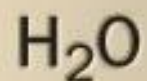


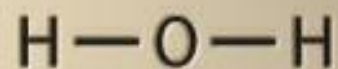
- **Panas spesifik :**
- Kalori yang diperlukan untuk meningkatkan suhu 1 gram air 1 derajat Celcius
- **Panas laten :**
- Energi yang dilepas atau diserap dalam transformasi air dari satu keadaan ke keadaan lain.

- **Tegangan permukaan :**
- Film elastis pada permukaan yang disebabkan gaya tarik antar molekul-molekul pada permukaan cairan.
- **Viskositas :**
- Resistensi cairan untuk mengalir :
- Viskositas air termasuk tinggi

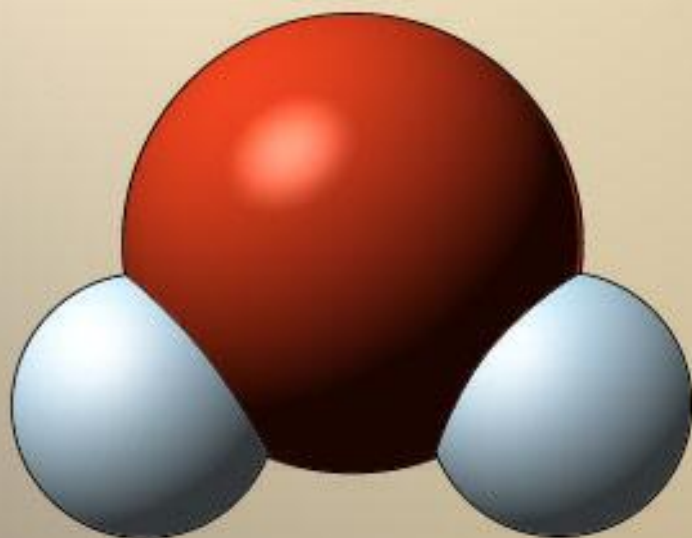
Molecular formula



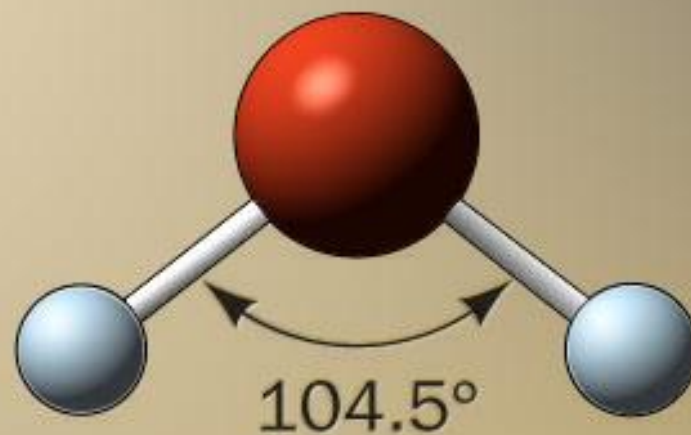
Structural formula



Molecular models



Space filling

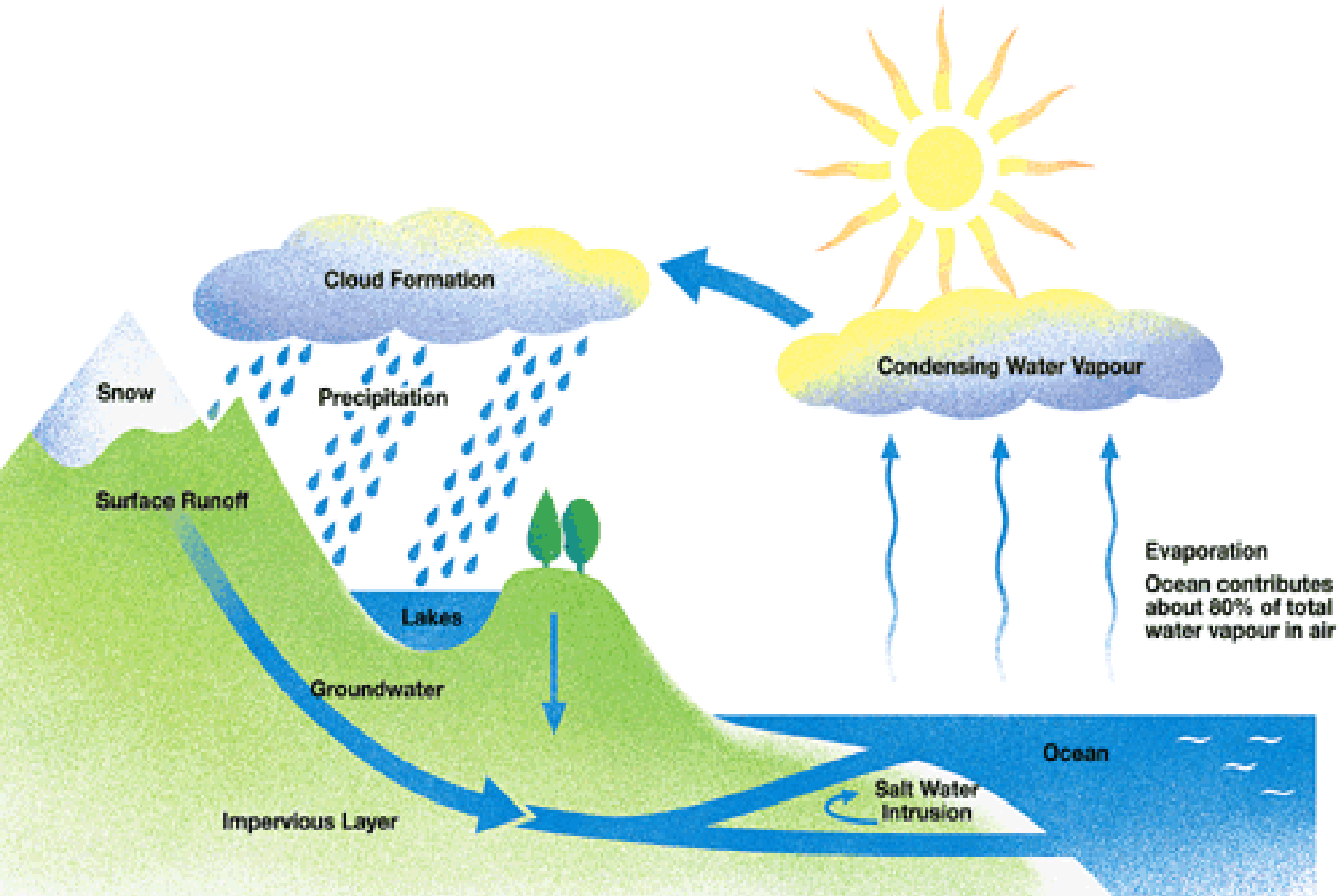


Ball-and-stick

WATER

SIKLUS AIR

- Air yang ada di bumi mengalami penguapan
- Uap air terkumpul menjadi awan
- Awan terus mengalami kondensasi
- Awan membesar



