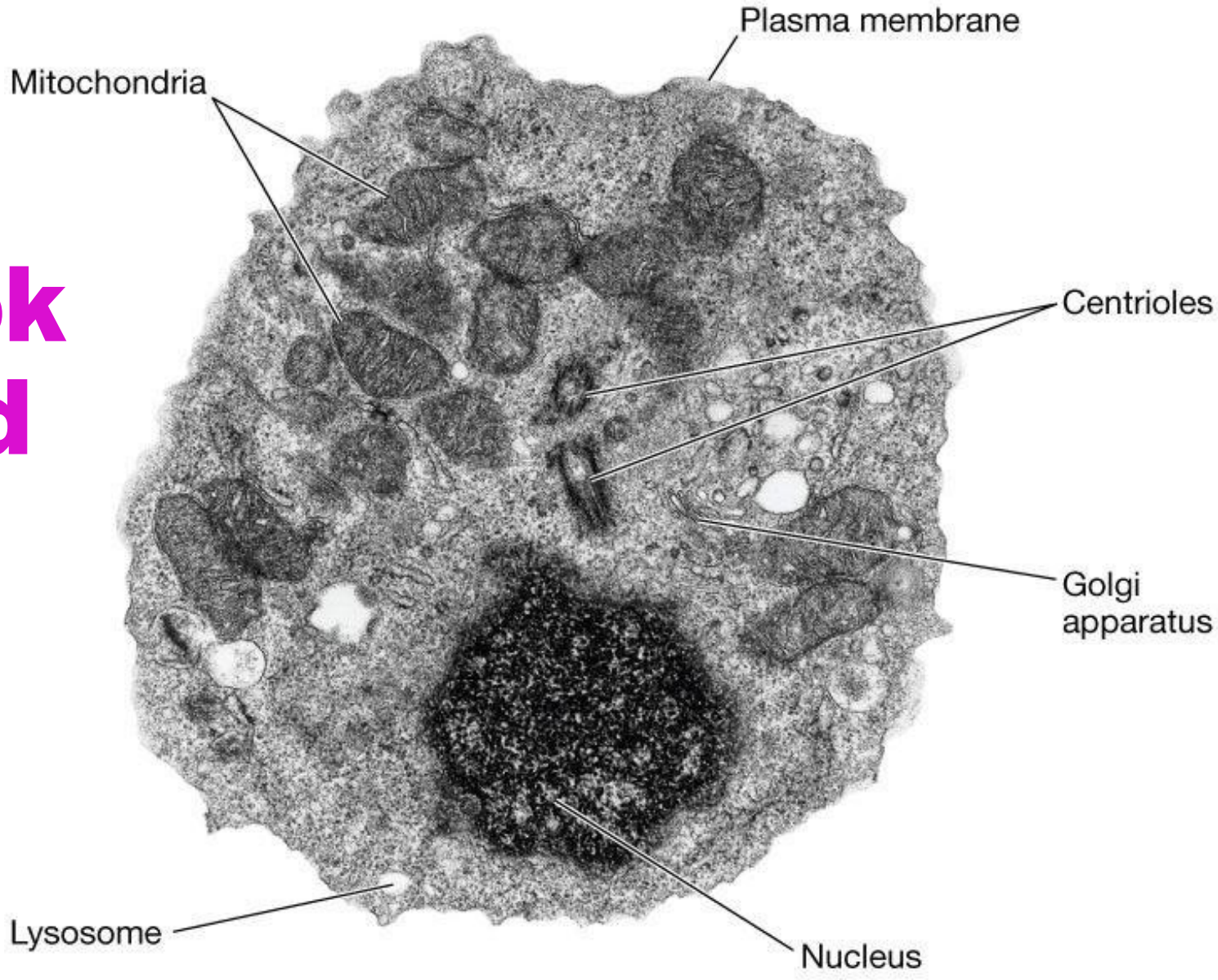
www.bbc.gov.uk

CLASSIFIED

Who are the two thieves who broke into house A?



Let's have a look at this cell and its organelles!



