# ABSCISIC ACID - STOMATAL CLOSURE

- ABA = stress hormone ∴ secreted ↓Ψ (dry, ↑t°) & released in ↓ light intensities
  + salty
- rapid response

Guard cells - inner wall > thick ← turgid = open (bend)
flaccid = closed

## Stomatal Closure process

- ADA attatch receptor p·memb guard cells
- ↳ ↑ $[Ca^{2+}]$ cyt (stim mov $Ca^{2+}$ cell cyt)
  ↳ $K^+$ ch open - as $Ca^{2+}$ 2nd mess
  ↳ inhib proton pumps
  ∴ ↑ +ve charge build up IN cells
- $Ca^{2+}$ acts 2nd mess ∴ Δ perm guard c·memb via activ. memb ch prot
- $K^+$ diff OUT cell ∴ ↑Ψ
- ↓Ψ out ∴ $H_2O$ $\xrightarrow{osm}$ OUT, ↓vol g·c
- lose turgor ⇝ flaccid ∴ stomatal pore closes

↑ABA - inhib prot· pumps
↓
+ve build up
↓
$K^+$ diff out
↓
$H_2O$ out osm ⇝ flaccid
∴ close

## Q: Describe role ABA in closure of stoma (8)

1. stress horm
2. plant secretes ABA : ↑t°, dry conds
3. ABA binds recept. - p·memb guard cells
4. inhib proton pump
5. ↑ +ve charge IN cell
6. $K^+$ diff OUT cell
7. ↑ Ψ cell
8. $H_2O$ $\xrightarrow{osm}$ OUT
9. ↓ vol guard cells ⇝ flaccid
10. v·fast response

## g·cells

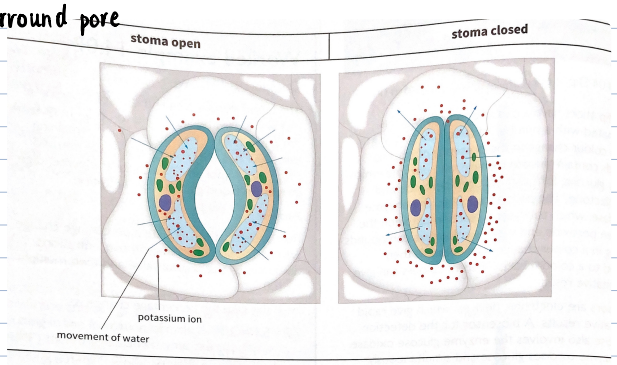
- sausage shaped
- joined only @ ends
- unevenly thickened walls
- vacuole

## STOMATA

- each stomata = 2 curved guard cells surround pore
- Δ curvature g·c Δ size pore
- open + close via turgor g·c

### 4 factors ⇝ close stomata :

- darkness
- ↓ humidity ∴ dry
- ↑t°
- water stress & ↑ rate transp"




- proton pumps actively transport $H^+$ ions out of guard cells
- this causes potassium channels to open and $K^+$ ions enter the guard cells
- the increase in the concentration of potassium ions in the guard cells lowers the water potential
- water enters the guard cells, by osmosis, increasing the turgor of the guard cells
- because of differences in the cell wall thickness, the guard cells become curved, opening the stomatal pore

When stomata close, these changes are essentially in the opposite direction; loss of water by the guard cells causes them to lose turgor.