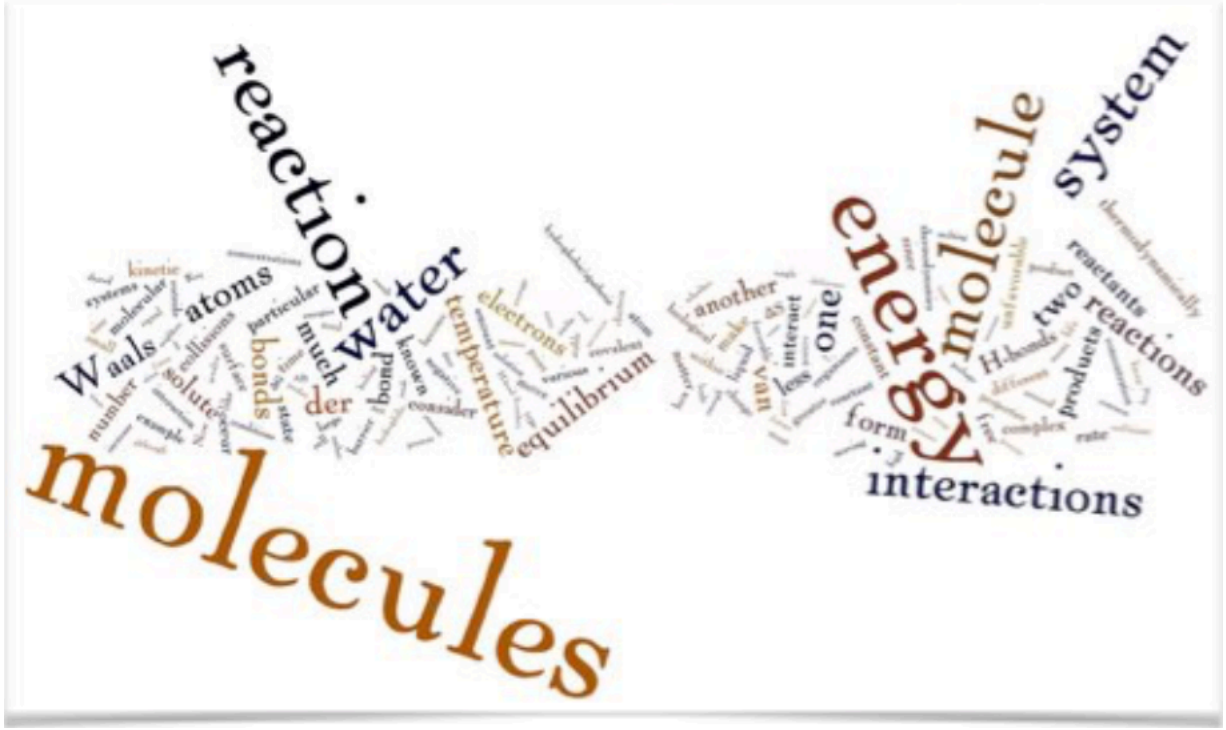


Capturing energy, environments, and symbiosis

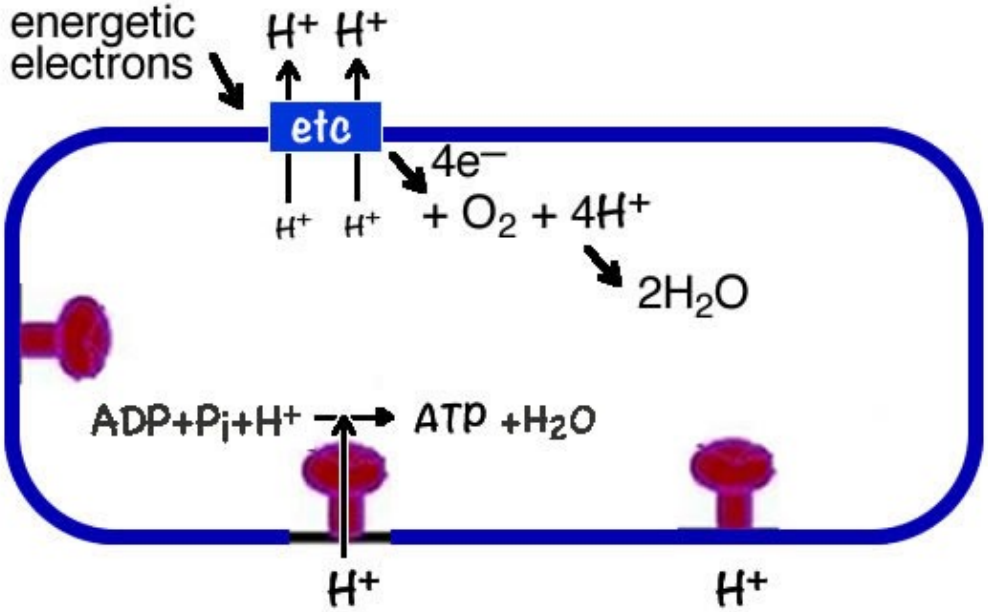
course web site

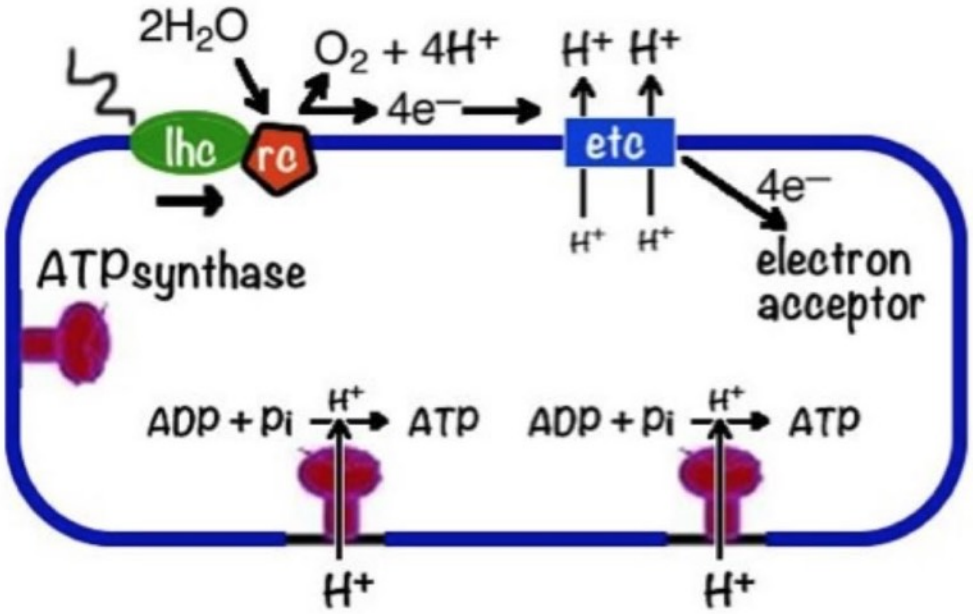
Group (discuss and draw on the white board)

If we assume that the H+-driven ATP synthase