CLASSIFIED

Who are the two burglars who broke into house B?

suspect #1
COTTON BAG

suspect #2
LEATHER BAG

suspect #3
PLASTIC BAG

Suspect #1 and #2 broke into house B

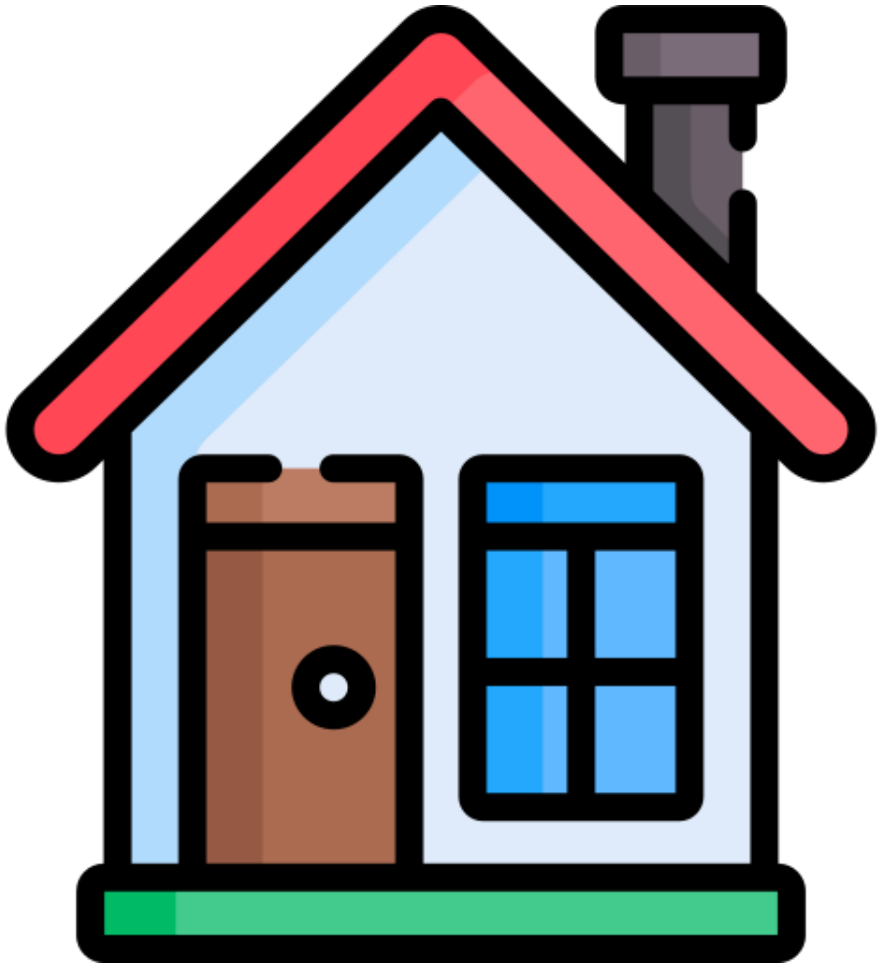
