

Lesson

Leaf Structure

Practice Questions

1) Which process is directly used by autotrophs to store energy in glucose?

(1) diffusion

(2) respiration

(3) photosynthesis

(4) active transport

Practice Questions

2) What does the process of photosynthesis produce?

- 1) starch, which is metabolized into less complex molecules by dehydration synthesis**
- 2) protein, which is metabolized into less complex molecules by dehydration synthesis**
- 3) glycerol, which is metabolized into more complex carbohydrates by dehydration synthesis**
- 4) glucose, which is metabolized into more complex carbohydrates by dehydration synthesis**

Practice Questions

3) Which process provides most of the oxygen found in Earth's atmosphere?

1) photosynthesis

2) aerobic respiration

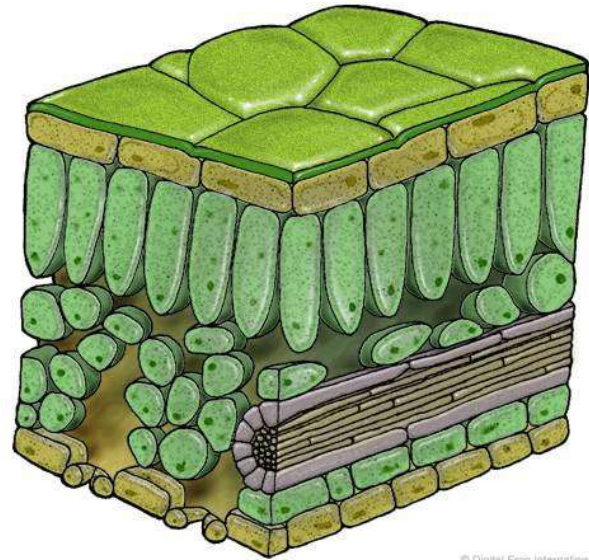
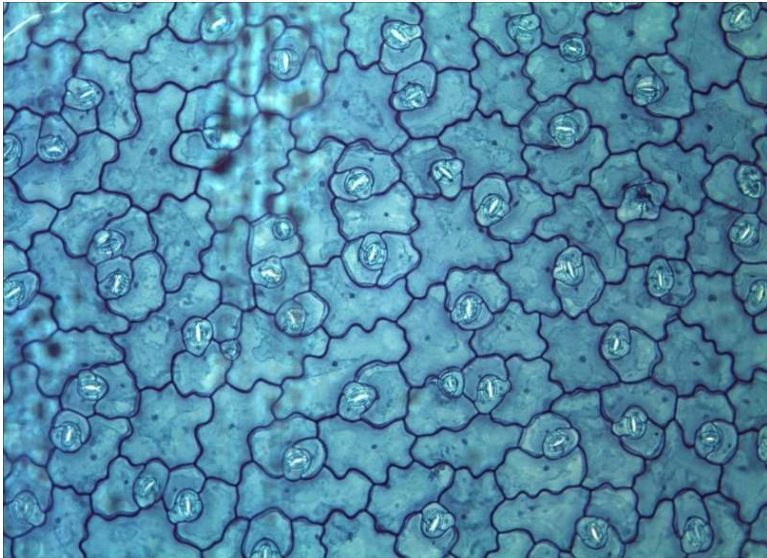
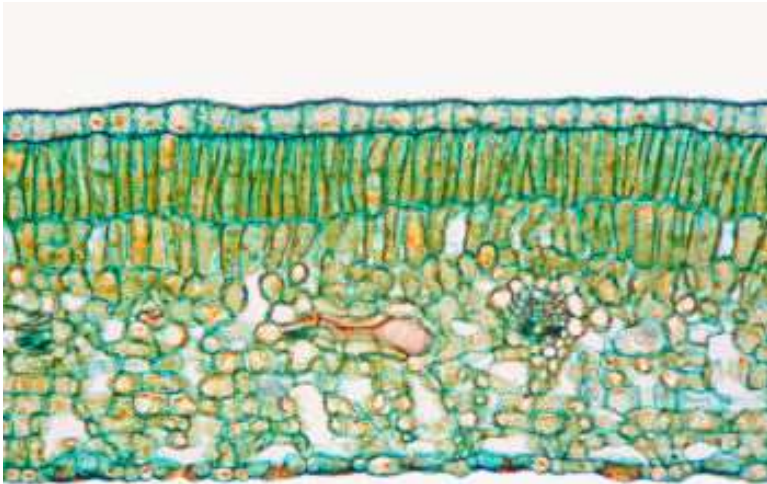
3) dehydration synthesis

4) fermentation

Design the INSIDE a Leaf!