was present in LUCA, what might it have been doing there (before aerobic respiration or photosynthesis) ?

Group (discuss and draw)

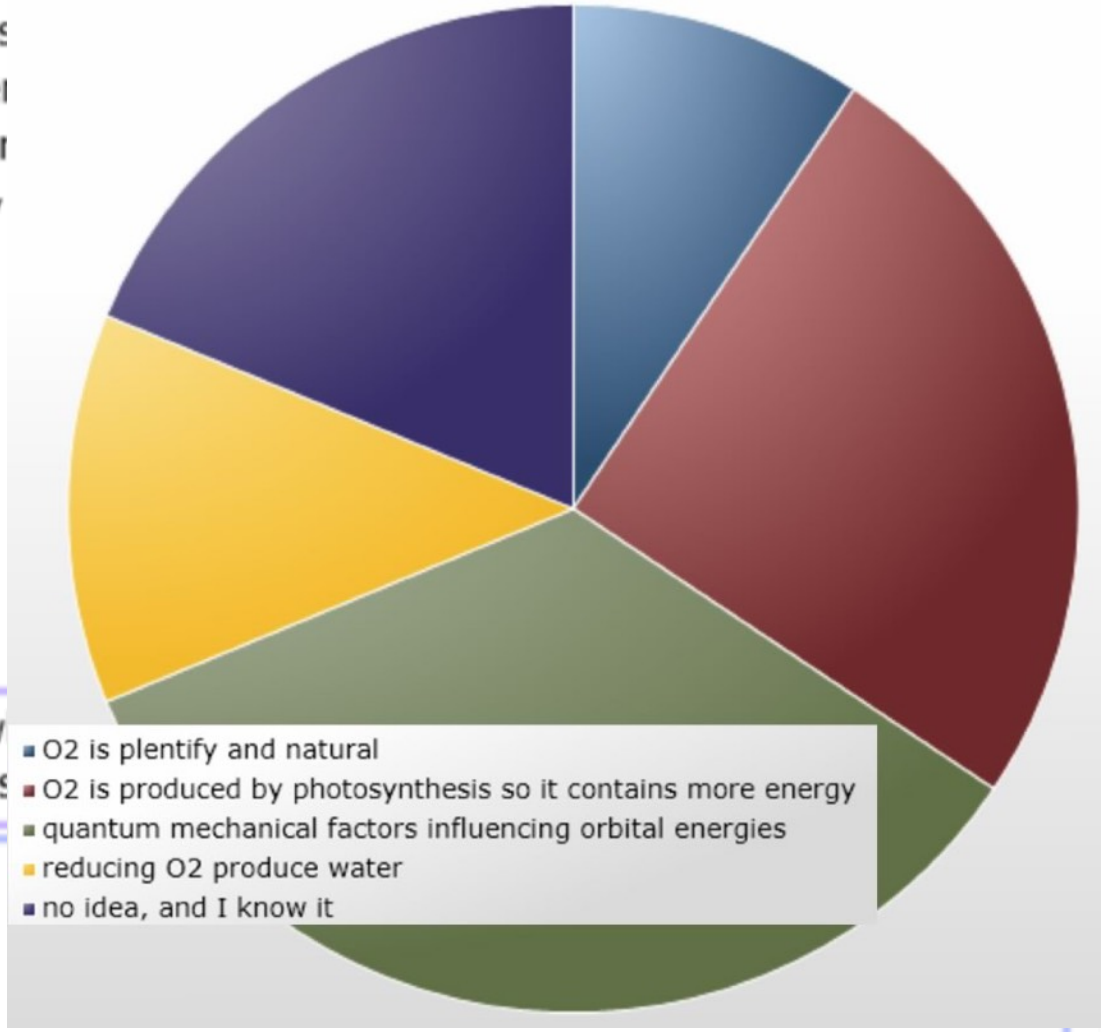
Are oxygenic photosynthesis and aerobic respiration the same or different? how are they interdependent?