CLASSIFIED

suspect #1
COTTON BAG

LEATHER BAG

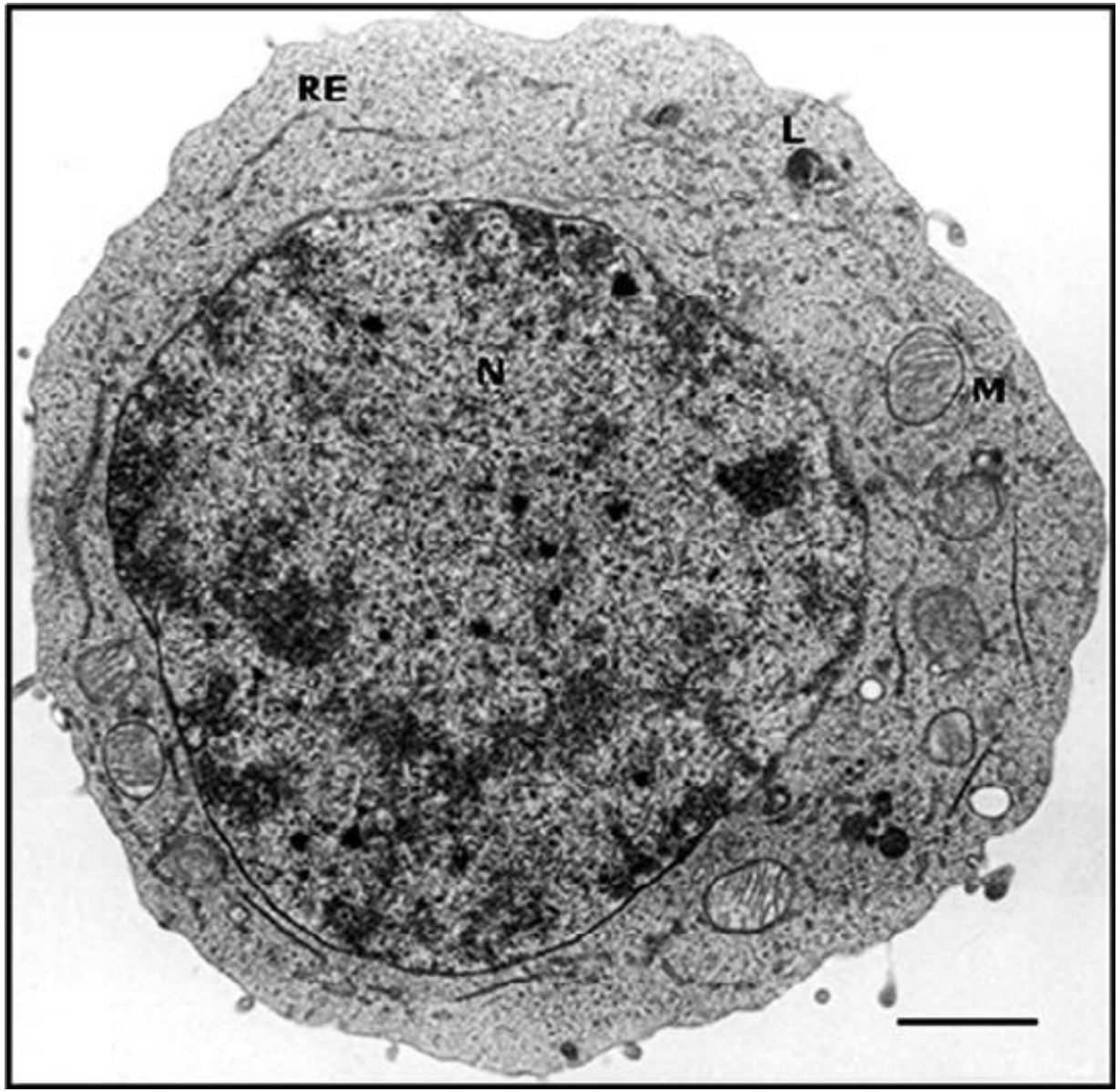
CLASSIFIED

Let's study the evidence found in house C to find out which two of the suspects broke into that house