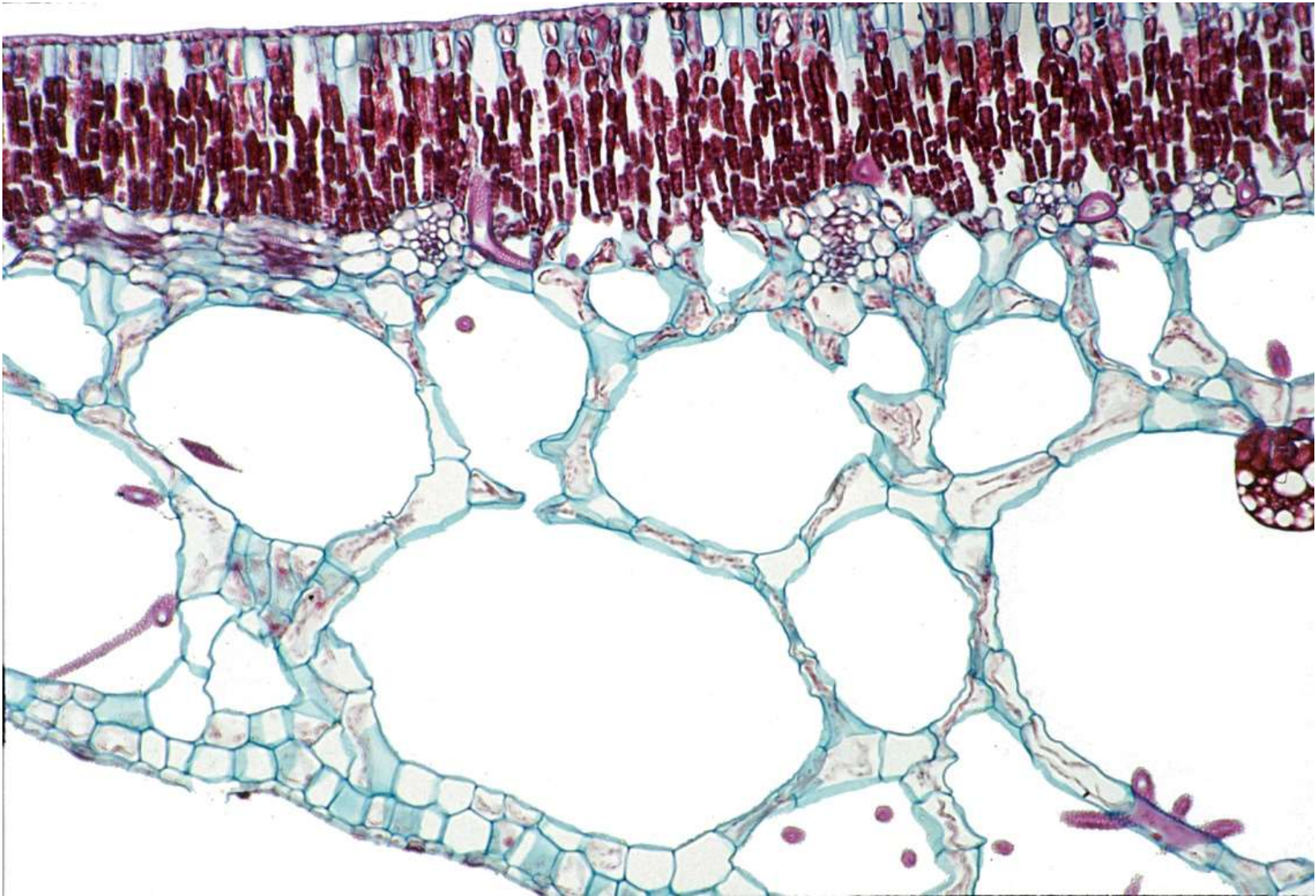
- What would be the best structure for a leaf to carry out its major function of **PHOTOSYNTHESIS**?
- Place the following in order from the top of the leaf to the bottom.
 - Layer of cells with the MOST chloroplasts
 - Spongy layer allowing gases to flow to the chloroplasts
 - Clear waxy waterproof coating
 - Layer of cells that includes holes for gases to enter or exit the leaf
 - Layer with veins to carry glucose and water to and from the leaf to other parts of the plant