Adaptation

- Terhadap kekurangan air
- Terhadap kelebihan air

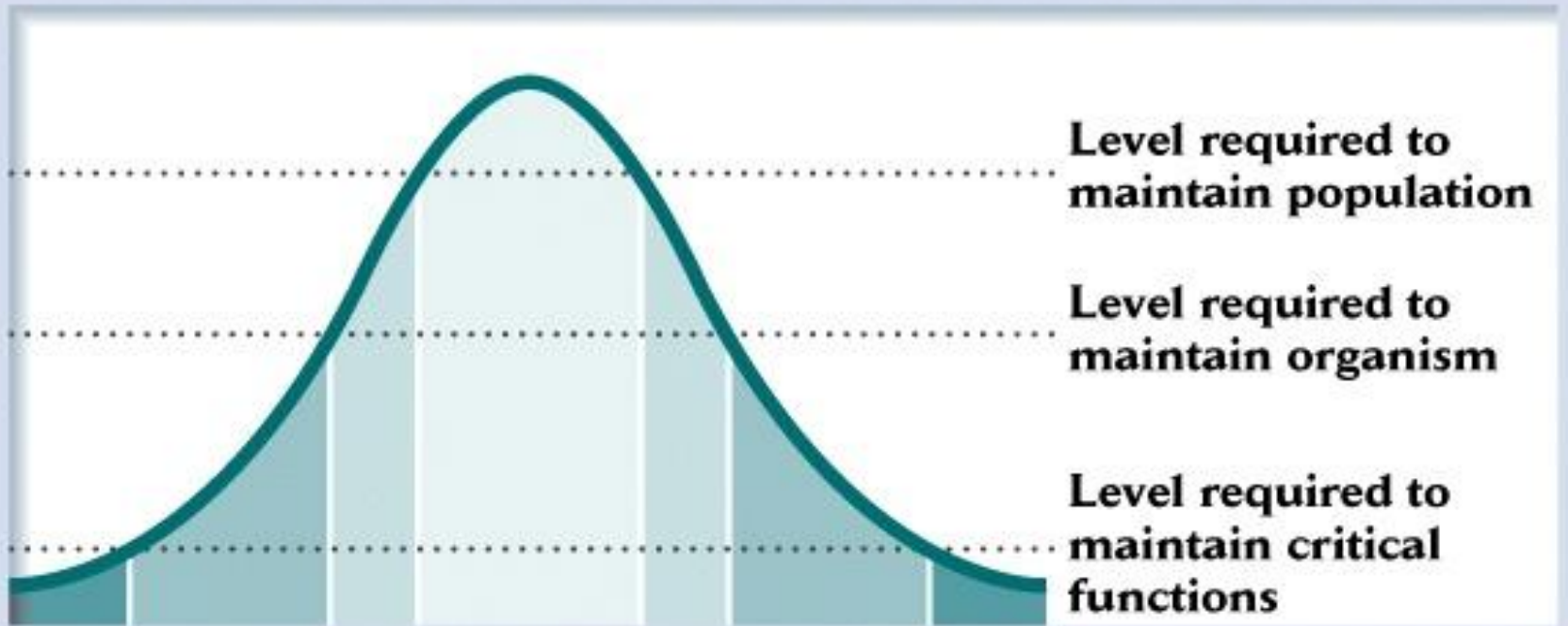
Biological activity

**Level required to
maintain population**

**Level required to
maintain organism**

**Level required to
maintain critical
functions**

Environmental condition

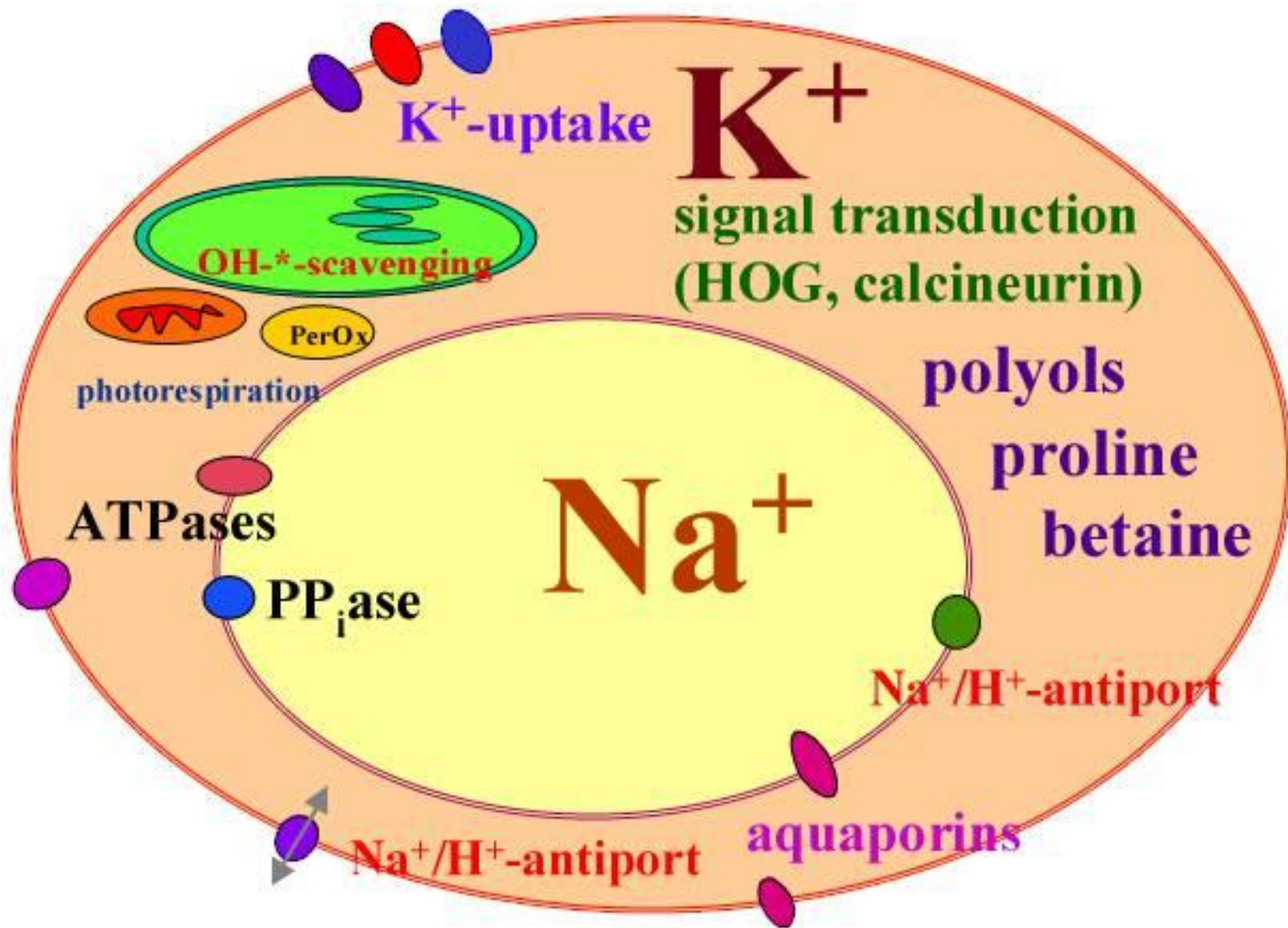


Adaptasi pada tumbuhan

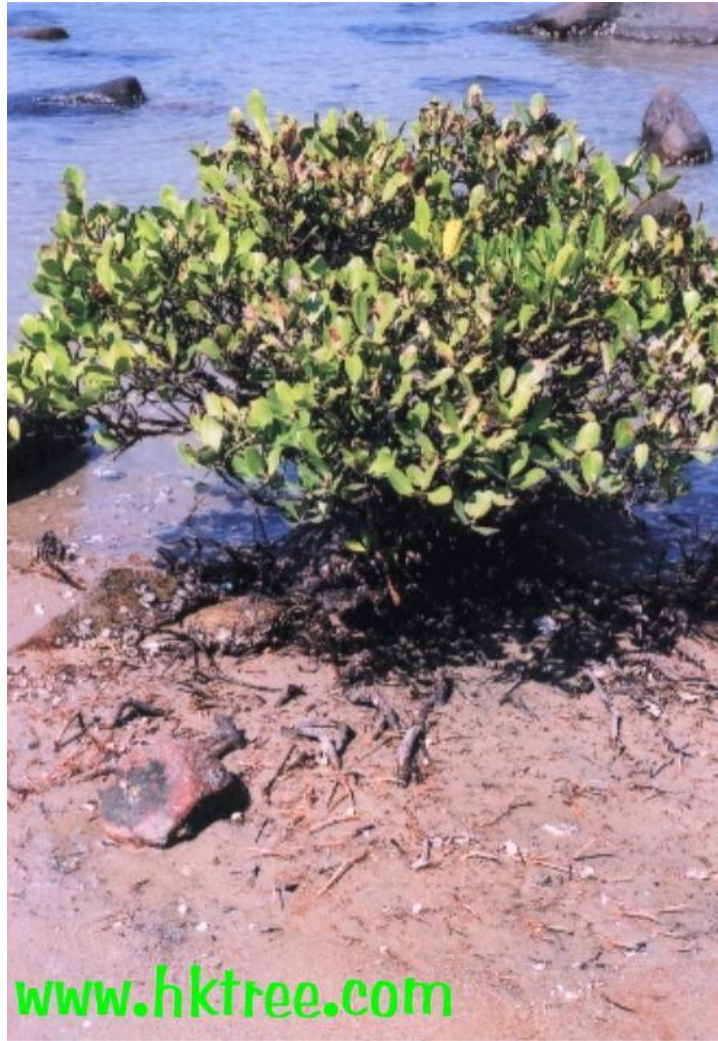
- Bagaimana tumbuhan menyesuaikan diri pada lingkungan yang kekurangan air ?
- Menutup stomata, ukuran stoma
- Daun menggulung, rambut, kutikula
- root-shoot ratio; siklus hidup
- Ukuran daun, orientasi daun, gugur daun
- Jaringan penyimpan air