HOUSE C

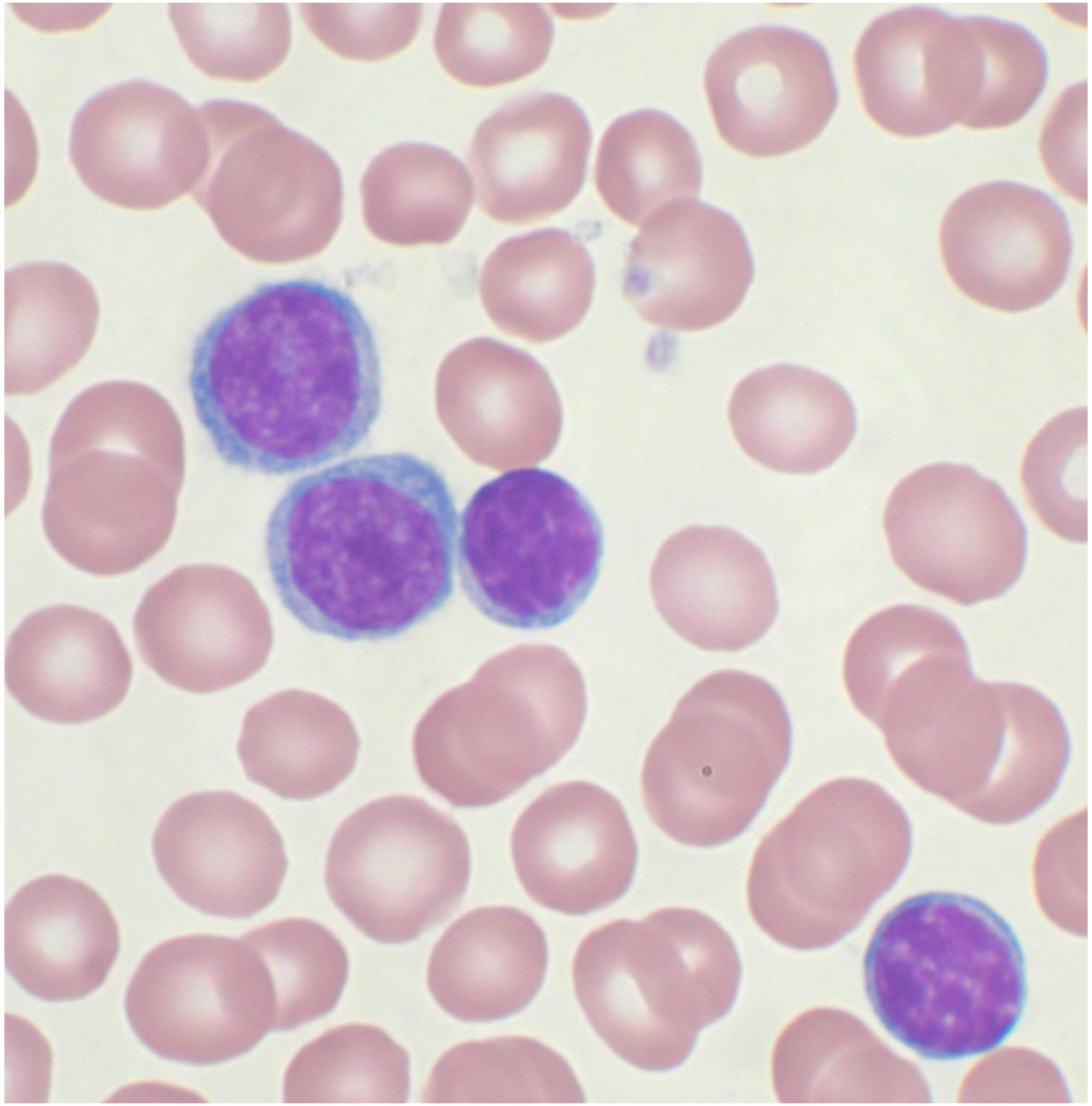
CLASSIFIED



FUENTE: Production of HPV16 L1L2 VLPs in cultures of human epithelial cells. Aurora Cianciarullo