energetic
electrons
H+ H+
etc
4e−
+ O2 + 4H+
2H2O
H+ H+
ADP+Pi+H+
ATP +H2O
H+
H+

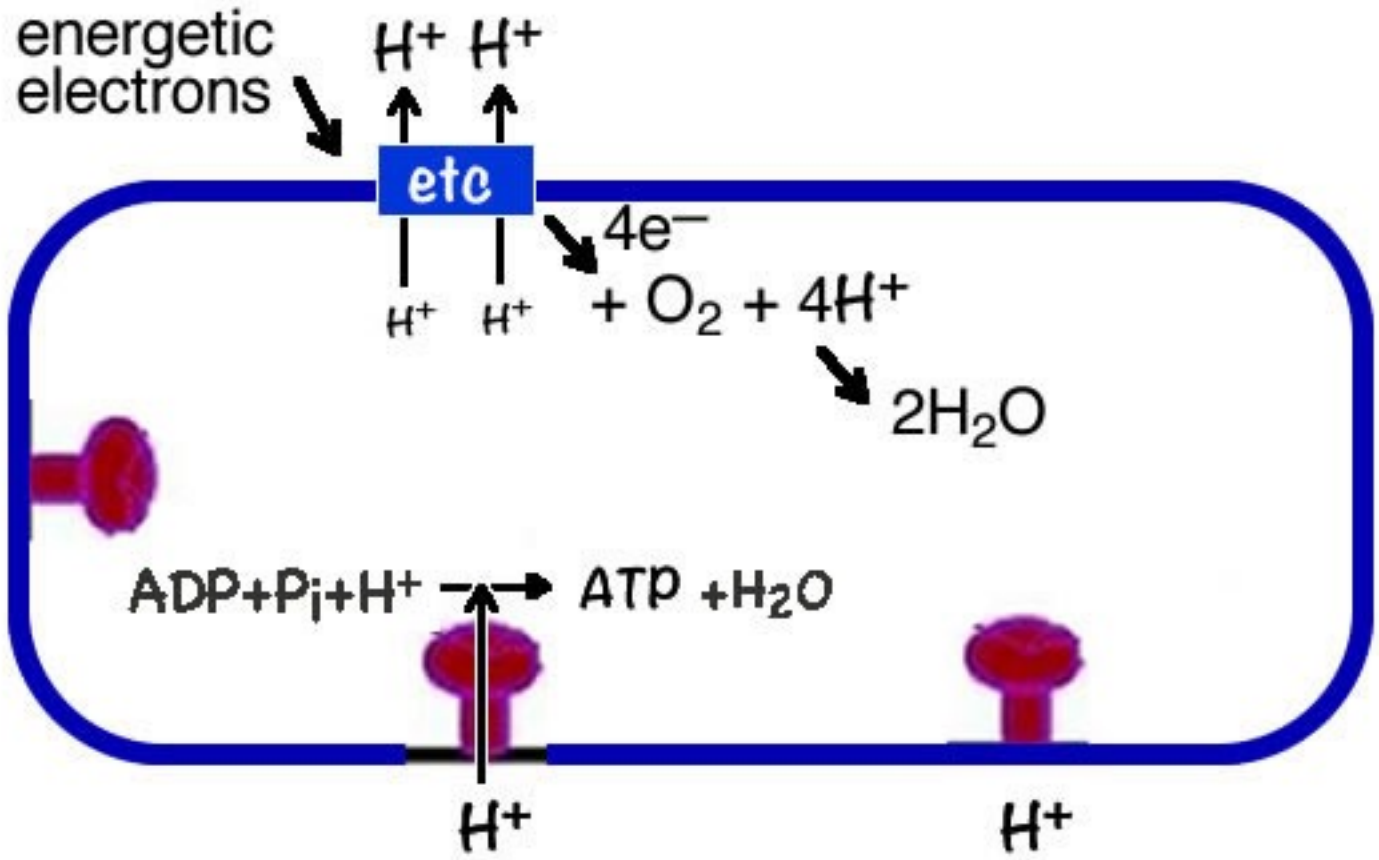

2H2O
O2 + 4H+
4e−
H+ H+
lhc
rc
etc
4e−
H+ H+
ATPsynthase
electron
acceptor
ADP + Pi
H+
ATP
ADP + Pi
H+
ATP
H+
H+

If someone asked you to explain why it is that O2 can be reduced by (accept) lower energy electrons compared to most other electron acceptors, you woul have to say is because ...

explain the logic of your answer



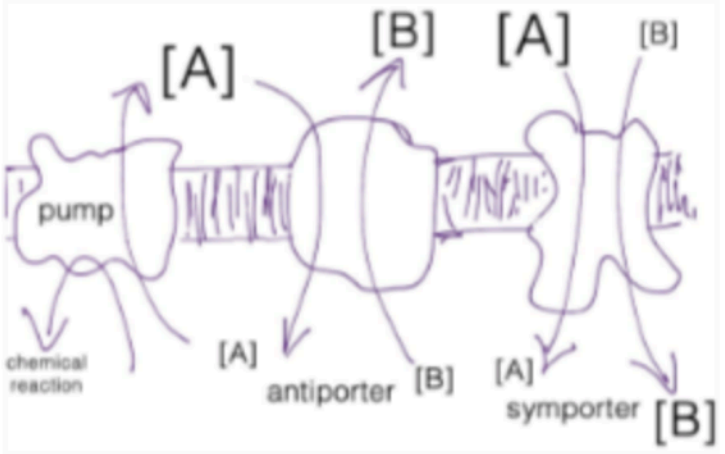
What is the source of these elections?



Group (discuss and draw on the white board)

Once a renewable source of ATP is present, produce a model for how it could be used to generate one or more concentration gradients across a cellular membrane.

In addition to directly driving the synthesis of ATP (through coupled rections), membrane gradients can be used to move molecules (say A and B) into and out of cells (and into and out of intracellular membrane-bounded compartments).



What determines the direction of the net flux of these molecules across the membrane?

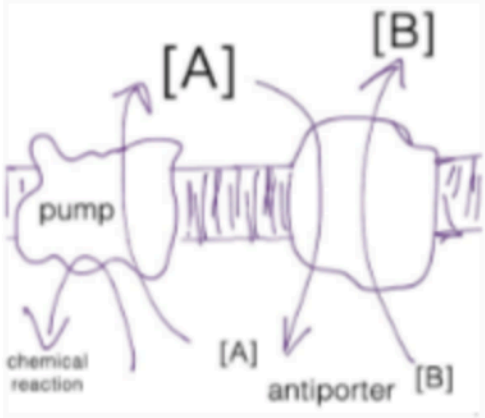
How might you use such a system to synthesize ATP?