Adaptasi pada kondisi saline

- Salt gland
- Pengguguran
- Osmotik
- Kutikula
- Sukulensi
- Filtrasi di akar







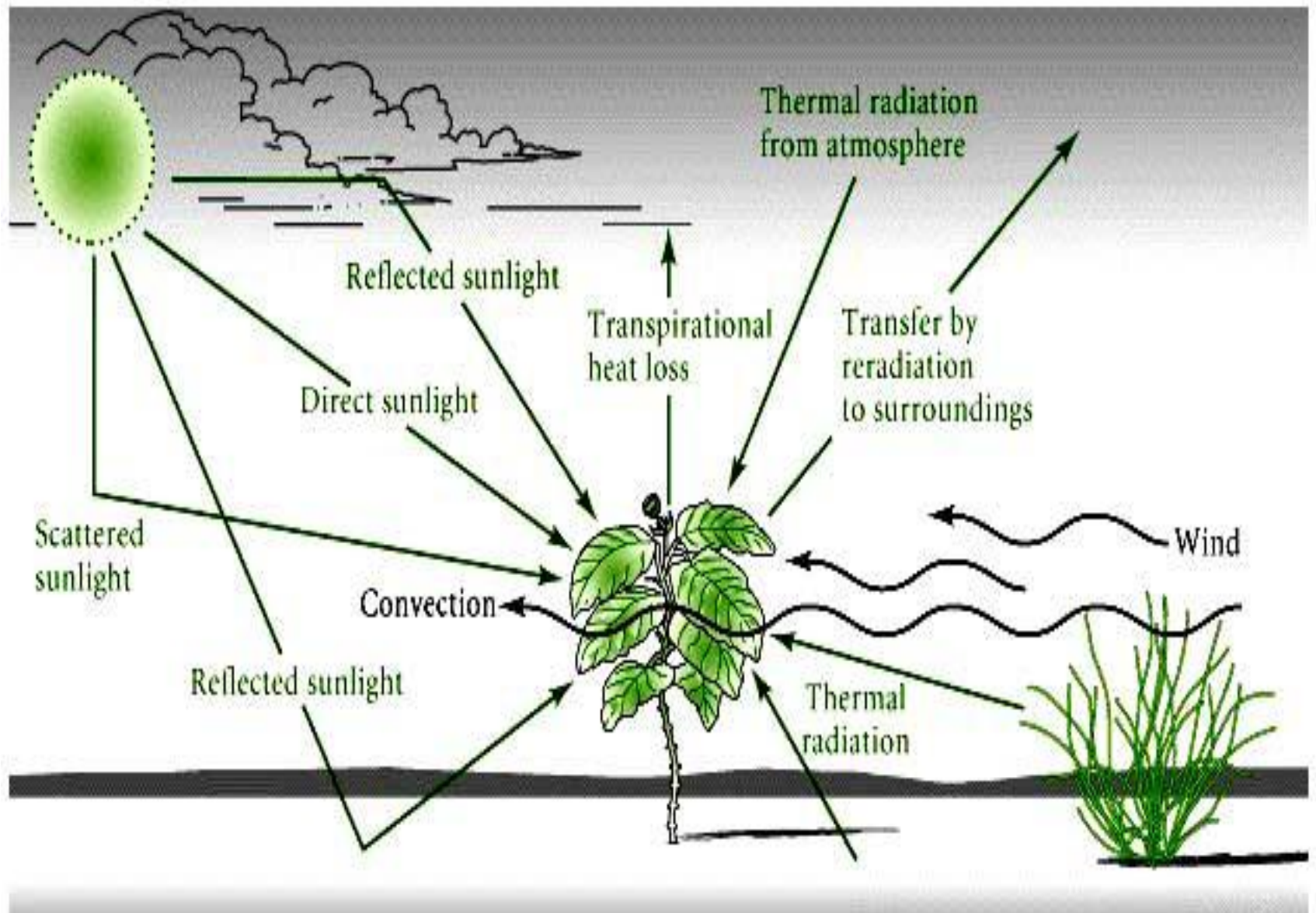
www.hktree.com

