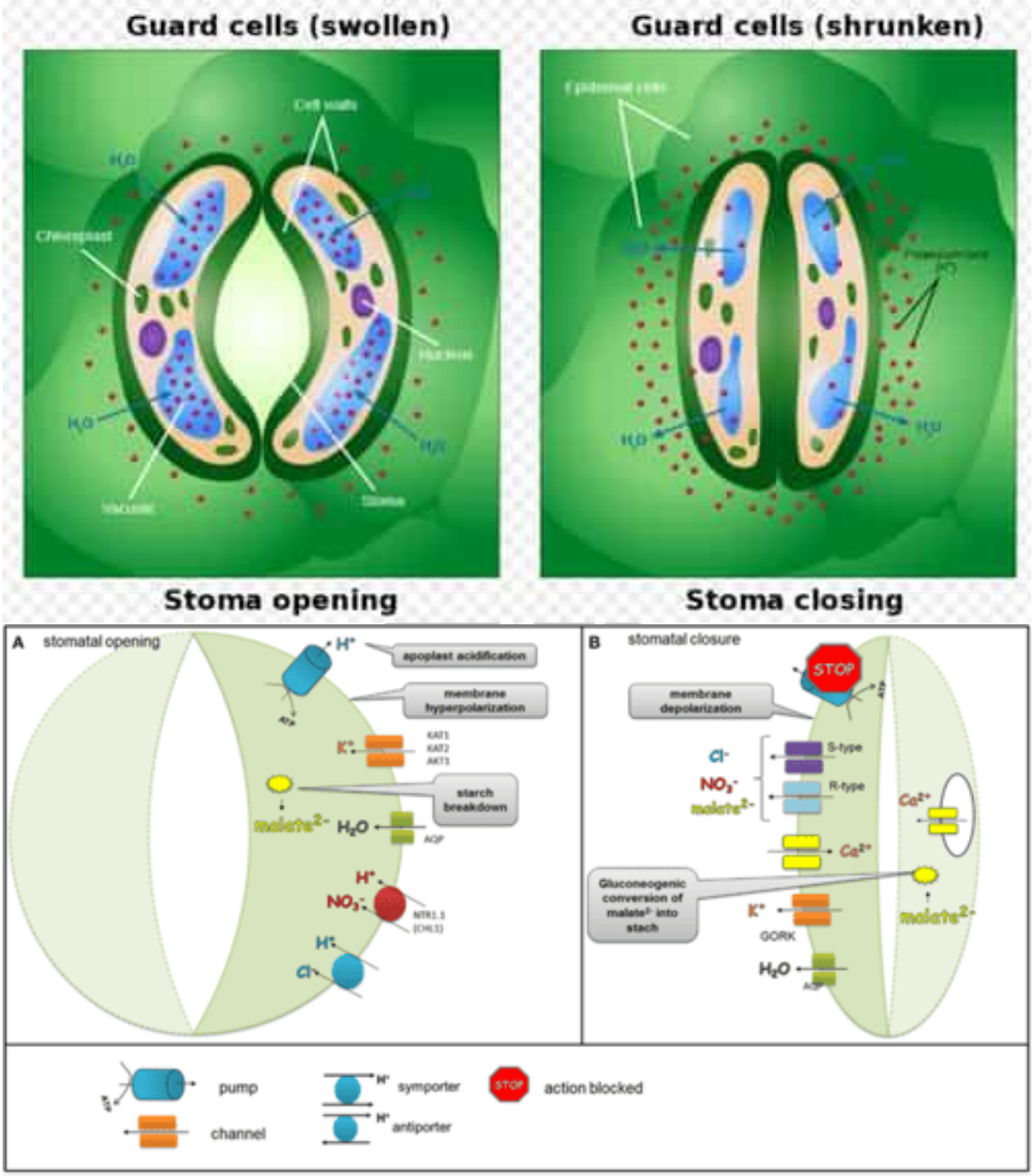
CSIR NET Life Science Unit 6

Stomatal Movement

Stomatal opening

- ***Day time: Light Present +Co2+Chloroplast +water= result in Photosynthesis*** (Glucose Production). Glucose converted into sucrose and Starch as per the requirement, Transfer in form of Sucrose and Stores in form of Starch.
- In the Guard Cells, ***Starch is converted into malic acid in presence of light (day Time)***. So, Decrease in Starch contents of guard cells due to conversion. ***As malic acid is a weak acid, so it dissociates into malate ions(proton).***
- Protons thus formed are used by the guard cells for the uptake of K+ ions (in exchange for protons). This is an active ionic exchange and requires ATP energy and Cytokinin.
- In this way, ***the concentration of K+ ions increase in guard cells***. At the same time, the concentration of H= ions decrease in Guard Cells.
- The ***PH in guard cells also increases simultaneously and becomes alkaline, there is also an increased uptake of Cl(anion) by the guard cells*** to maintain the electrical and ionic balance inside and outside the guard cells.
- The ***malate anions formed in Guard cells are neutralized by the K+ ions***. This results in formation of potassium malate.
- It is also observed that the co2 concentration of K+ ions malate and fucose increases, so this increases the osmolytes by decreasing water potential in guard cell.
- This causes endosmosis of water inside the guard cell, as water moves its higher concentration to its lower concentration.
- This results in ***high tumour pressure inside the guard cell, and stomata opens due to high pressure.***



STOMATAL CLOSING

- ***Absence of light. No Photosynthesis decreased concentration of malic acid in guard cells.***
- ***Efflux of K+ ions from guard cells. Influx of H+ ions in guard cells.***
- ***Presence of ABA (abscisic acid) favours closing of stomata by blocking uptake of K+ by guard cells in dark***. It also prevents efflux of H+ ions from guard cells. ABA and CO2, together help in lowering the PH in guard cells and making the medium acidic. ABA Change the diffusion and permeability of guard cell. This helps in closing of Stomata.
- ***Increase CO2 concentration in and around guard cell due to release of CO2 in respiration Combined with the absence of photosynthetic activity in dark.***

- Loss of turgidity of guard cell as water exit the guard cell due to high potential of water and low potential of solute inside guard cell.
- Finally***, <u>Stomata Closing.</u>***