

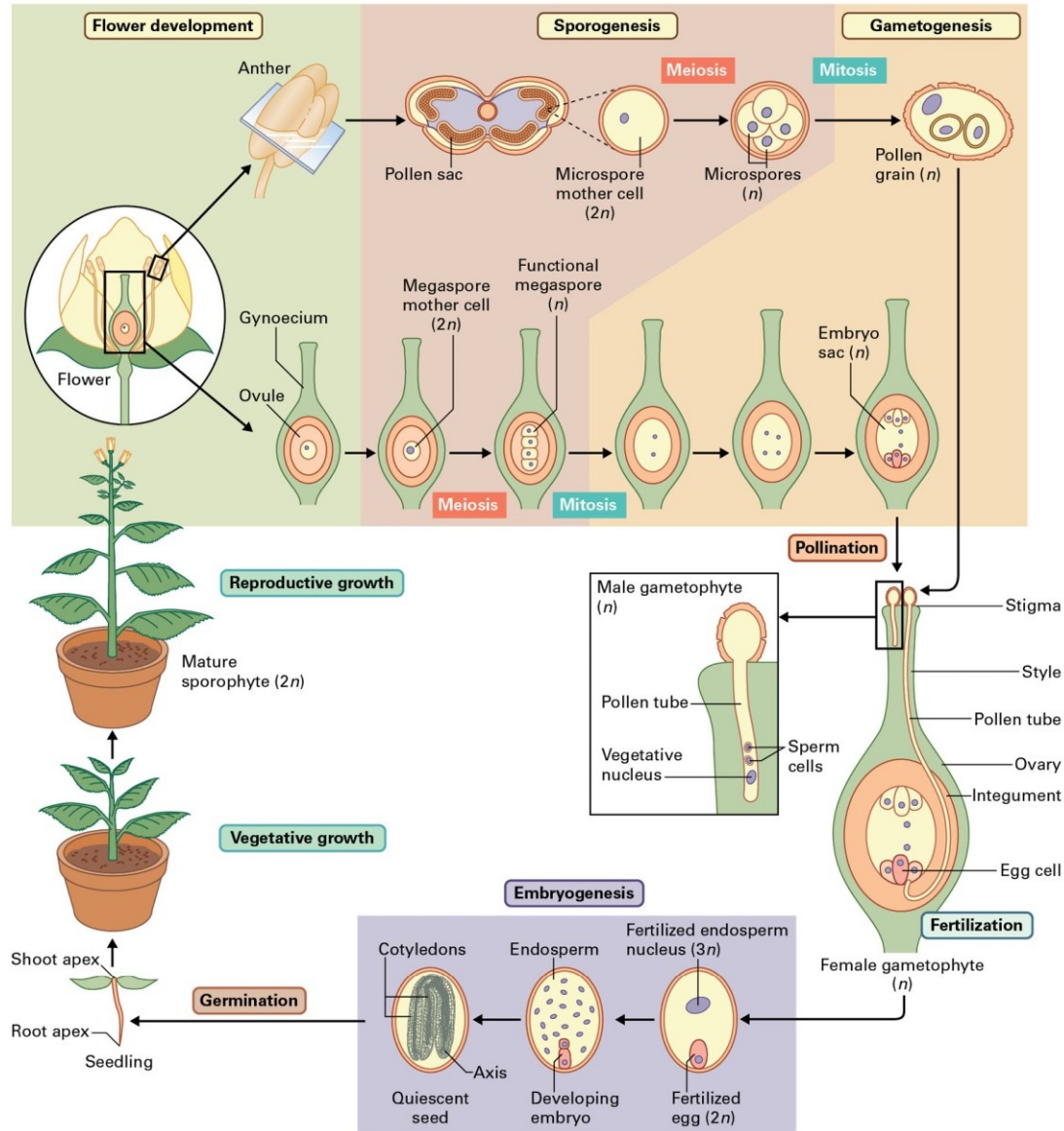


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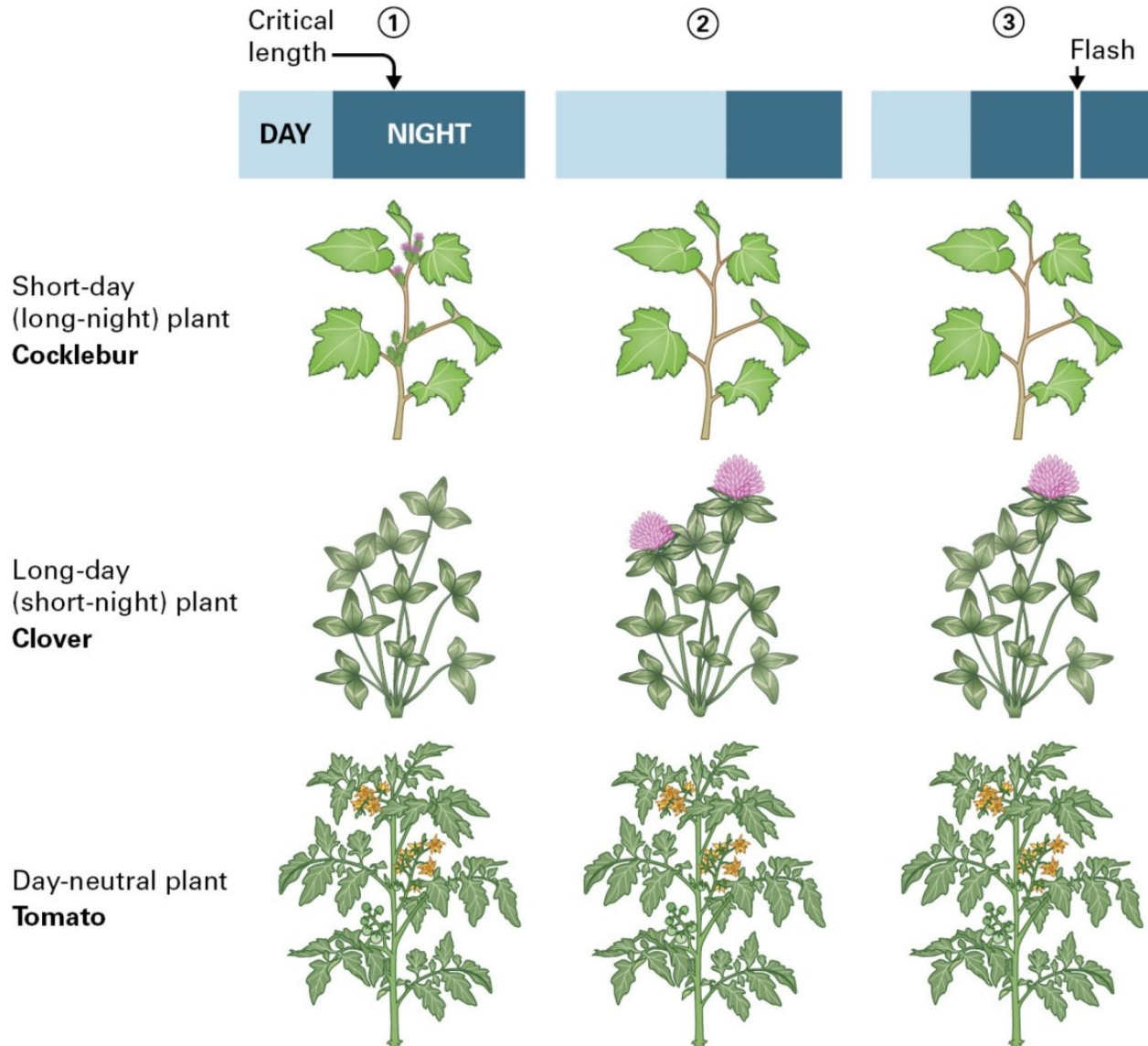
Reproduction and Senescence