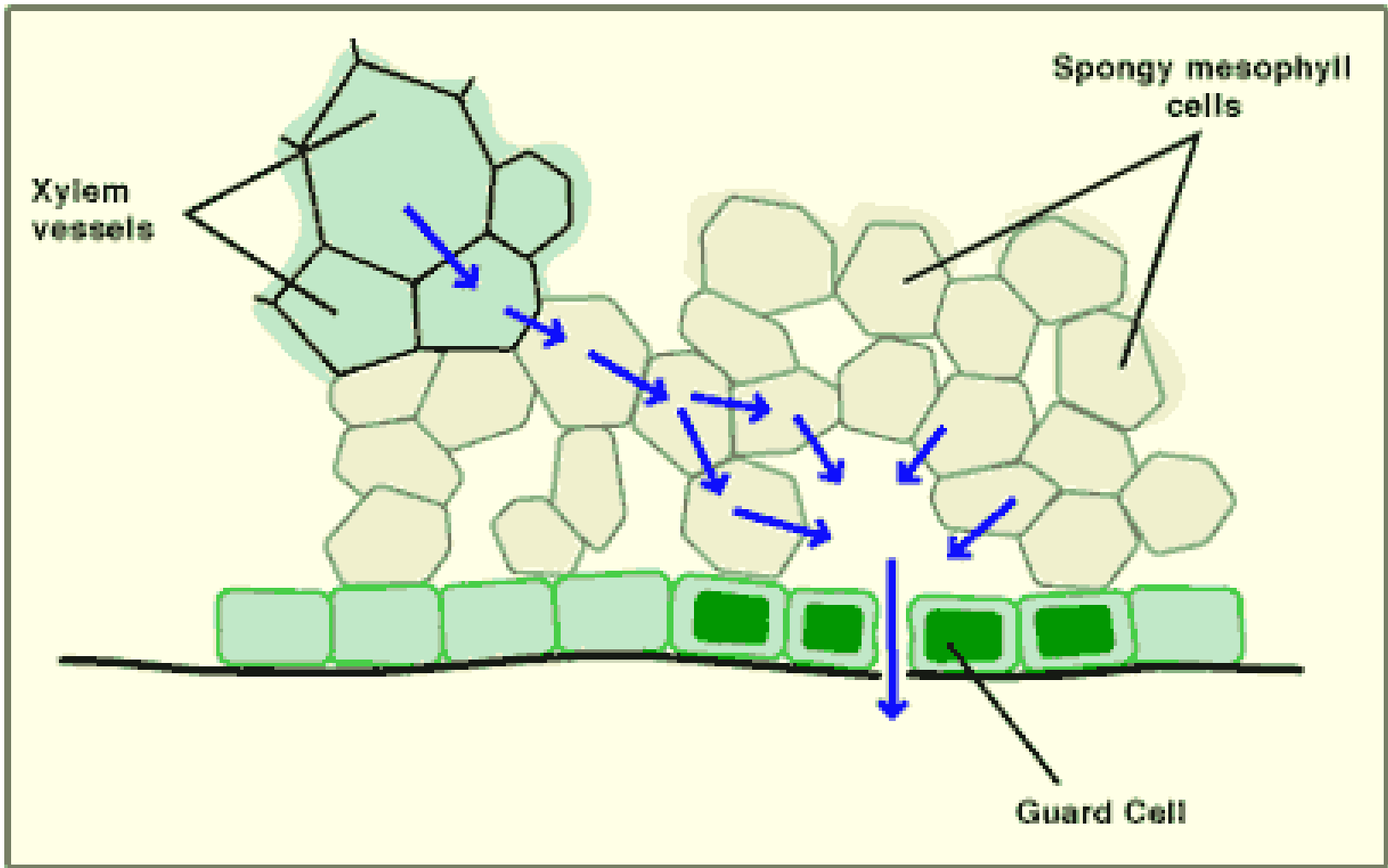




Hernandia peltata

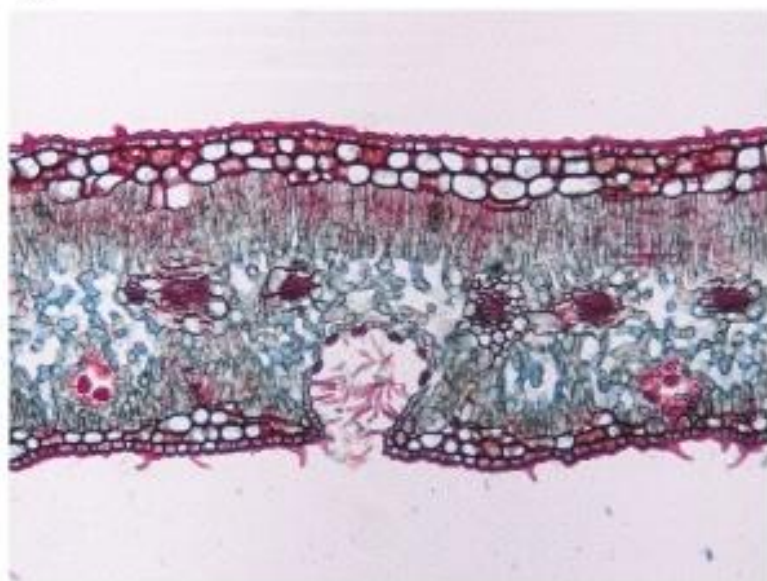




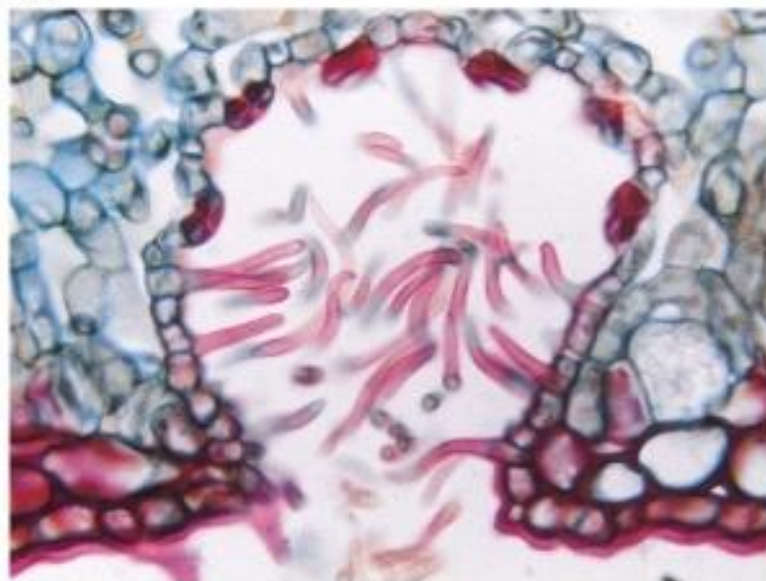




(a)



(b)