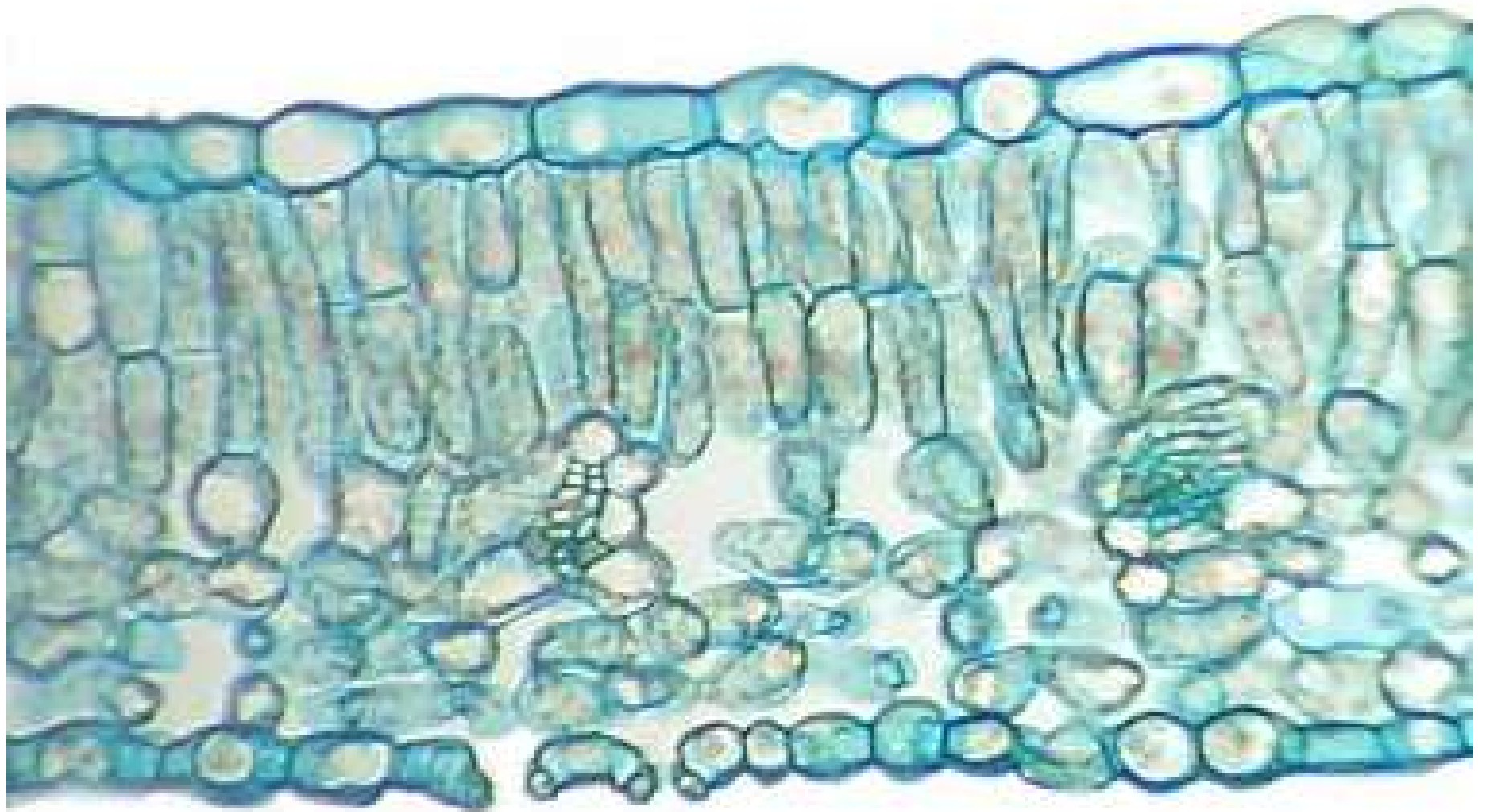
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