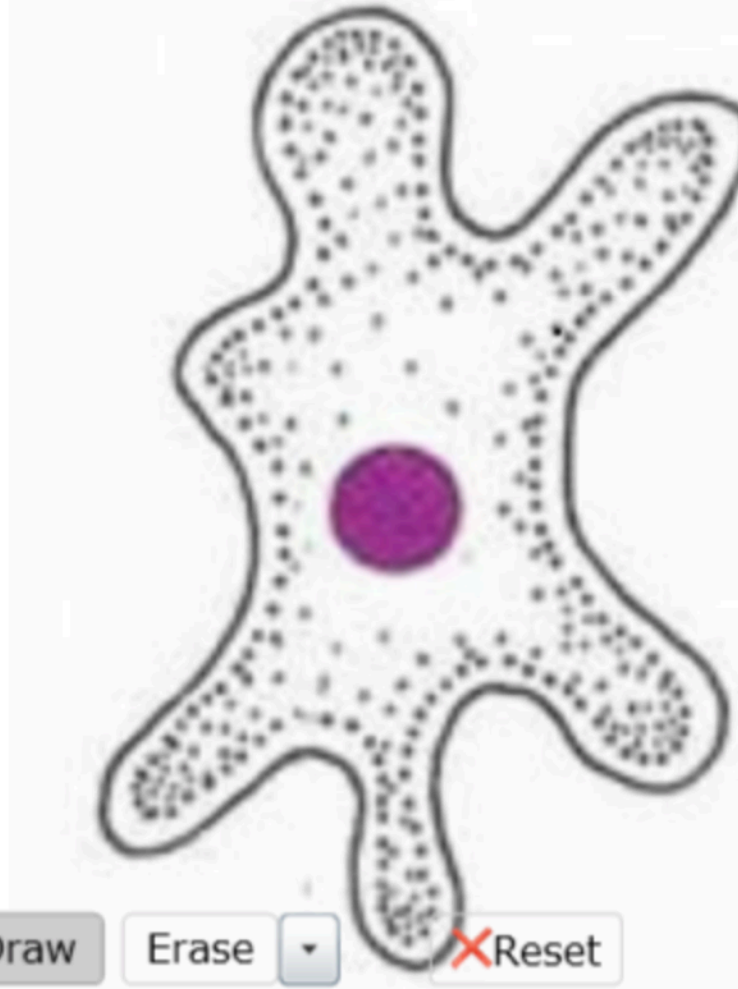
Group (discuss and draw on the white board)

Why might you need both symporters and antiporters?

How would a cellular system use a anti-porter/symporter to concentrate a nutrient molecule with a cell?

This cell's membrane contains a molecular pump running on chemical energy (the ATP hydrolysis reaction). It also contains A+B antiporters. Remembering that chemical reactions occur within the cytoplasm, indicate (below) the net direction B will move as long as there is chemical energy and both A and B are present in the system.



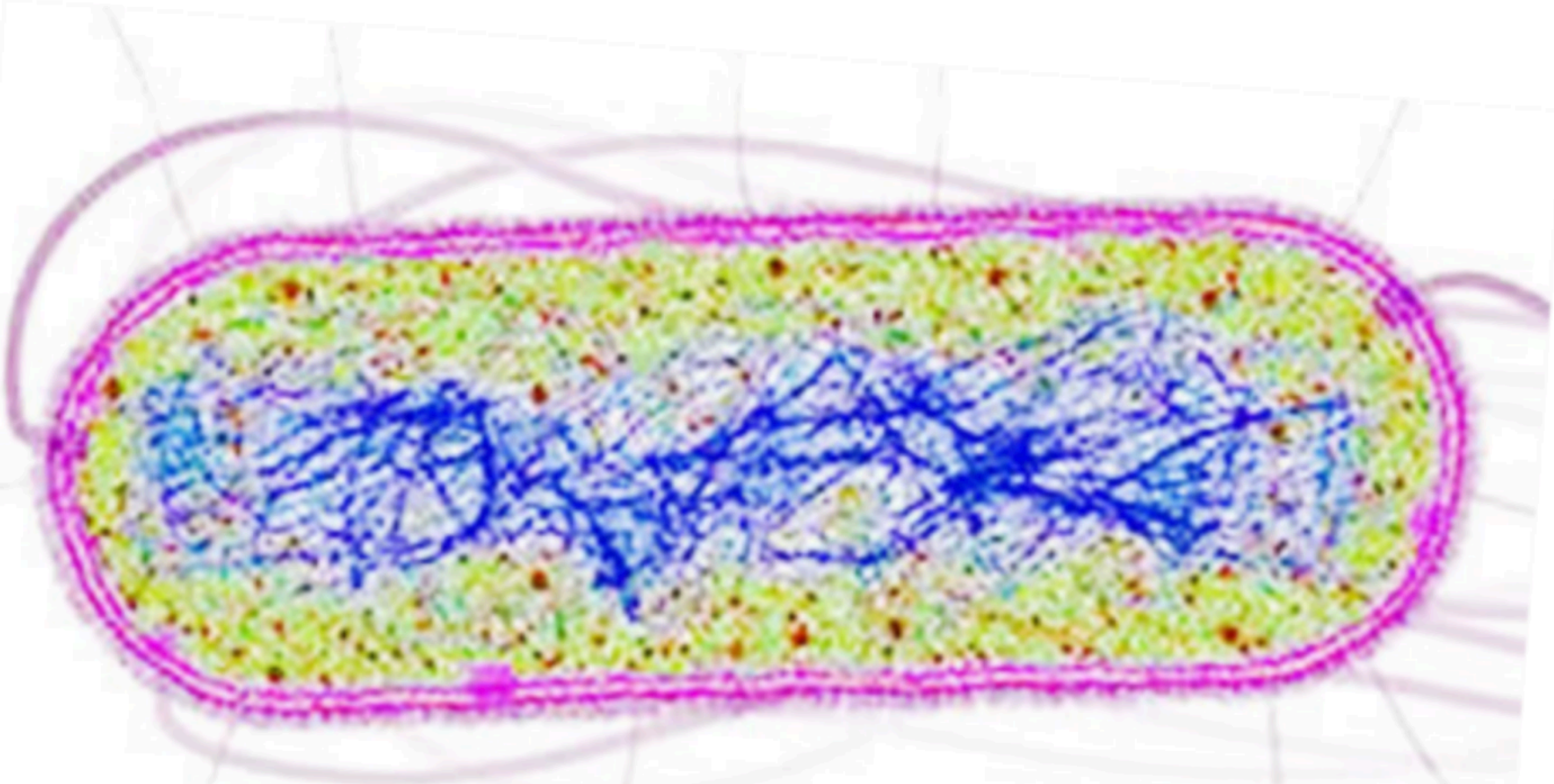


Draw Erase Reset

Predict (and explain) waht would happen to the movement of A if B were absent from the system? And under what conditions could ATP be synthesized?