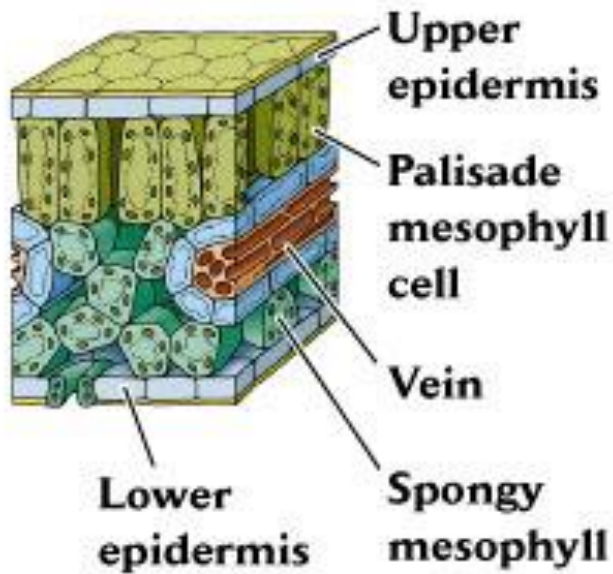




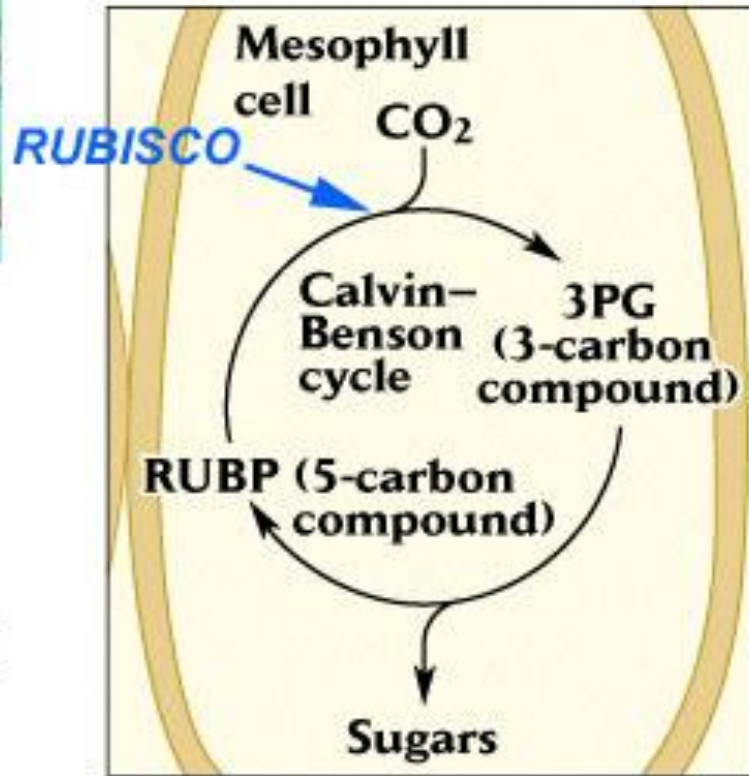
(a) C₃ PLANT



C₃ cell arrangement



C₃ photosynthesis

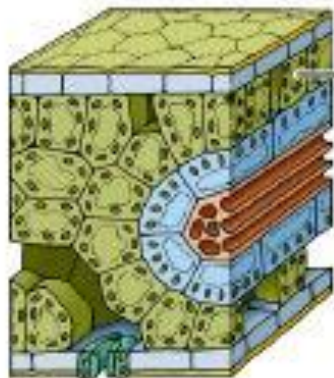


(b)

C₄ PLANT



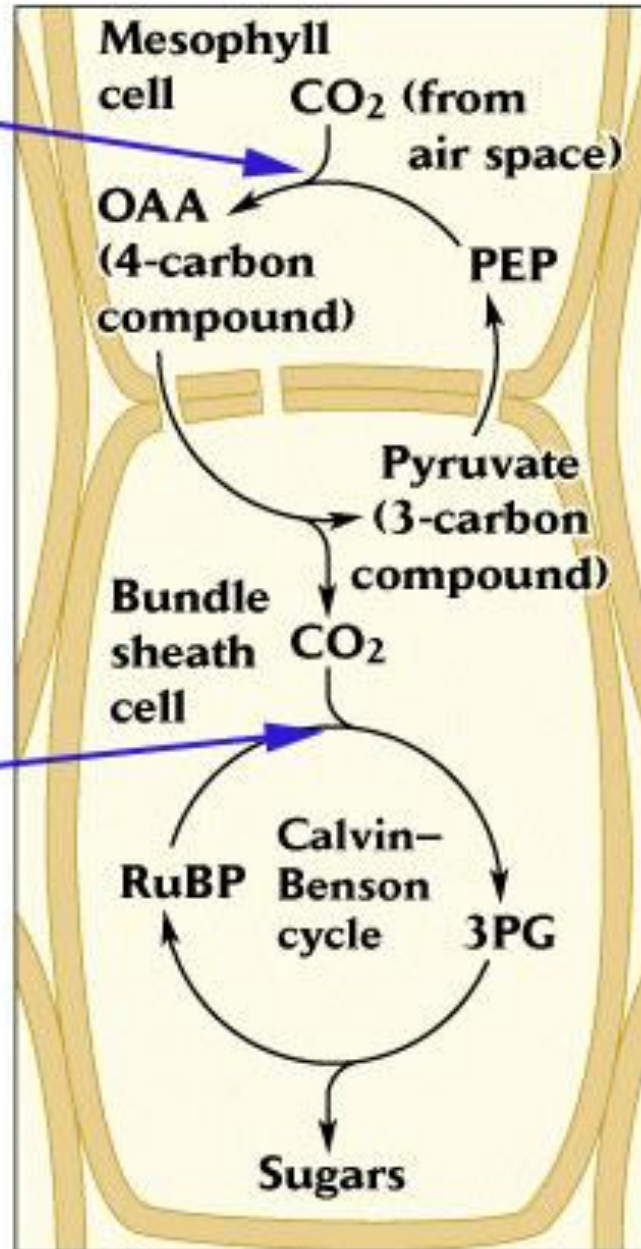
C₄ cell arrangement



Mesophyll cell

C₄ photosynthesis

PEPase



RUBISCO

Mesophyll cell
CO₂ (from air space)

OAA
(4-carbon compound)

PEP

Pyruvate
(3-carbon compound)