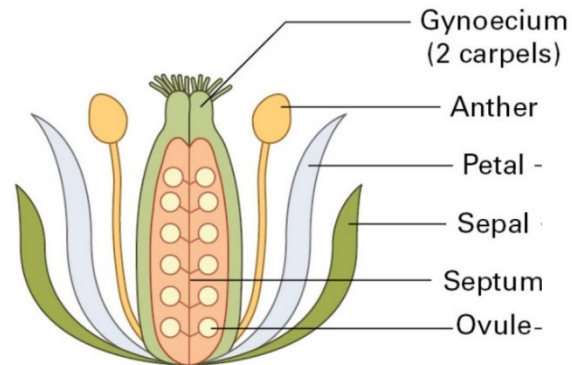
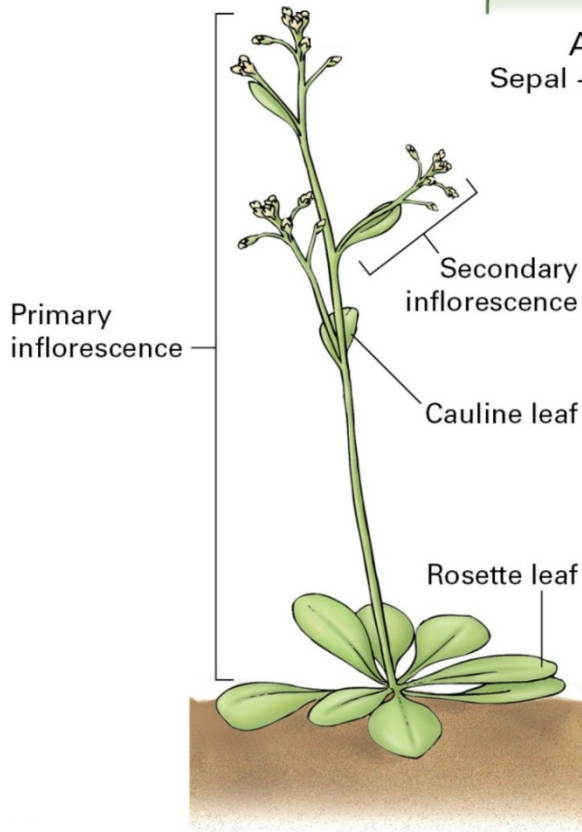
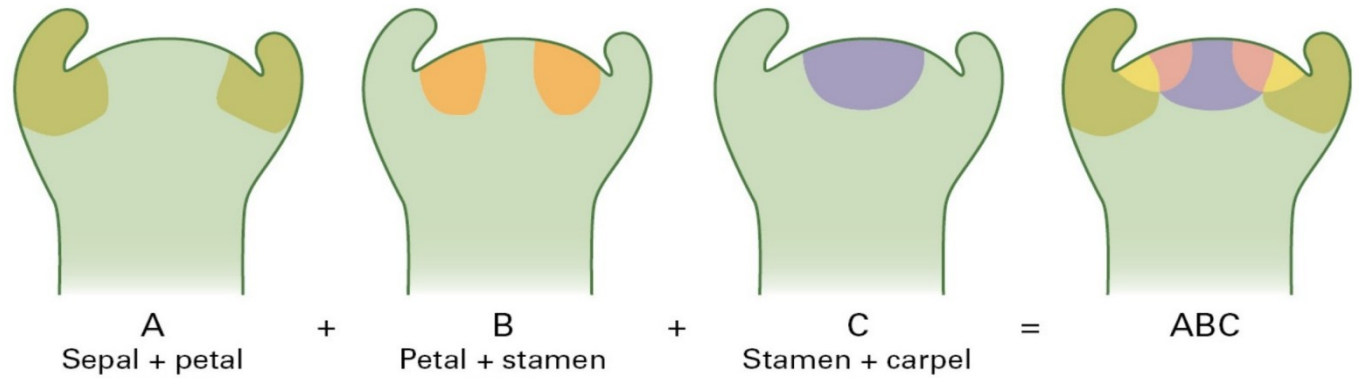
The life cycle of flowering plants



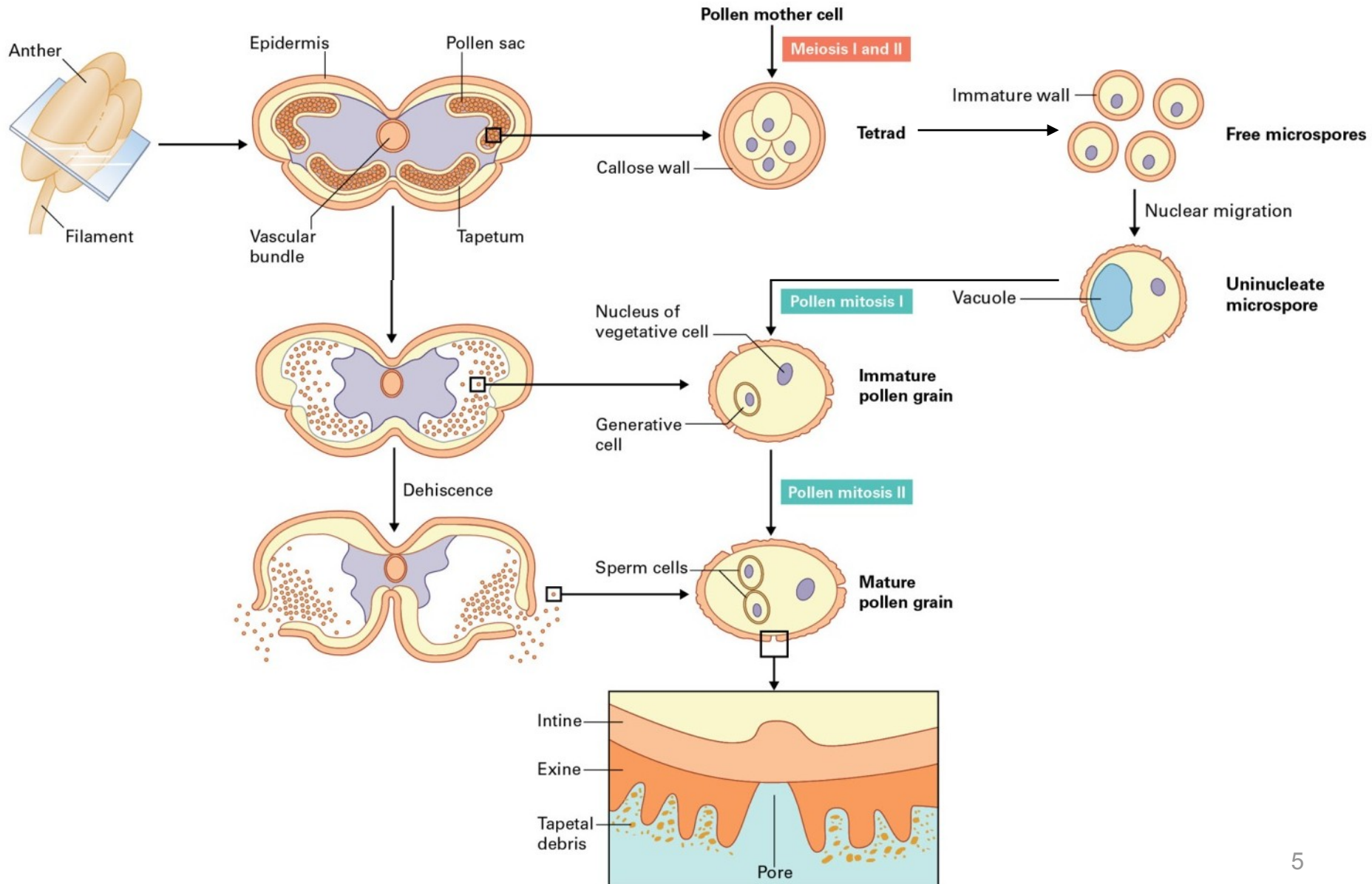
The transition to reproductive development