CRIME EVIDENCE #09

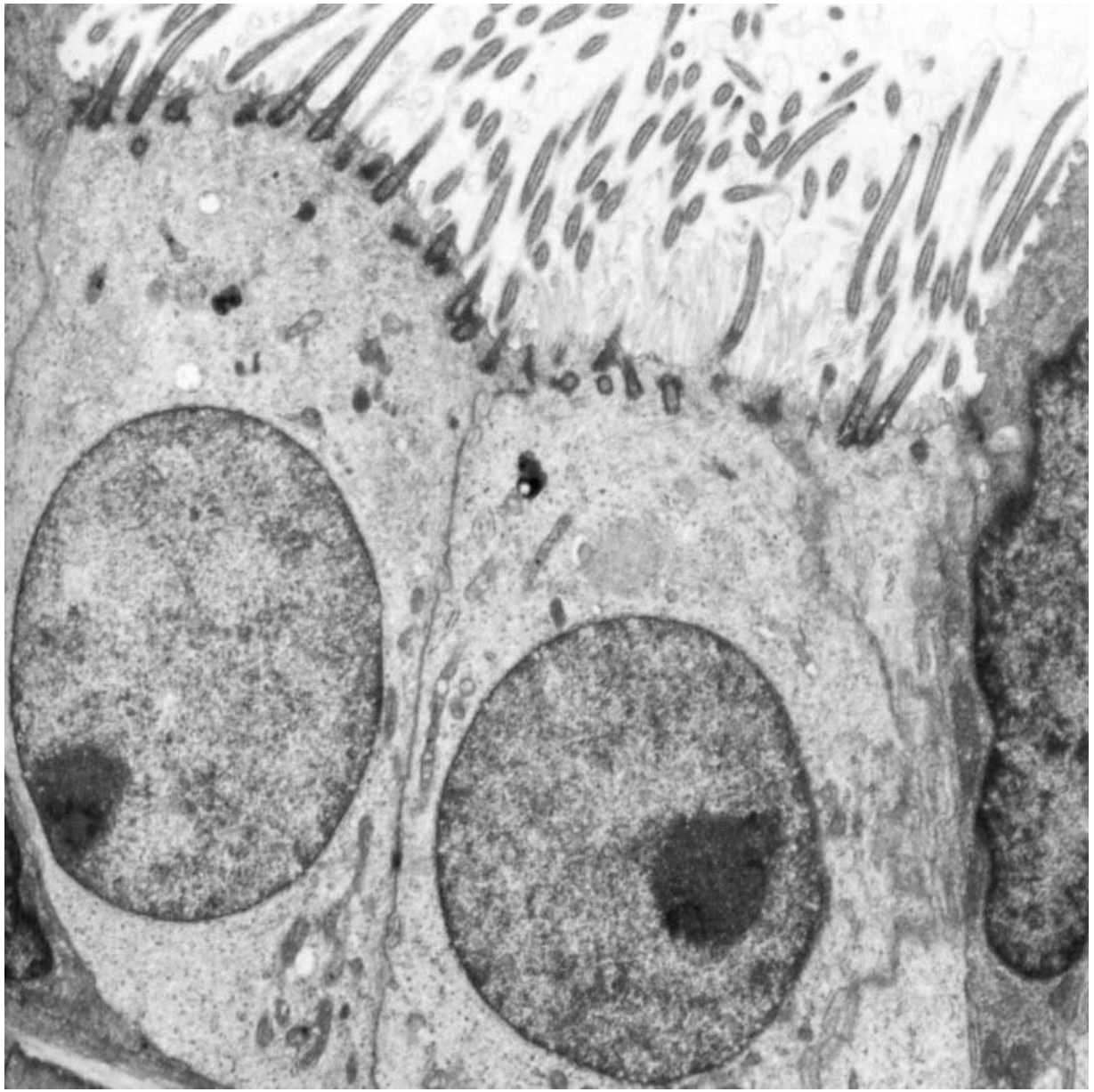
CLASSIFIED



VashiDonsk at the English Wikipedia, CC BY-SA 3.0, via Wikimedia Commons

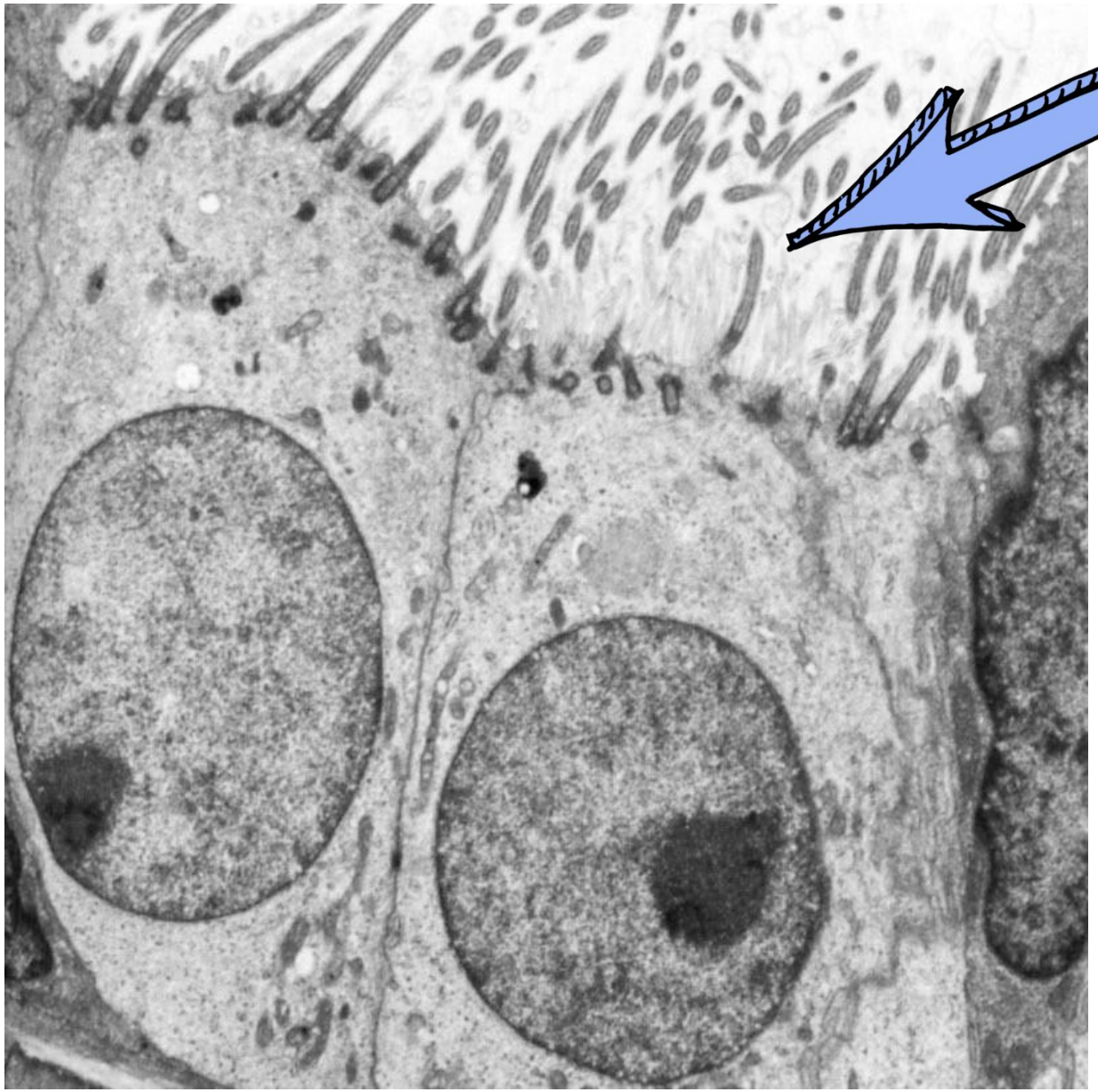
CRIME EVIDENCE #10

CLASSIFIED