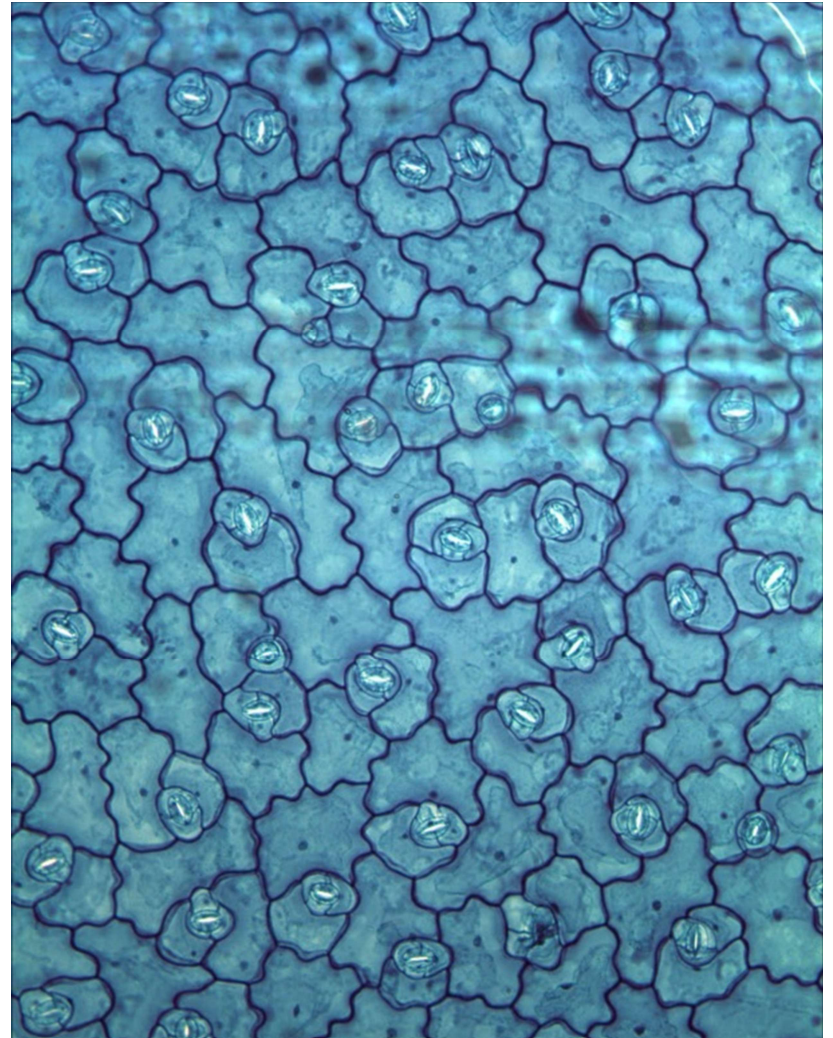
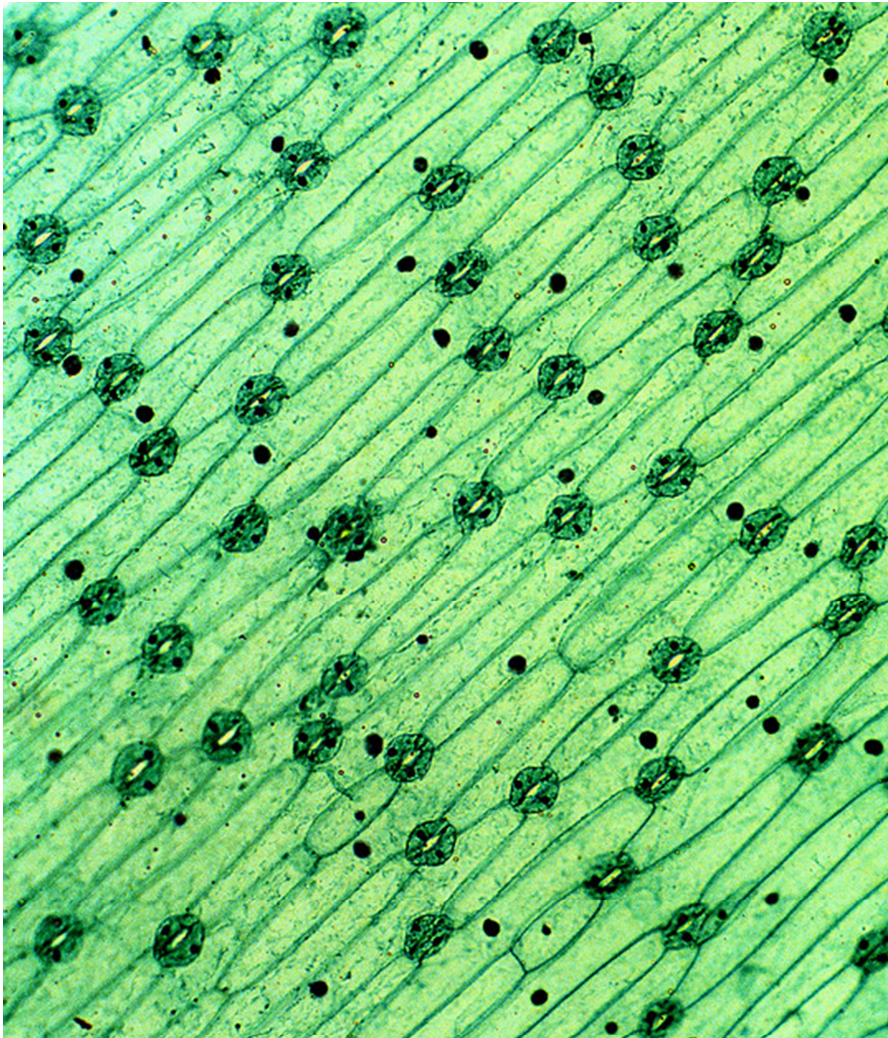
LEAF cross
section
(Water Lily)