Bundle sheath cell
CO₂

Calvin-Benson cycle
3PG

Sugars

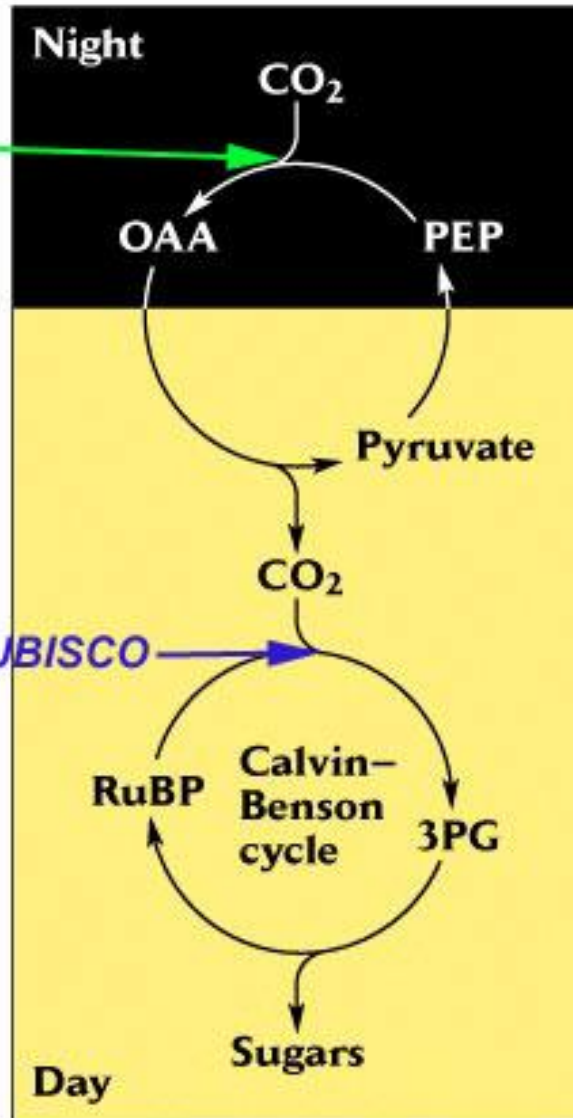
(c)