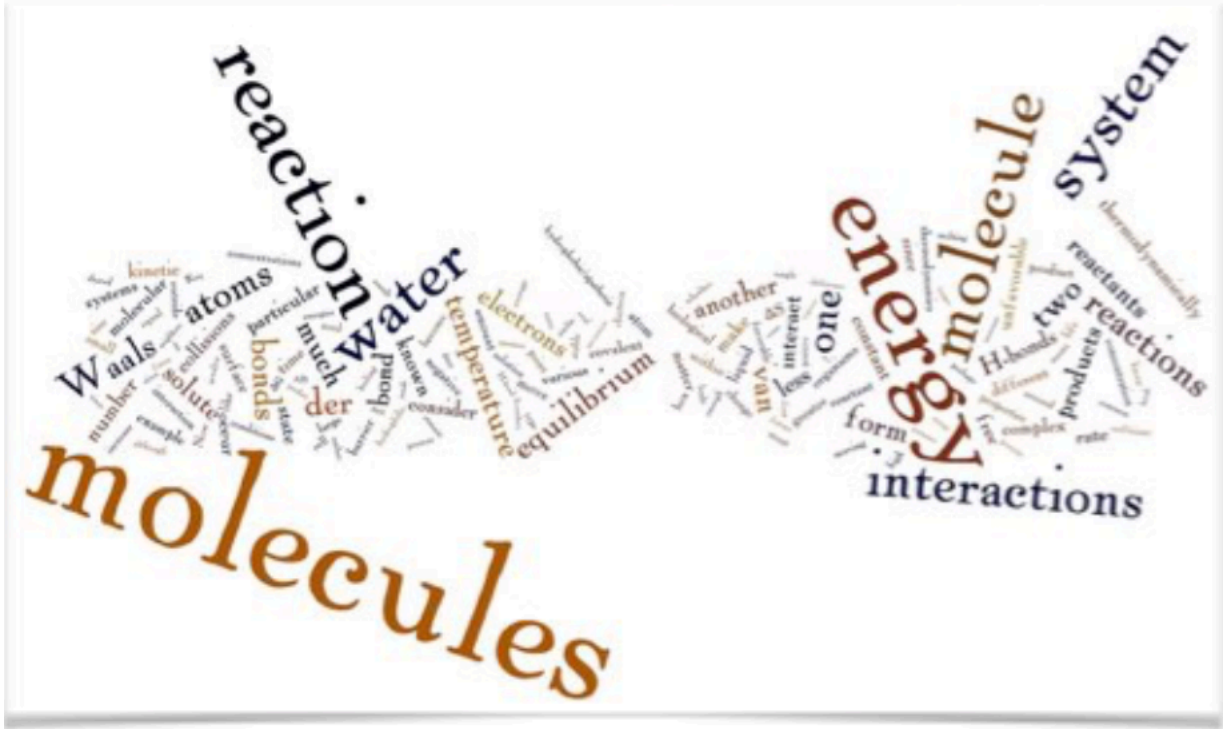
6.4 read pages 144-150 first

In this image of a bacterium, the cell wall is pink; draw the plasma membrane and indicate)(with an arrow) how it will be effected if the bacteria is placed in high salt solution. what happens to the cell (explain your logic)?