Leaf cross section under a microscope



Leaf Epidermis with Guard Cells & Stomata



Guard cells and stomate



Parts of a Leaf

1. Upper Epidermis: **Outer layer, only 1 cell thick, allows light to enter**
2. Cuticle: **Waxy, protective clear waterproof covering**
3. Palisade Mesophyll: **Tightly packed cells, close to top of leaf, MOST photosynthesis occurs here**
4. Chloroplast: **Sites of photosynthesis in leaf cells (contain pigment chlorophyll)**
5. Xylem: **Vascular (vein) tissue that carries water up from roots to leaves**
6. Phloem: **Vascular tissue that carries glucose from leaf to rest of plant**

Control (REGULATE) the opening and closing of stomata

7. Guard Cell:



8. Stomates: **Holes on bottom of leaf, allow gas exchange and excess water loss**



Guard cells help maintain HOMEOSTASIS

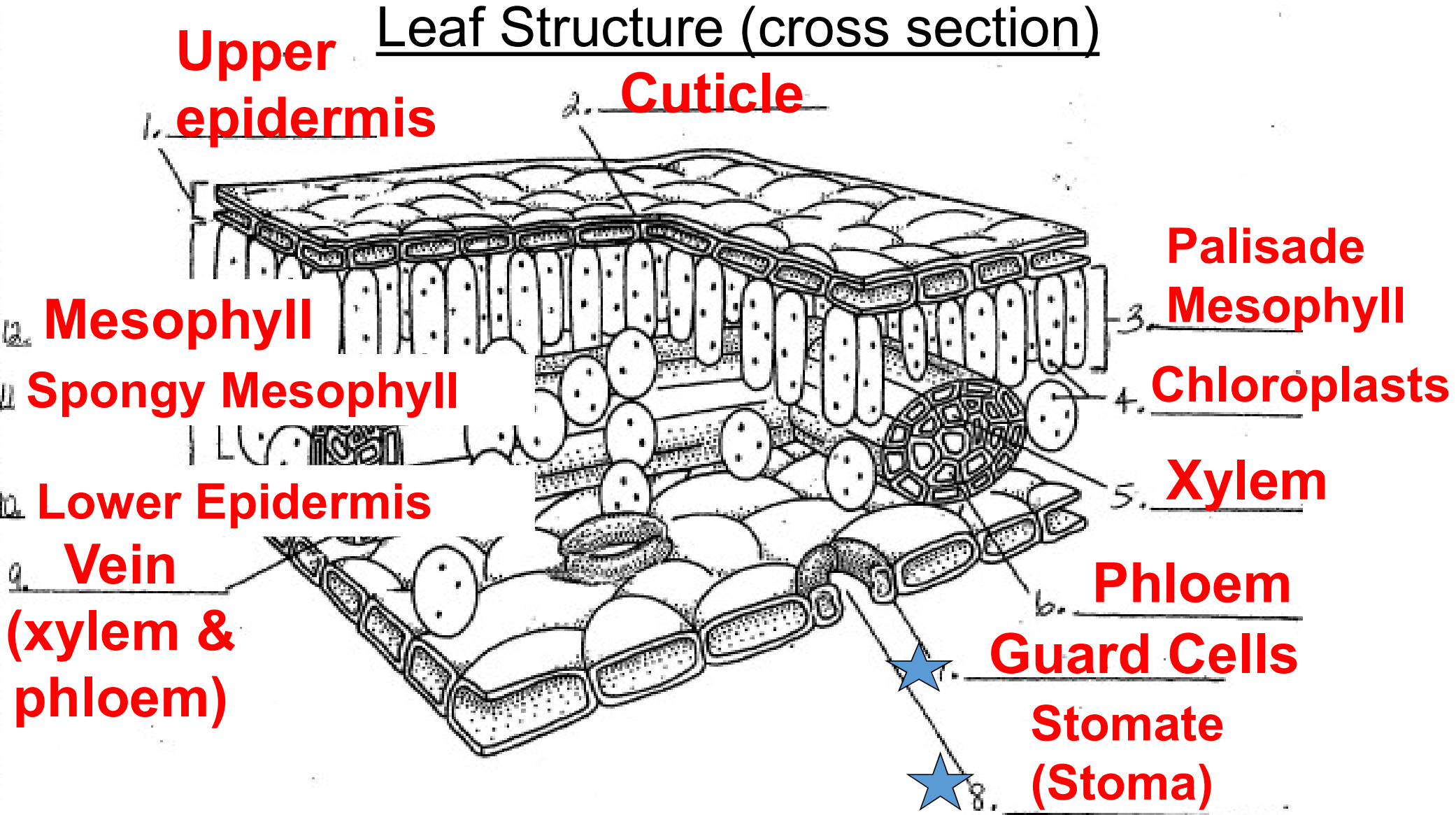
9. Vein: **TRANSPORTS water and glucose through plant**

10. Lower epidermis: **Bottom layer, contains guard cells & stomates**

11. Spongy Mesophyll: **Contains air spaces that allow gases to circulate (O_2 & CO_2)**

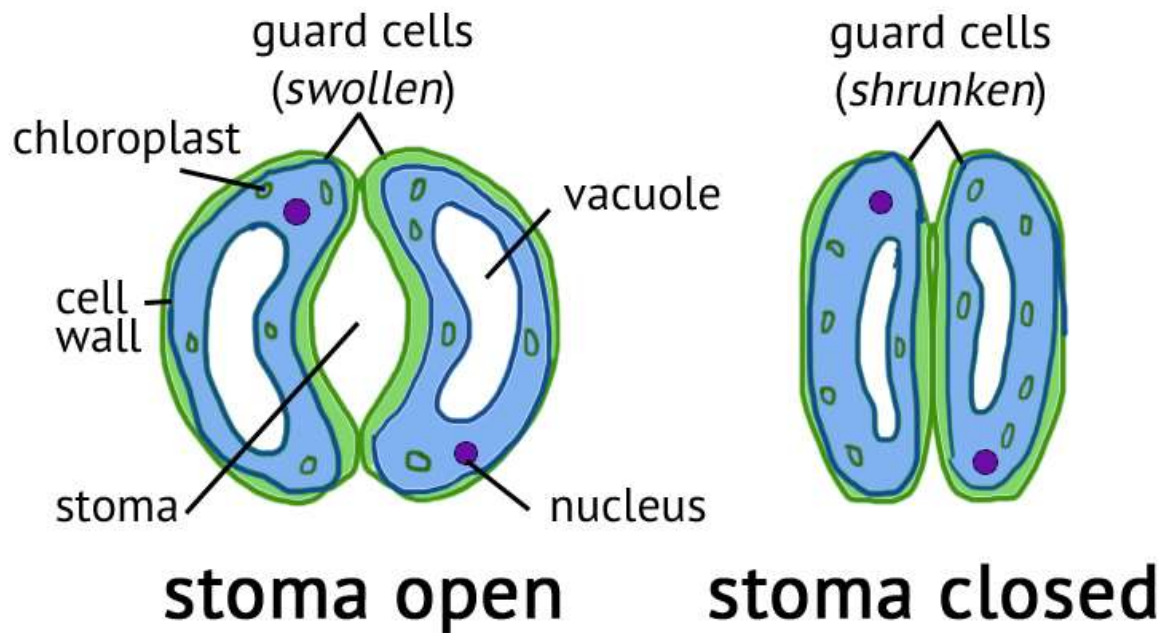
12. Mesophyll: **2 middle layers of leaf (palisade and spongy)**