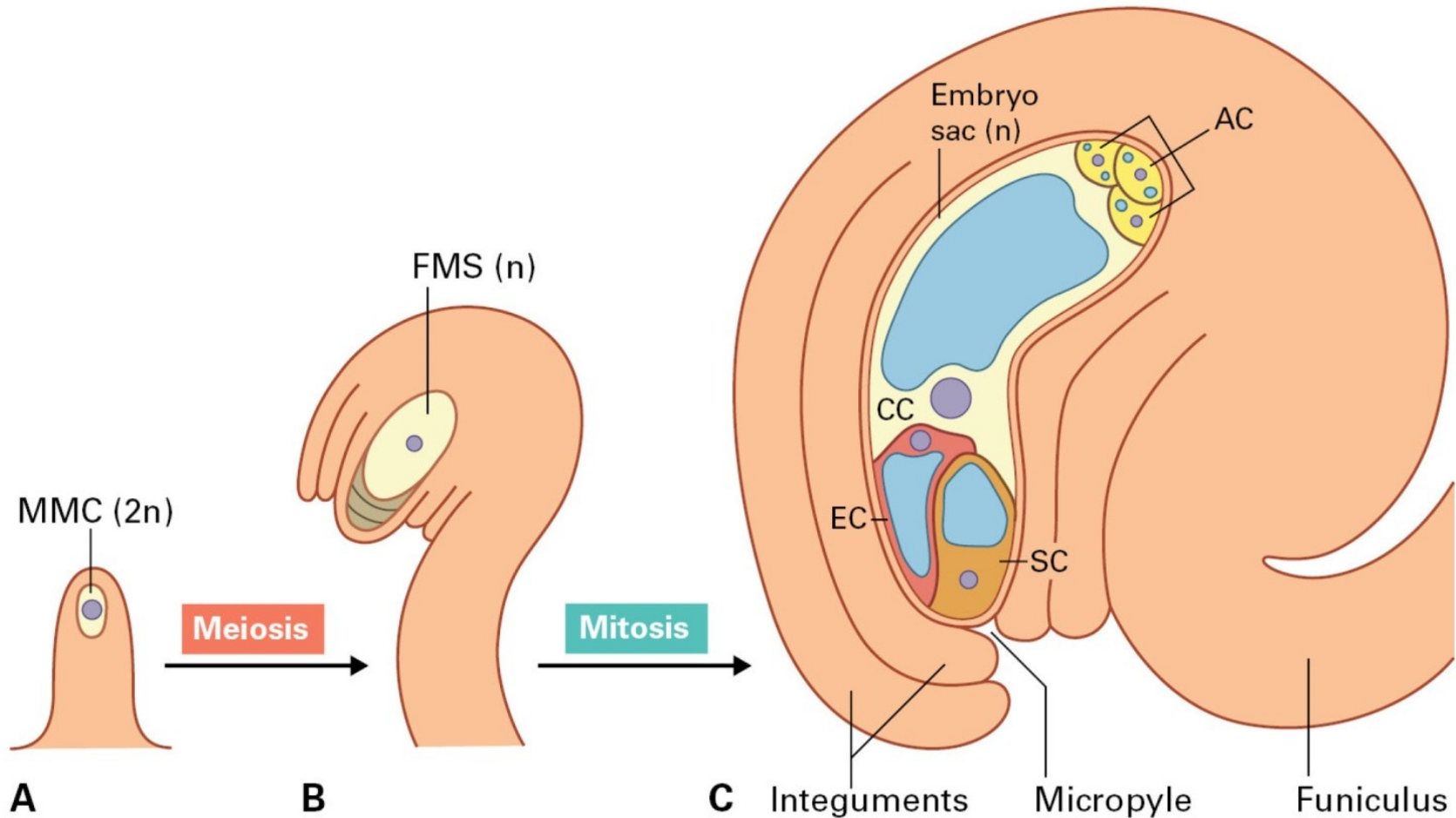
Flower development



Male gametes



Female gametes

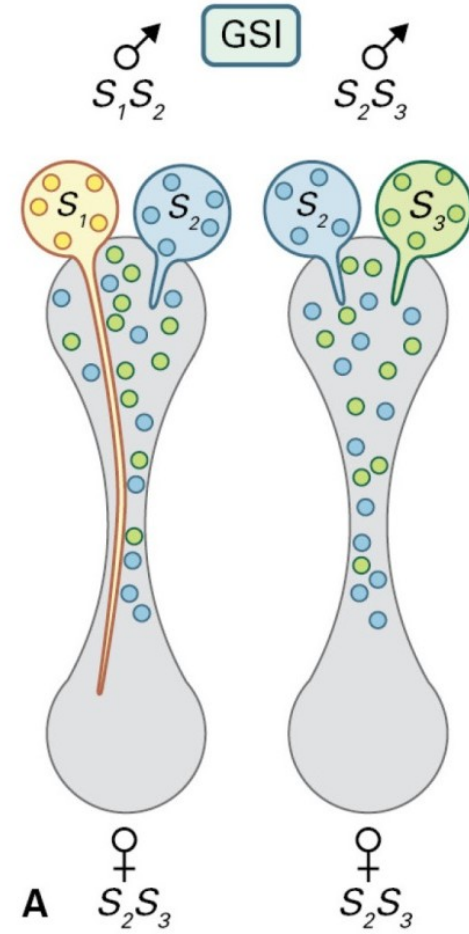
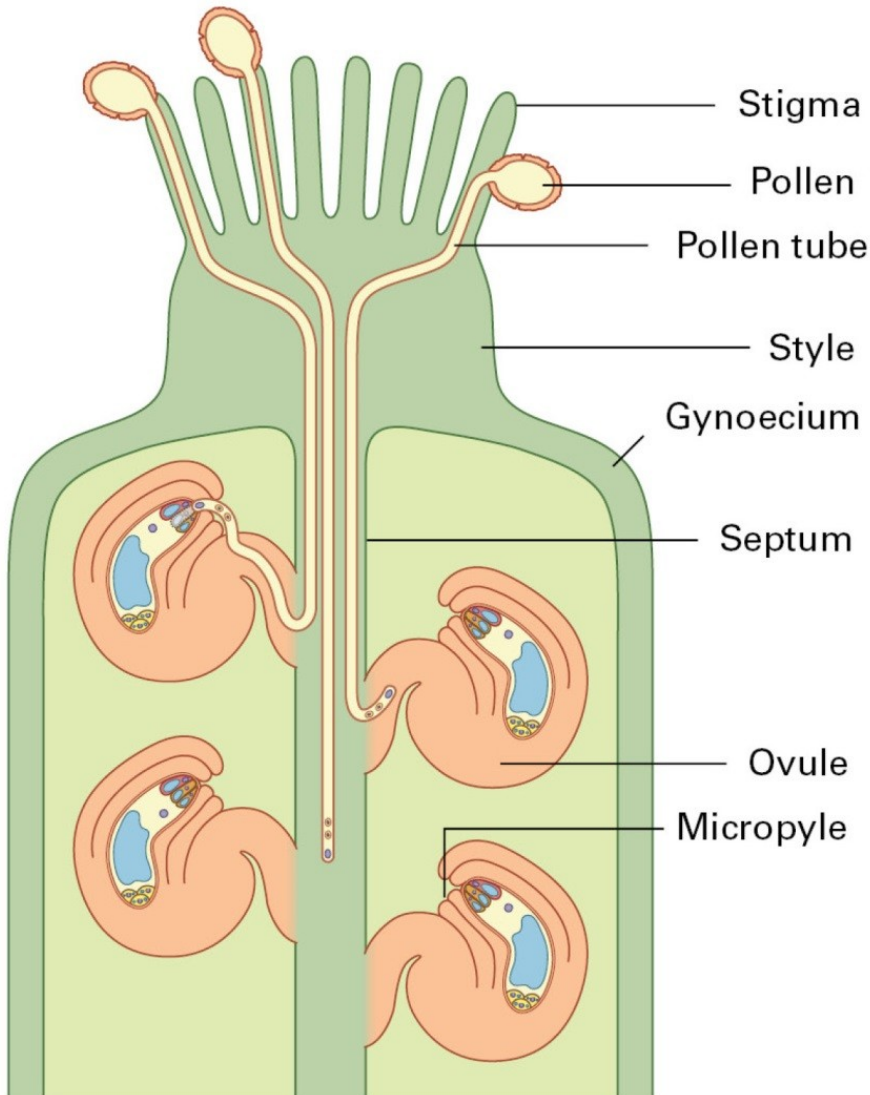


(A) Megaspore mother cell at the tip of a young ovule primordium