CRIME EVIDENCE #11

CLASSIFIED



These hair-like structures are CILIA

CRIME EVIDENCE #11

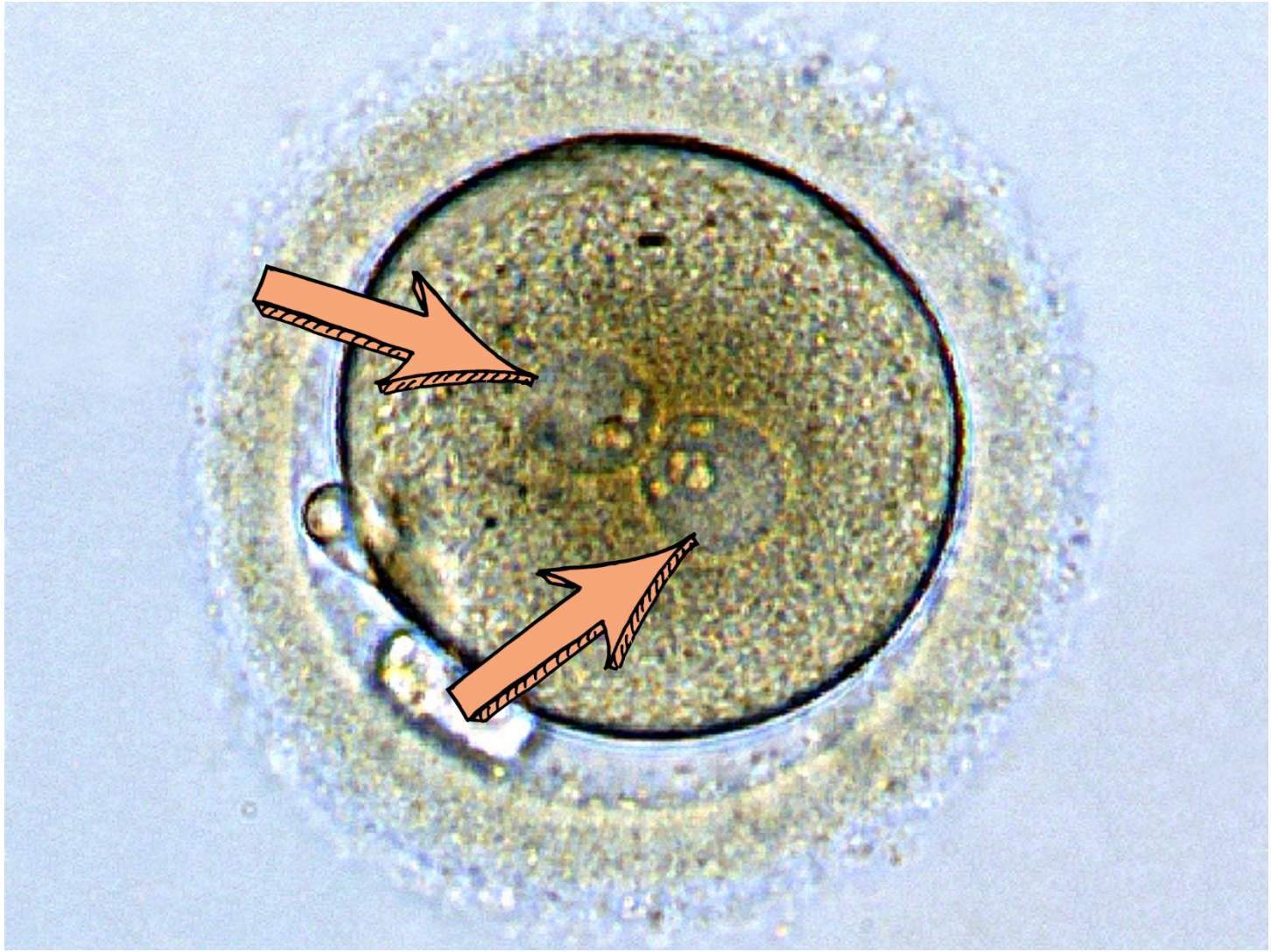
CLASSIFIED

By Nina Sesina - File:Zygote.tif, CC BY-SA 4.0 via WIKIMEDIA COMMONS

CRIME EVIDENCE #12