Leaf Structure (cross section)

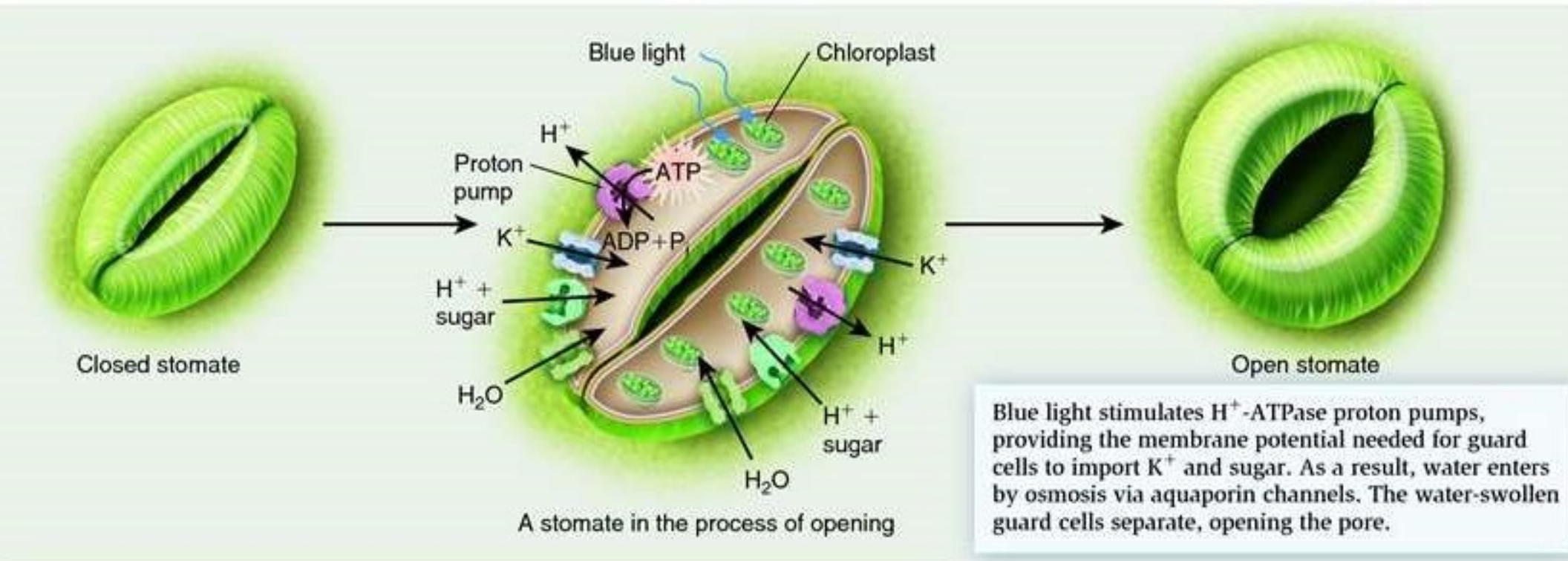


★ Guard Cells

- Paired cells that regulate opening/closing of stomates
 - Let gasses (oxygen & carbon dioxide) in and out and excess water out (transpiration)
 - Close on hot, dry days to reduce water loss