(B) Functional megaspore initiates embryo sac development

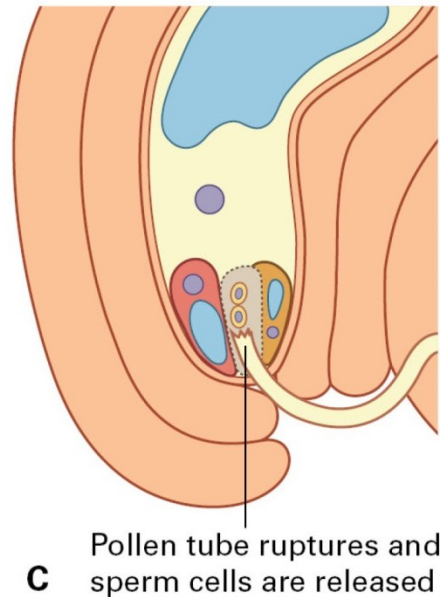
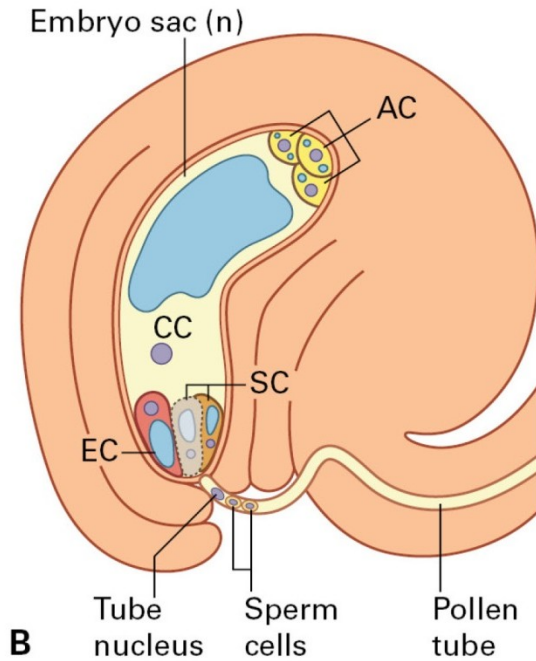
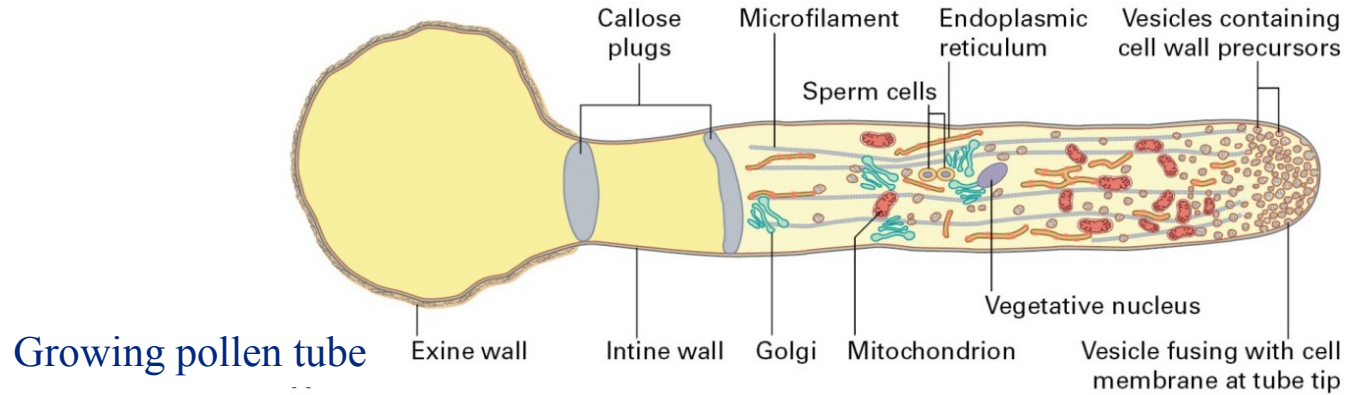
(C) Mature ovule containing synergid cells, egg cell, central cell, and antipodal cells