Did you know this cell is a zygote?

Here, the sperm nucleus has not fused yet with the egg nucleus to form a single zygote nucleus.



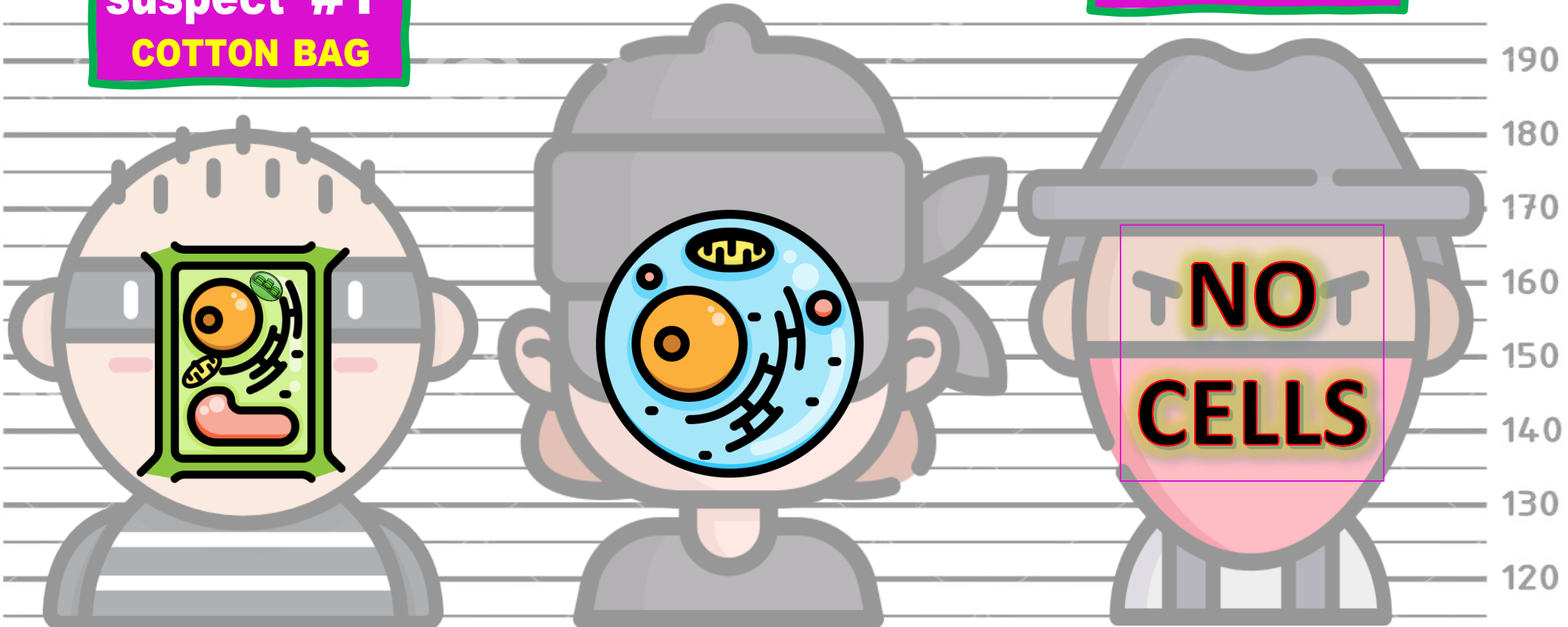
CLASSIFIED

Who are the two thieves who broke into house C?