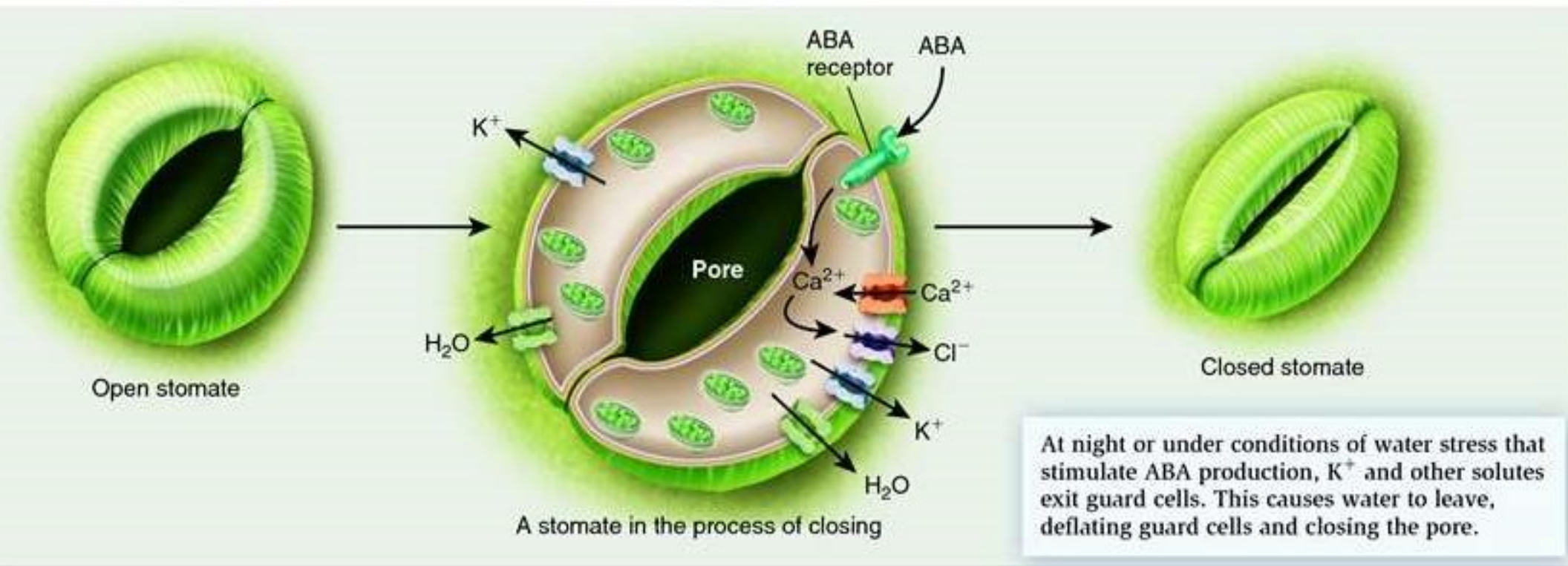


How a stomate opens...