Pollination and fertilization

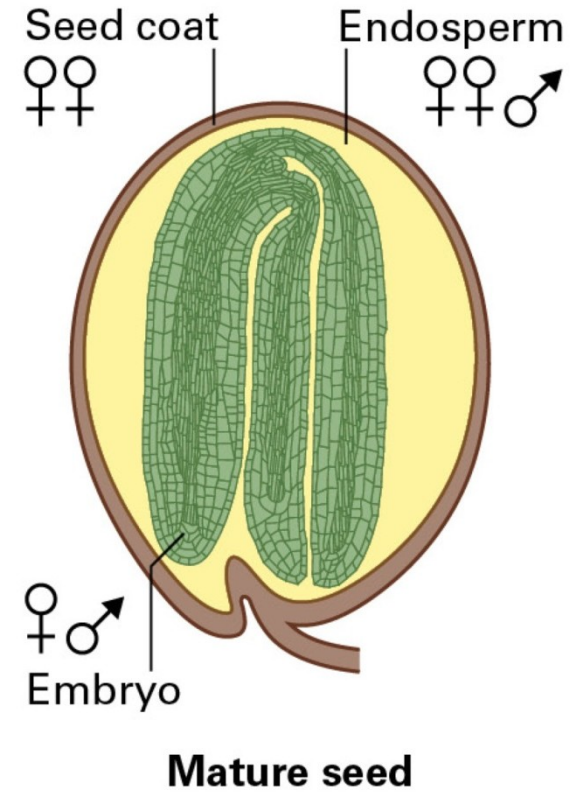
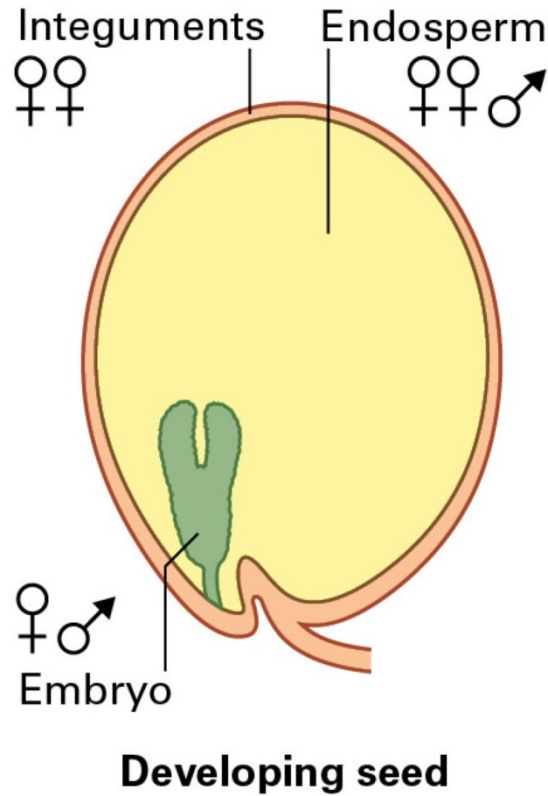
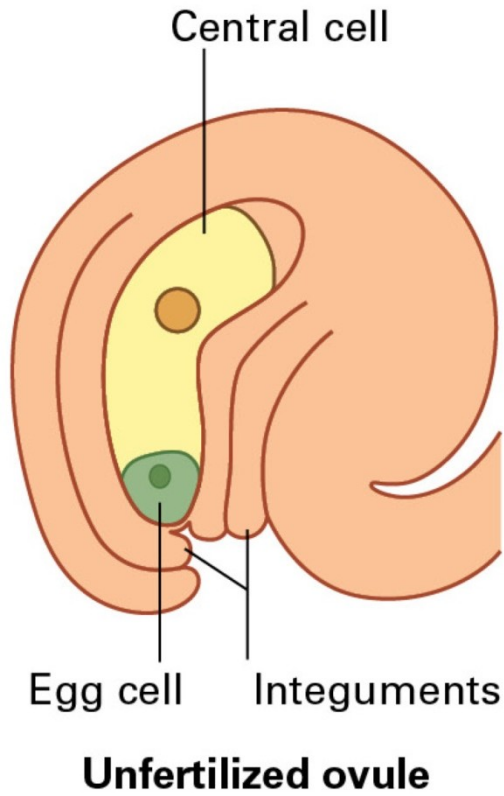


Genetic basis of self-incompatibility

Pollination and fertilization

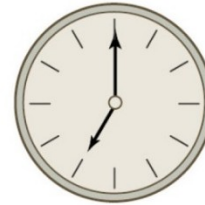
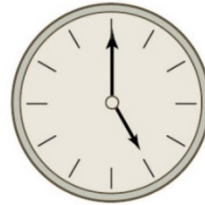
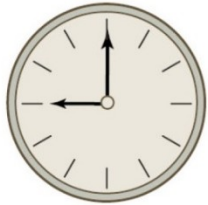


Seed development





Senescence



Ipomoea tricolor



Welwitschia mirabilis



Senescence

① Initiation phase

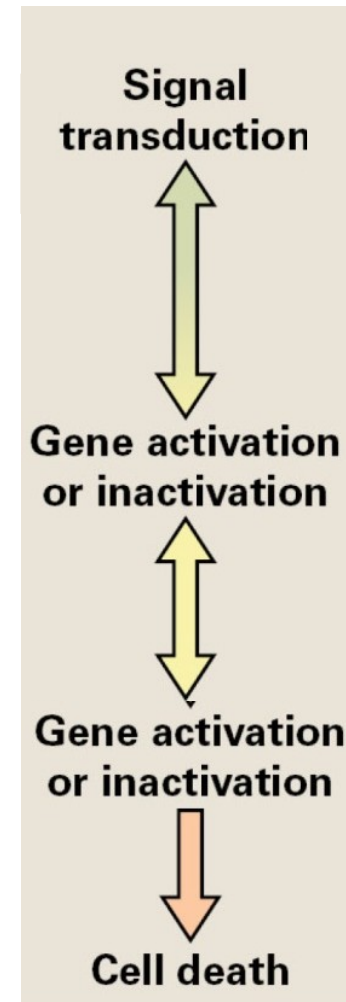
- Crossing of metabolic threshold
- Altered redox state
- Signaling cascades