Crassulacean acid metabolism

CAM PLANT

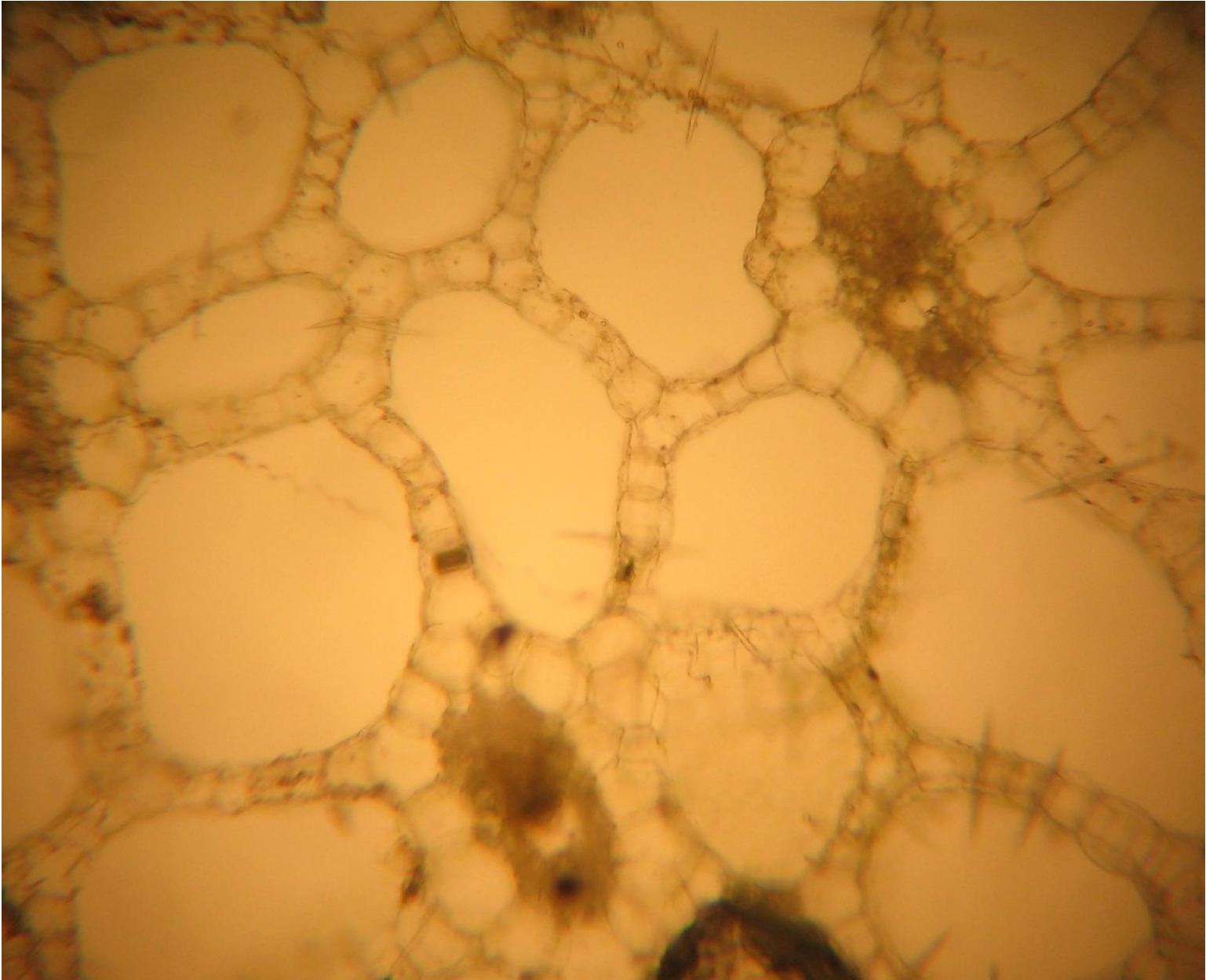


PEPase



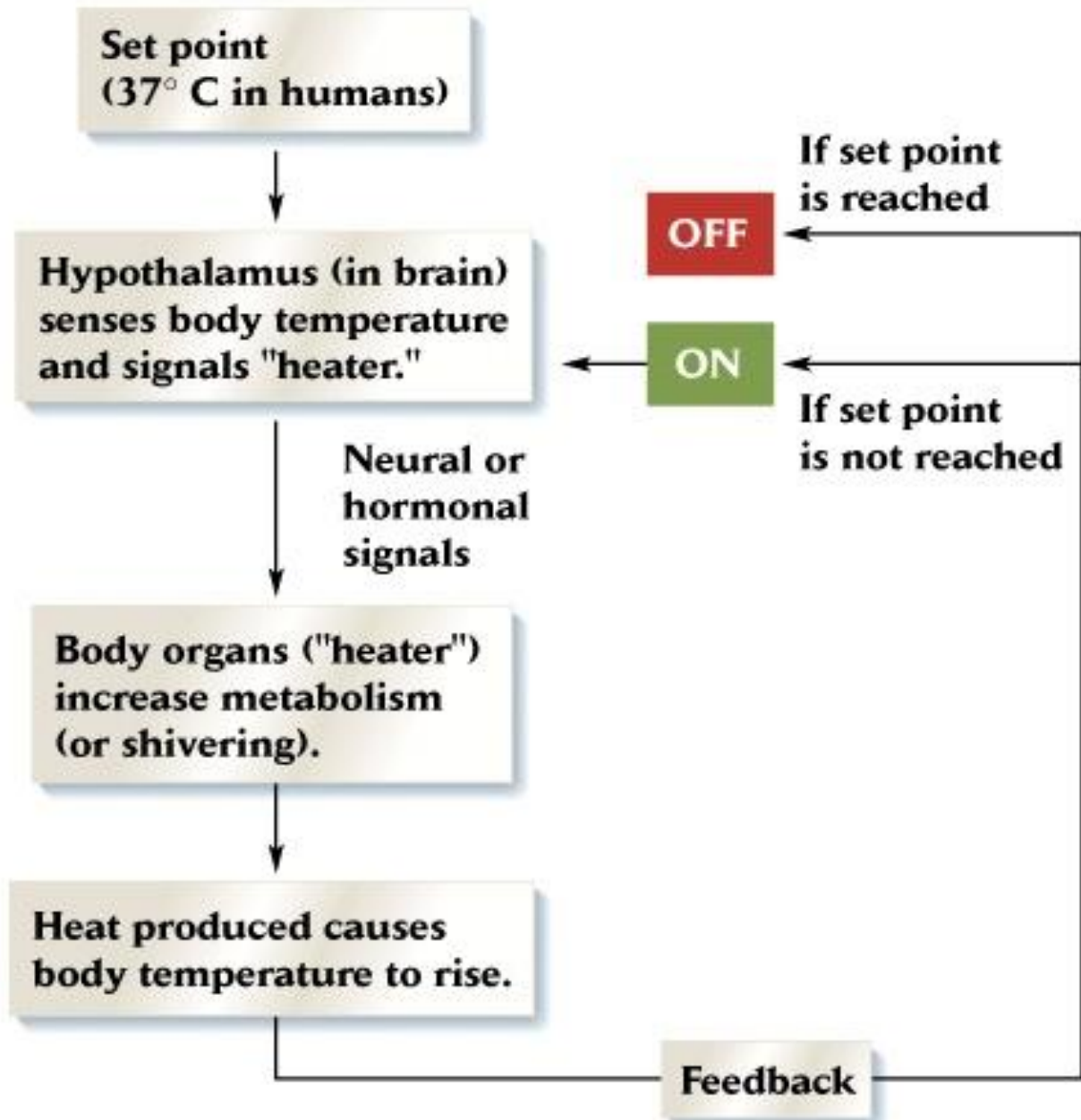
Kondisi penggenangan

- Untuk tumbuhan intoleran gejalanya seperti pada kondisi kering : menutup stoma, daun kuning/gugur, reduksi fotosintesis.
- Untuk tumbuhan yang dapat bertahan terjadi pembentukan aerenkim, akar adventif, pneumatophore