Draw | Erase | Reset

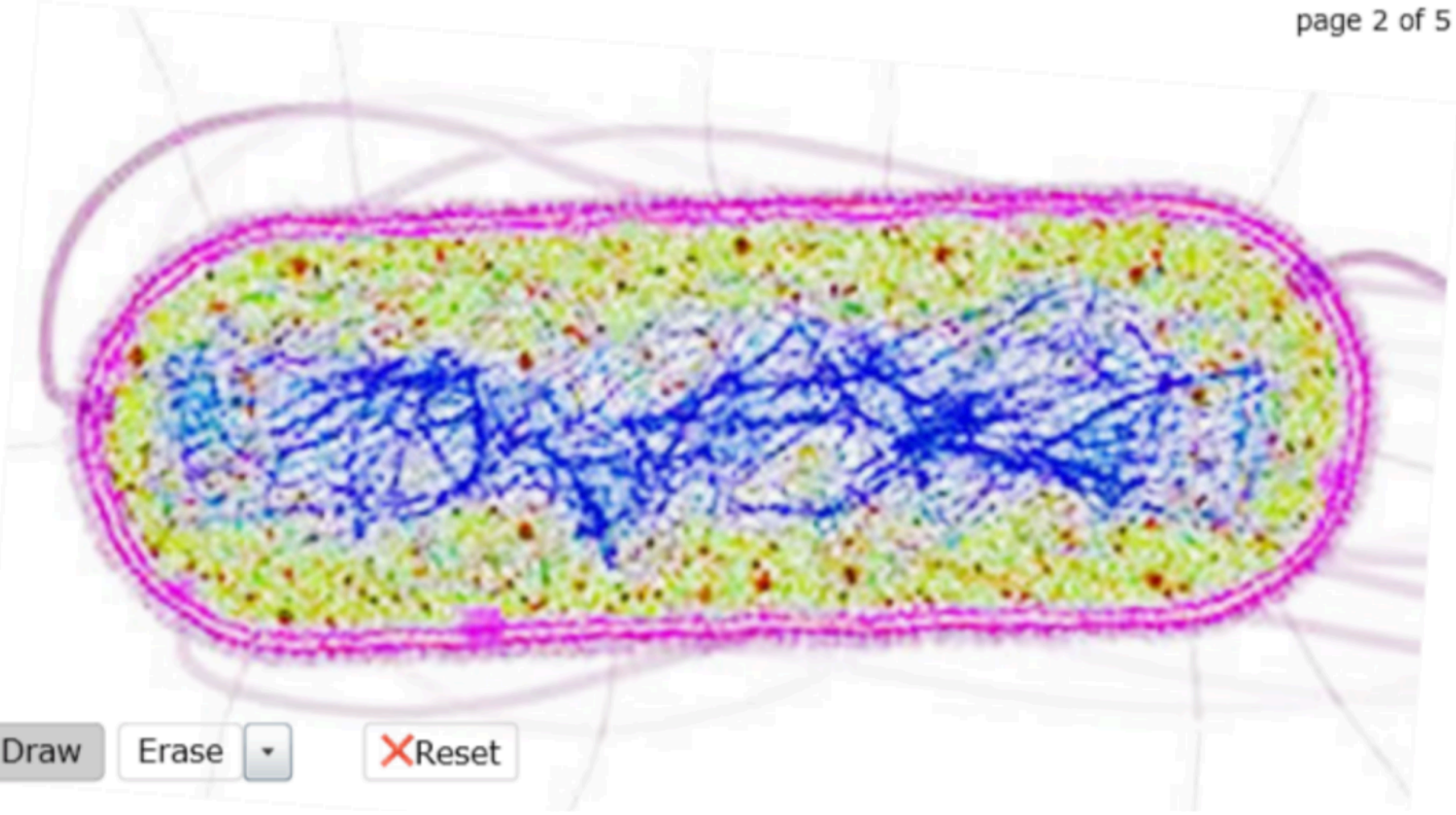
start here (finish) + review



course web site

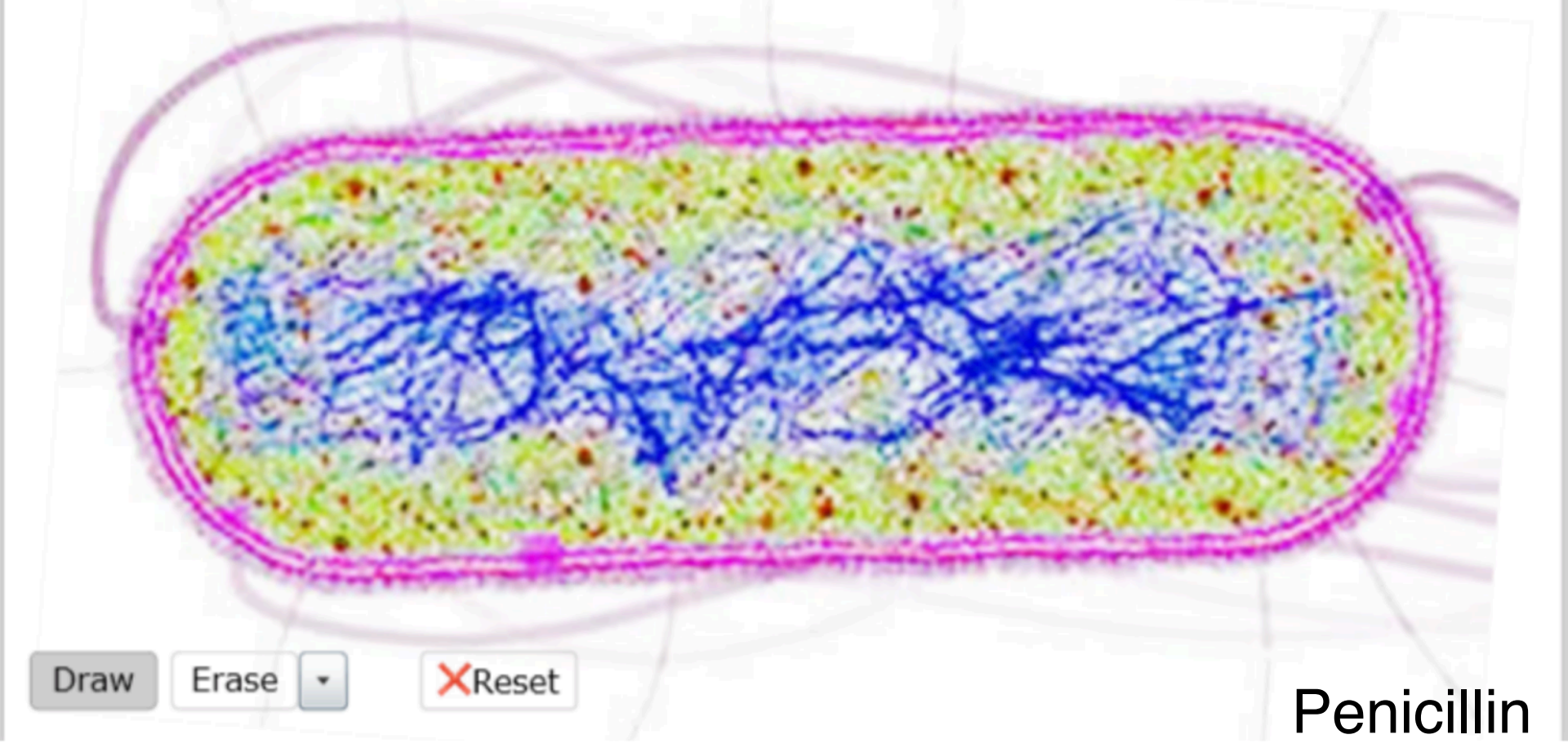
Now, what do you expect to happen if the bacterium is placed in pure water?

Is there a [water] gradient across the membrane?
Which way is the net flux of water?