② Reorganization phase

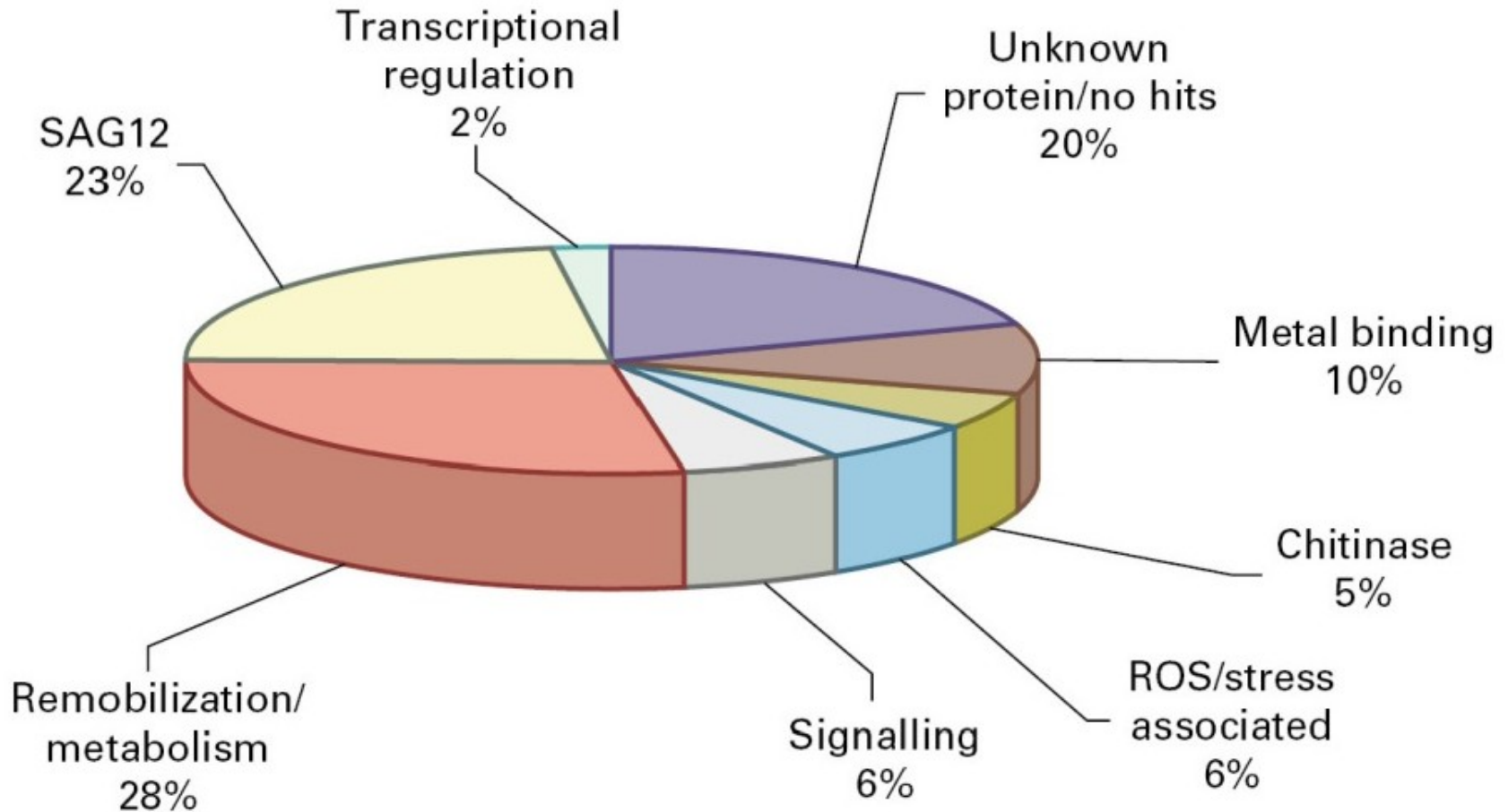
- Activation of salvage pathways
- Shift from autotrophic to heterotrophic metabolism
- Detoxification
- Reversible organelle redifferentiation

③ Terminal phase

- Antibiotic accumulation
- Release of free radicals
- Elimination of remaining metabolites
- Irreversible loss of cell integrity and viability