suspect #1
COTTON BAG

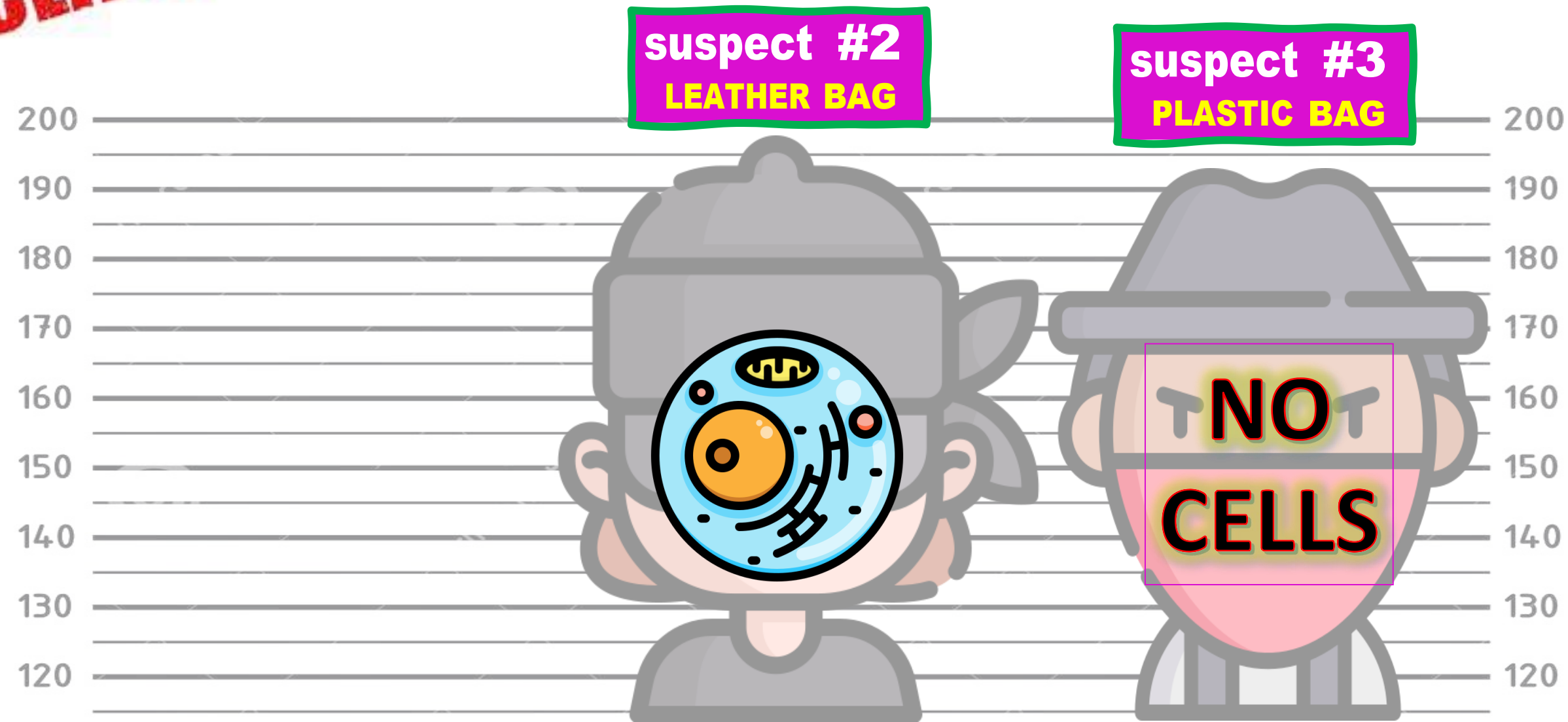
suspect #2
LEATHER BAG

suspect #3
PLASTIC BAG



CLASSIFIED

Suspect #2 and #3 broke into house C



Congratulations!

You are such an awesome CSI agent!