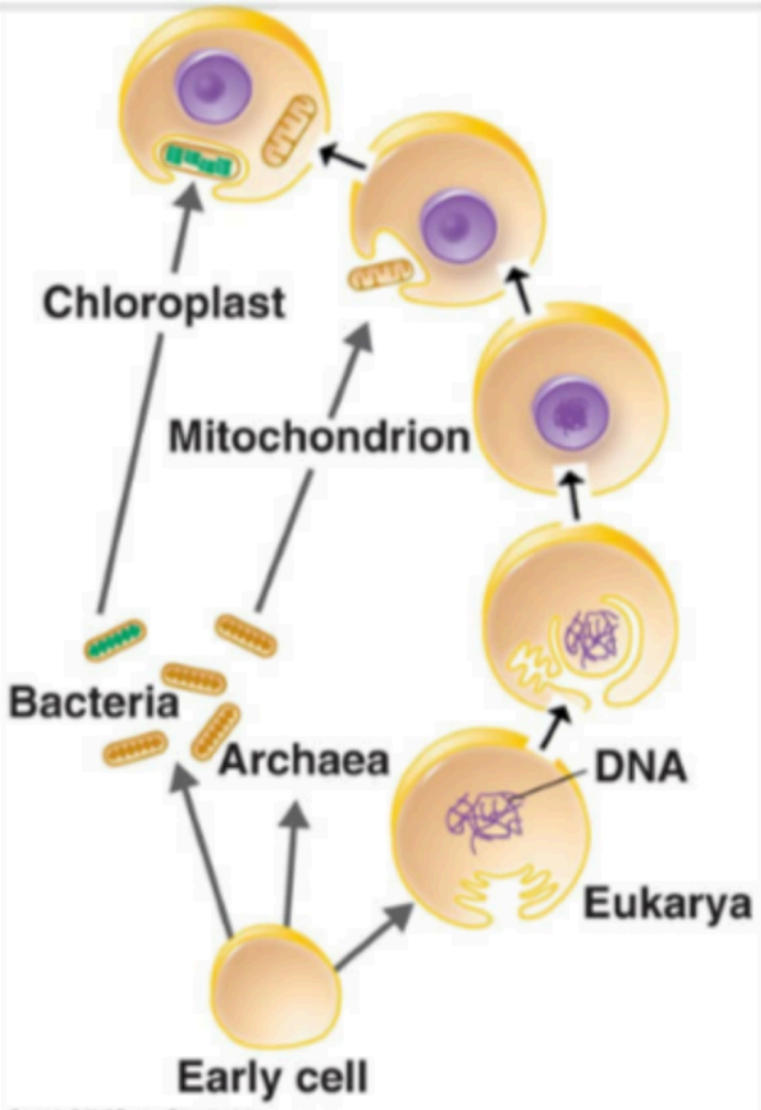
Draw Erase Reset

What will happen if the cell wall is removed or damaged?



Penicillin

Indicate when during evolution the ancestral eukaryote (1) lost its cell wall and (2) became able to eat other organisms.



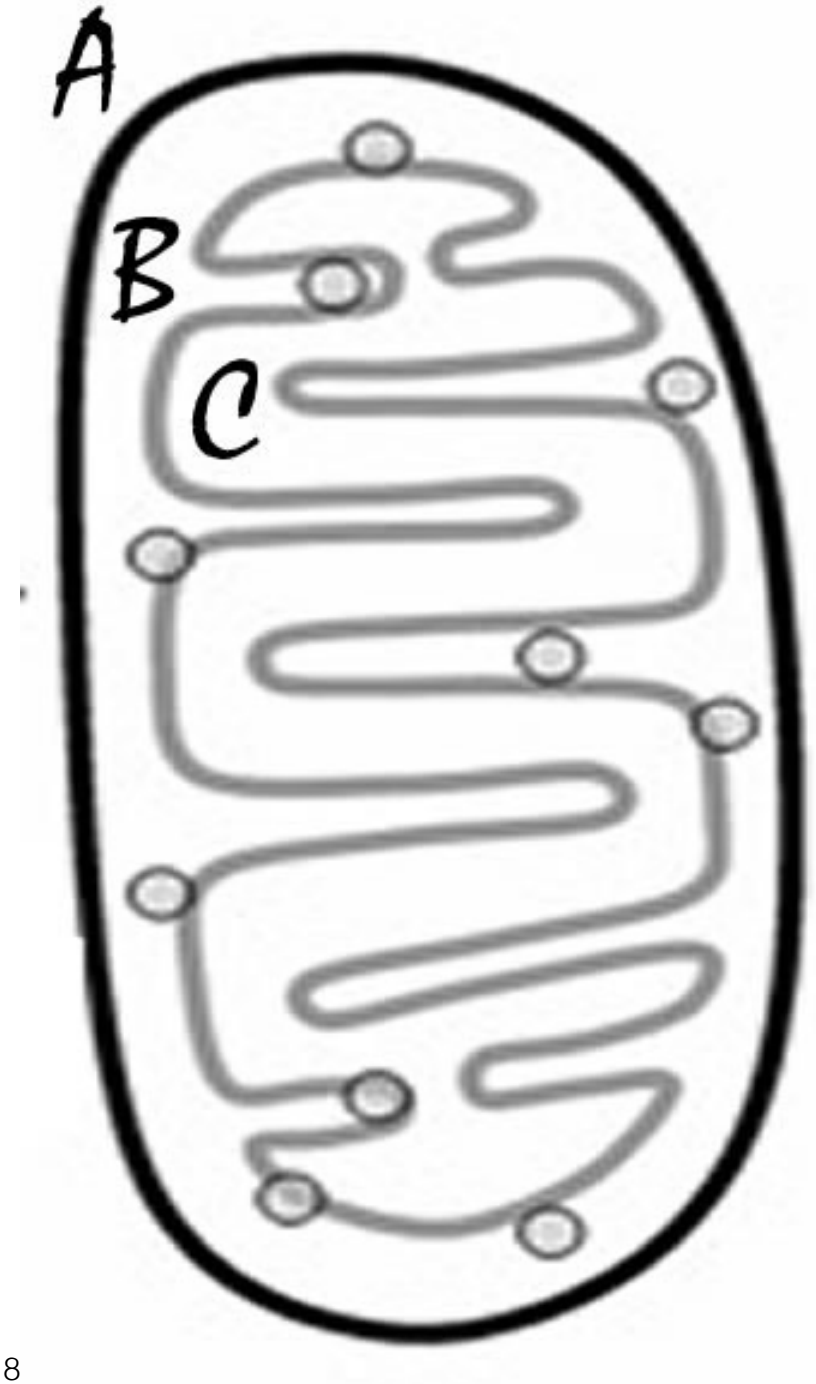
Draw | Erase | Reset

Are the cell walls of bacteria and plants and fungi (eukaryotes) homologous or analygous structures (evolutionarily). What is your answer based on (explain your logic)