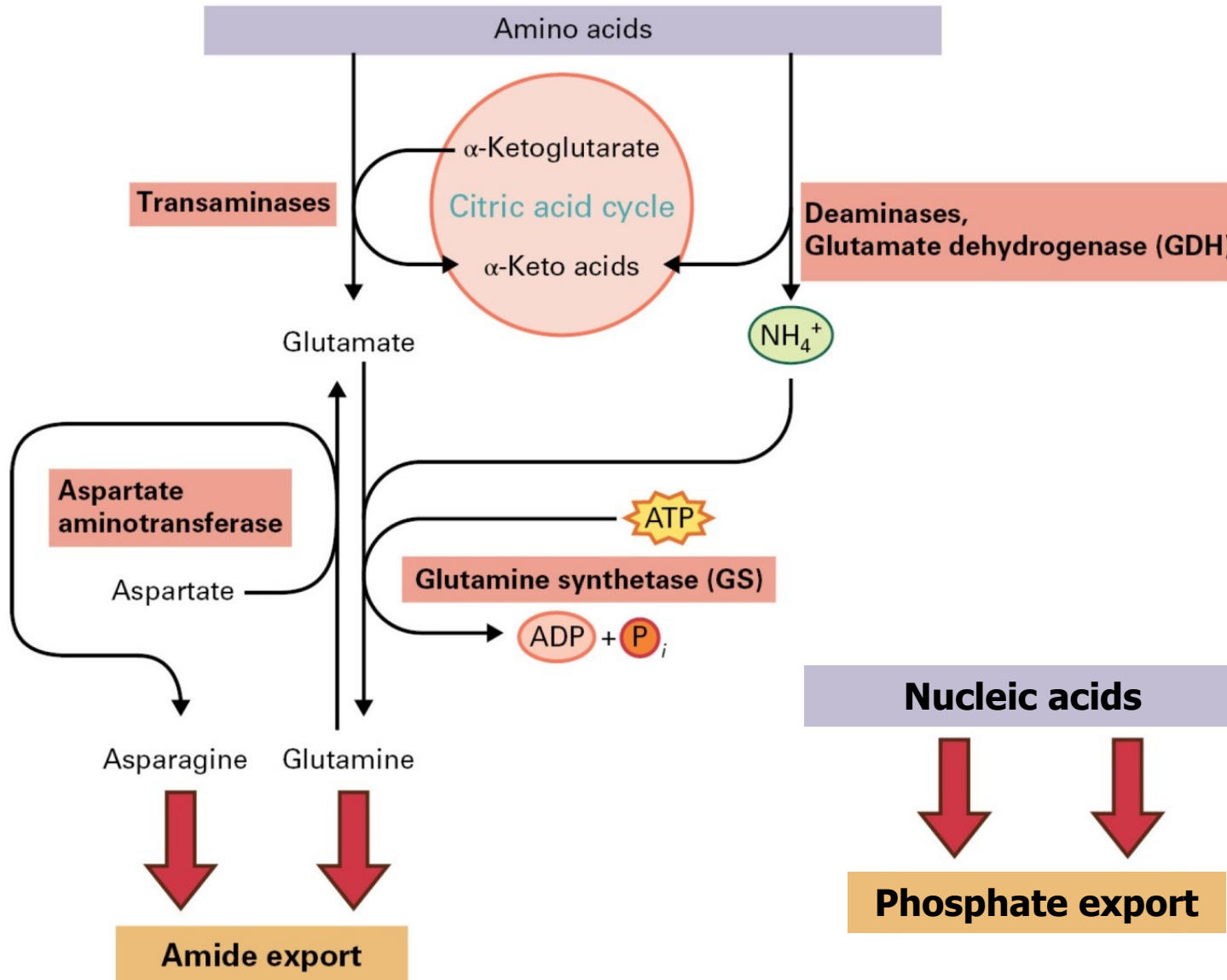


Gene expression during senescence

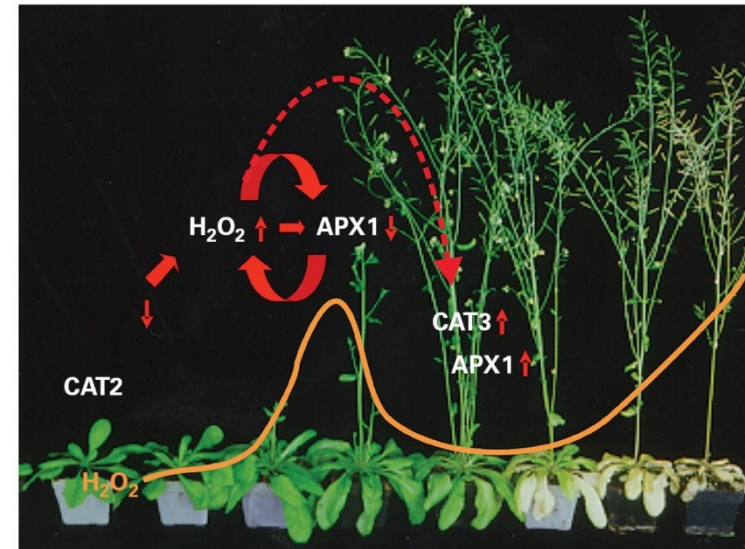
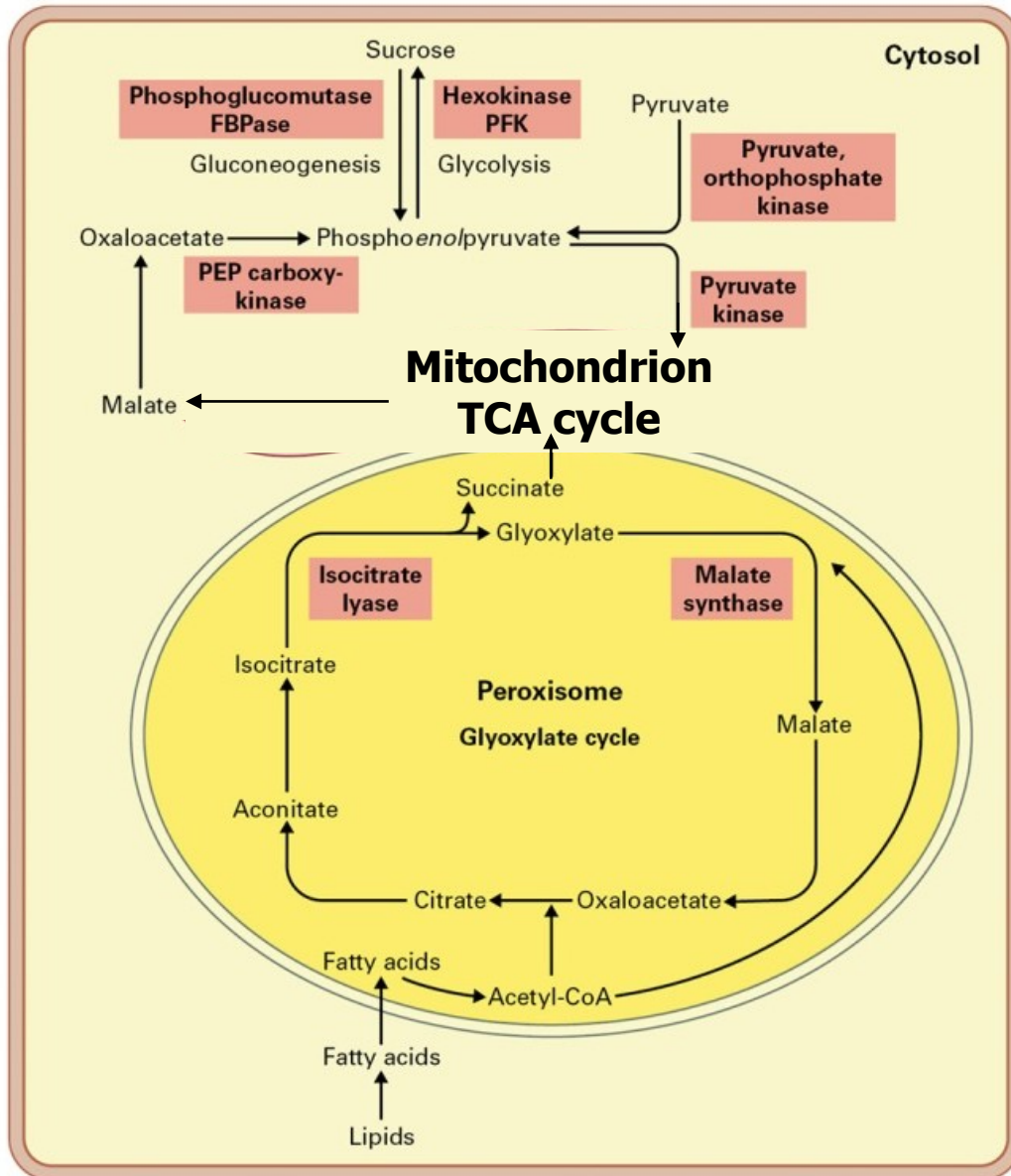