Adaptasi pada hewan

- Sistem ekskretori
- Osmotik
- Evading/avoiding
- Hyperthermic
- Nokturnal/berlindung di lubang

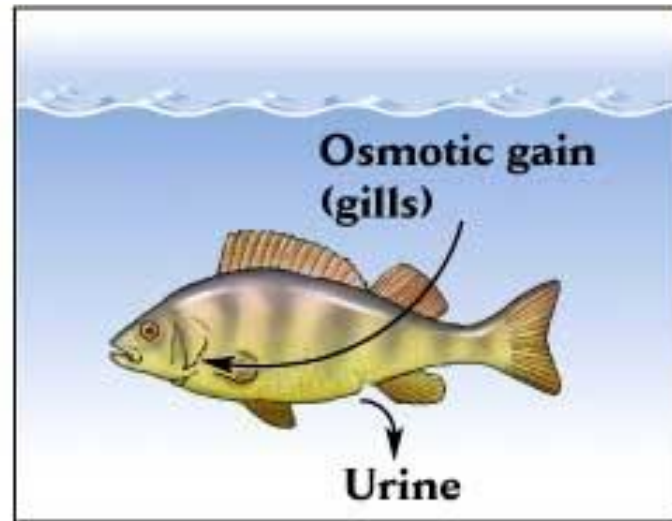
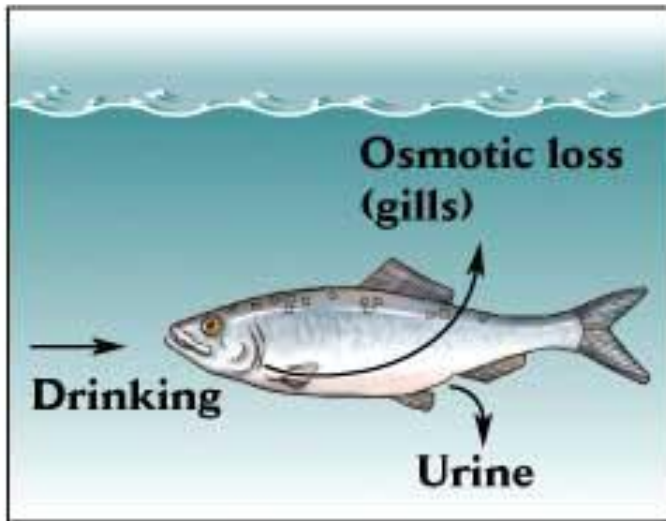




**Marine fish
(hypo-osmotic body fluids)**

**Freshwater fish
(hyperosmotic body fluids)**

Water



Solutes