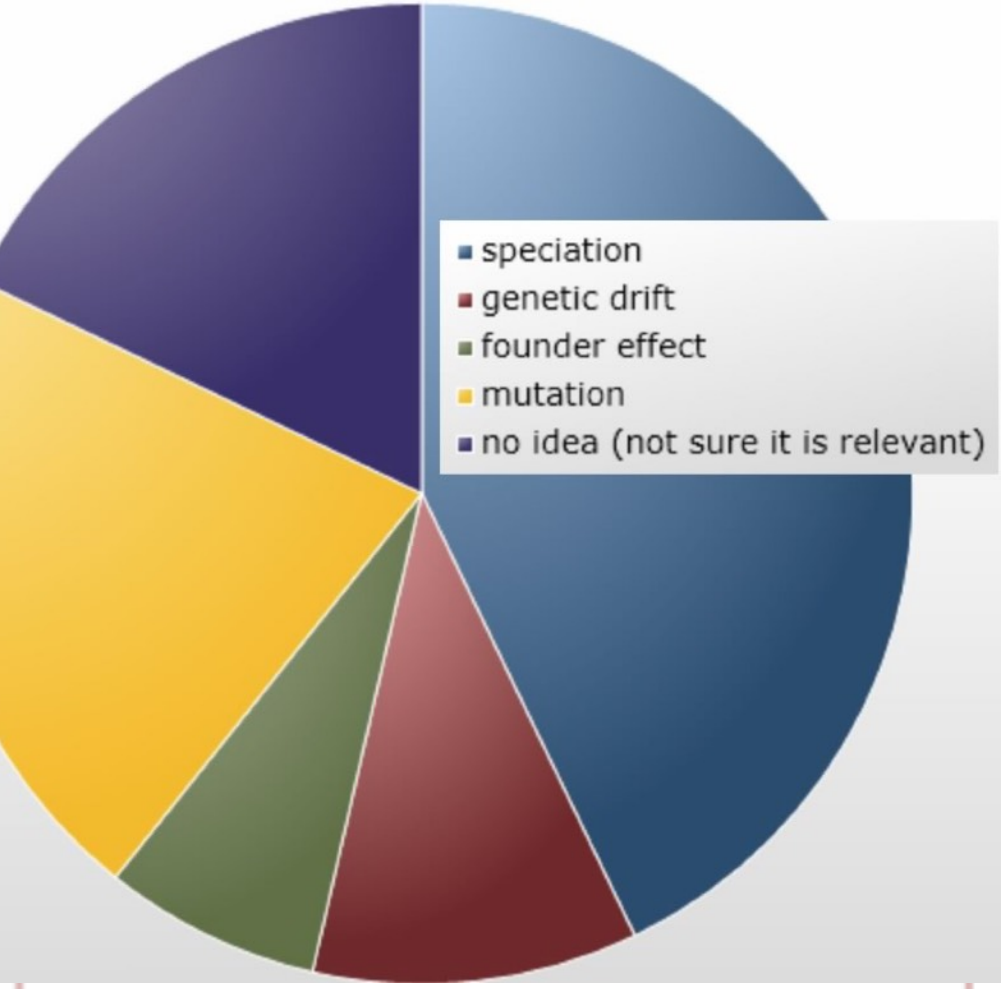
which membrane is derived from the host (eukaryotic) cell?

which membrane is derived from the bacterial cell?

Where is ATP synthesized?



What kinds of evidence leads us to think that the mitochondria of eukaryotic cells and the chloroplasts of plants are derived from sequential endosymbiotic events with aerobic and photosynthetic bacteria, respectively?

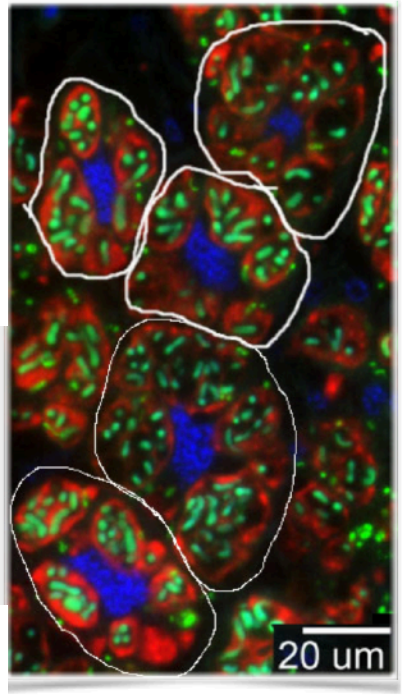


What type of evolutionary event would this endosymbiotic event be considered most analogous to? explain the logic of you answer

- speciation
- genetic drift
- founder effect
- mutation
- no idea (not sure it is relevant)
- completely unsure

Under what conditions could a cell lose its cell wall and survive? is it analogous to the vitamin C dependence of primates or completely different?

human cells.[256] In some cases, even these parasites can have parasites. Consider the mealybug *Planococcus citri*, a multicellular eukaryote; this organism contains cells known as bacteriocytes (outlined in white →). Within these cells are *Tremblaya princeps* type β-proteobacteria (red). Surprisingly, within these Tremblaya live *Moranella endobia*-type γ-proteobacteria (green).[257]



Review session: Friday 5-7PM in the Learning Lounge!!!!

practice exam link

Monday 23 Oct.	**second midterm exam**	exam answers