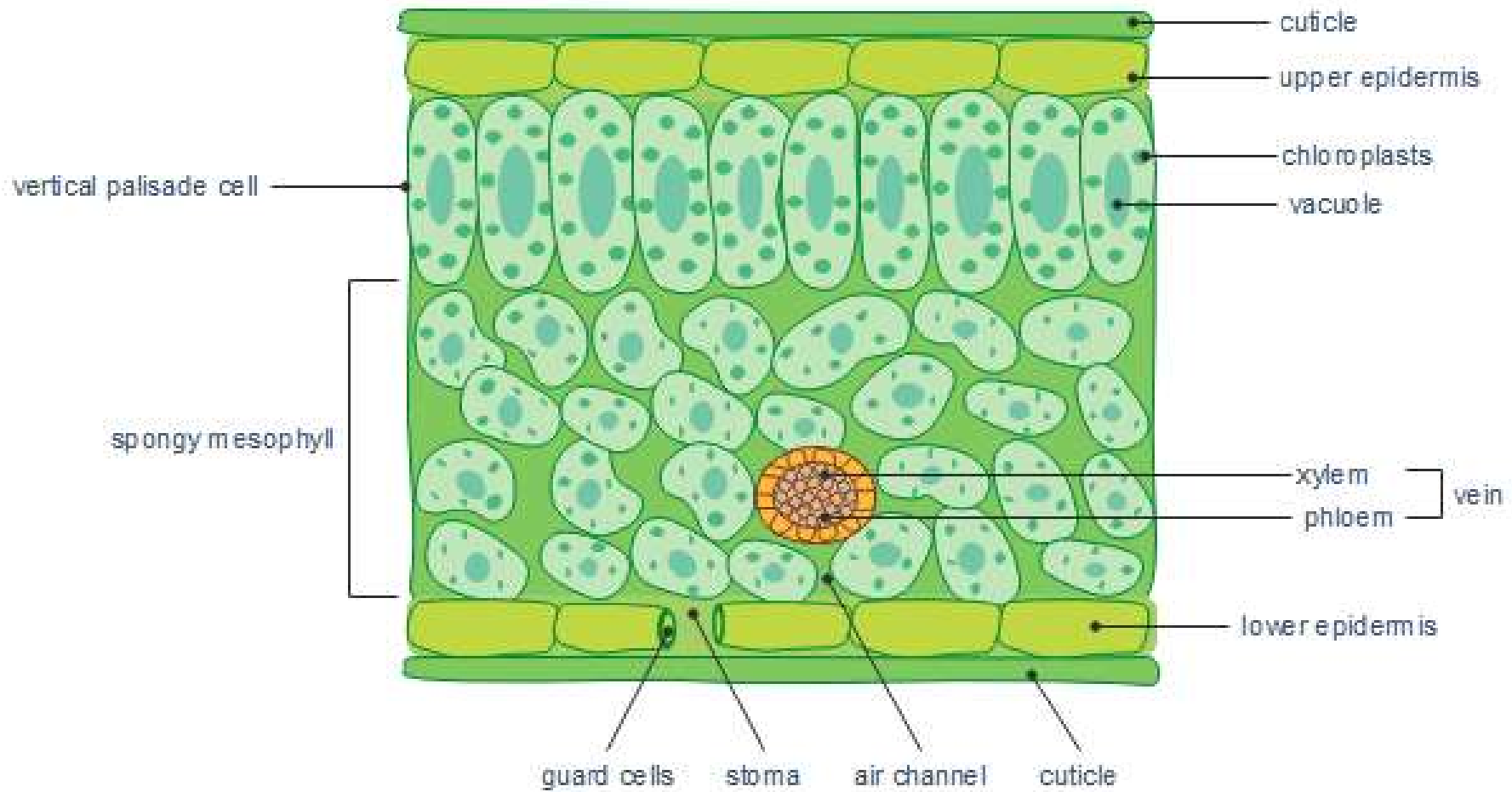
a) The process of stomate opening

How a stomate closes...

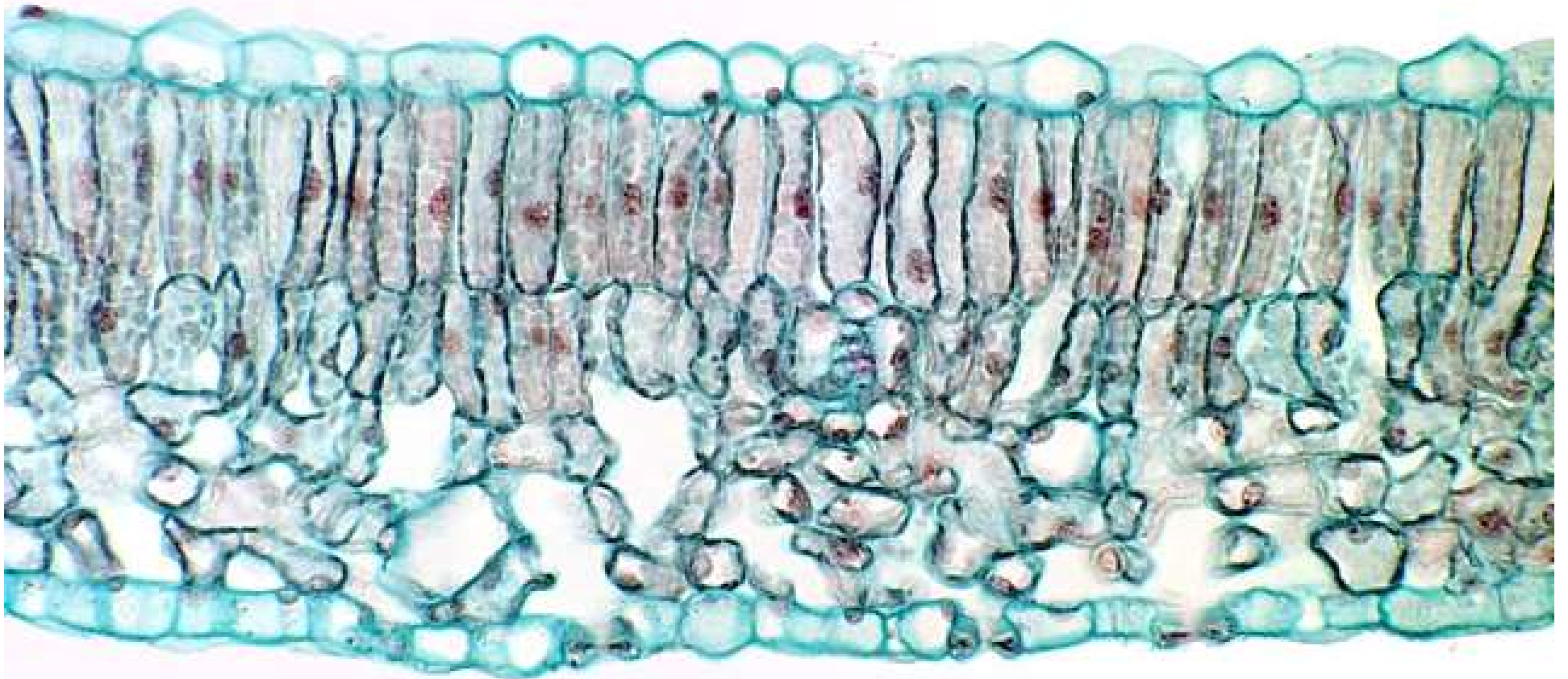


The process of stomate closing

CROSS SECTION OF A LEAF



Leaf cross section under a microscope



Summary

- Transport, Nutrition, Regulation and Respiration are 4 of the life functions carried out by all living things! How does the leaf carry these out in plants?
- In Greek, “stomata” means “mouth”...why do you think the holes in the bottom of the leaf are called *stomates*?

Color code the different layers of the leaf cross section