Groups of genes upregulated in senescing leaves and petals

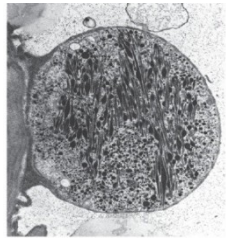
Salvage of nutrients



Energy and metabolism



Pigment metabolism in senescence



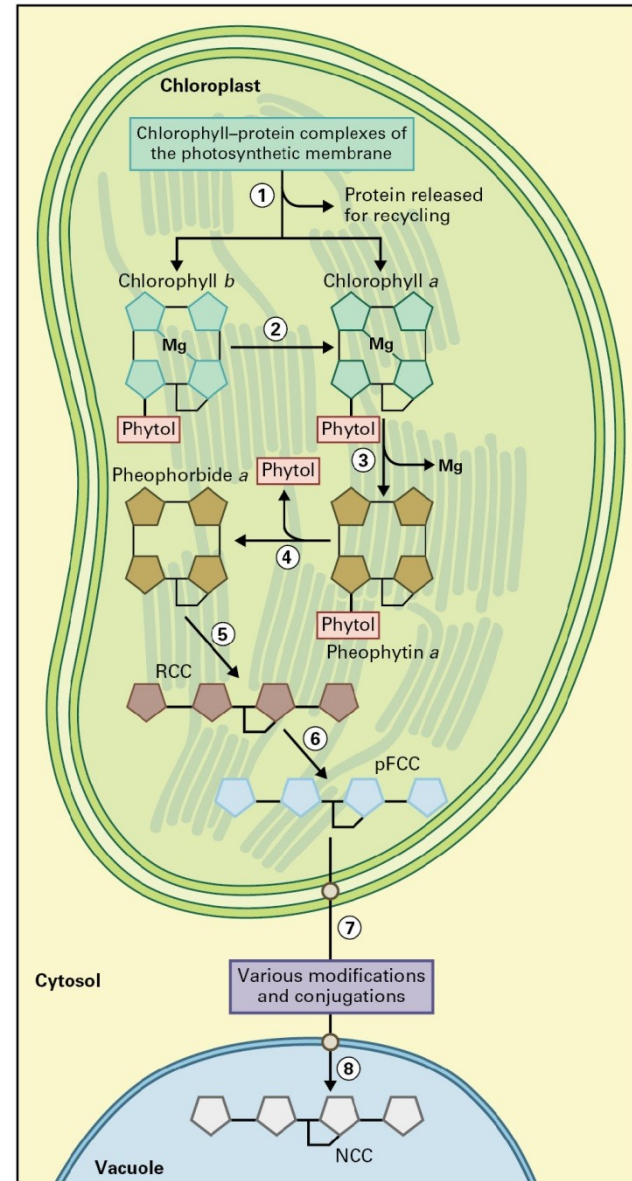
Chromoplast



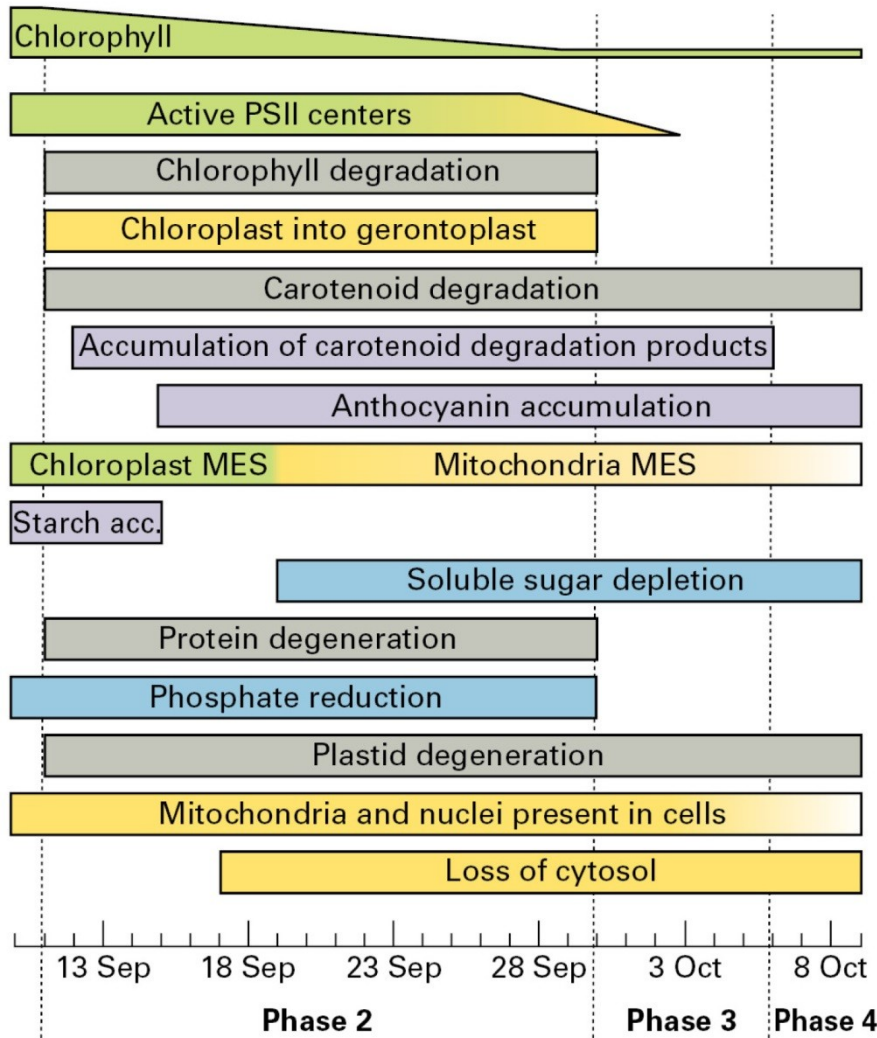
Chloroplast



Gerontoplast

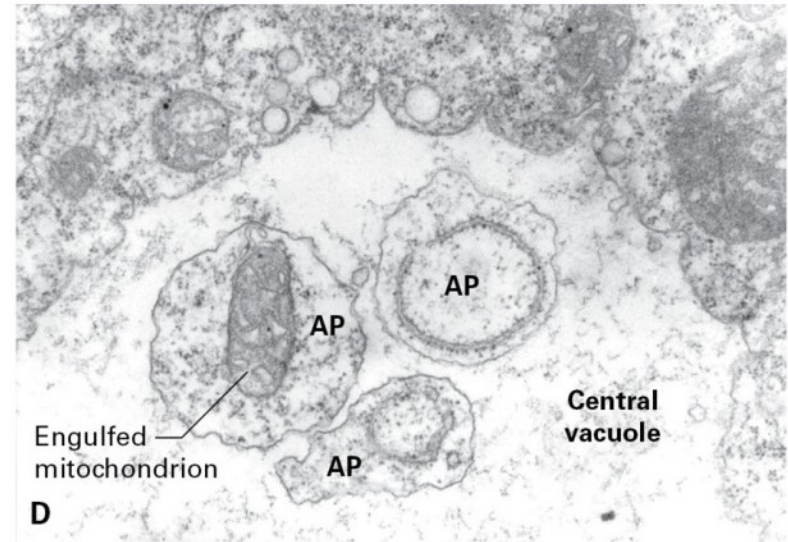
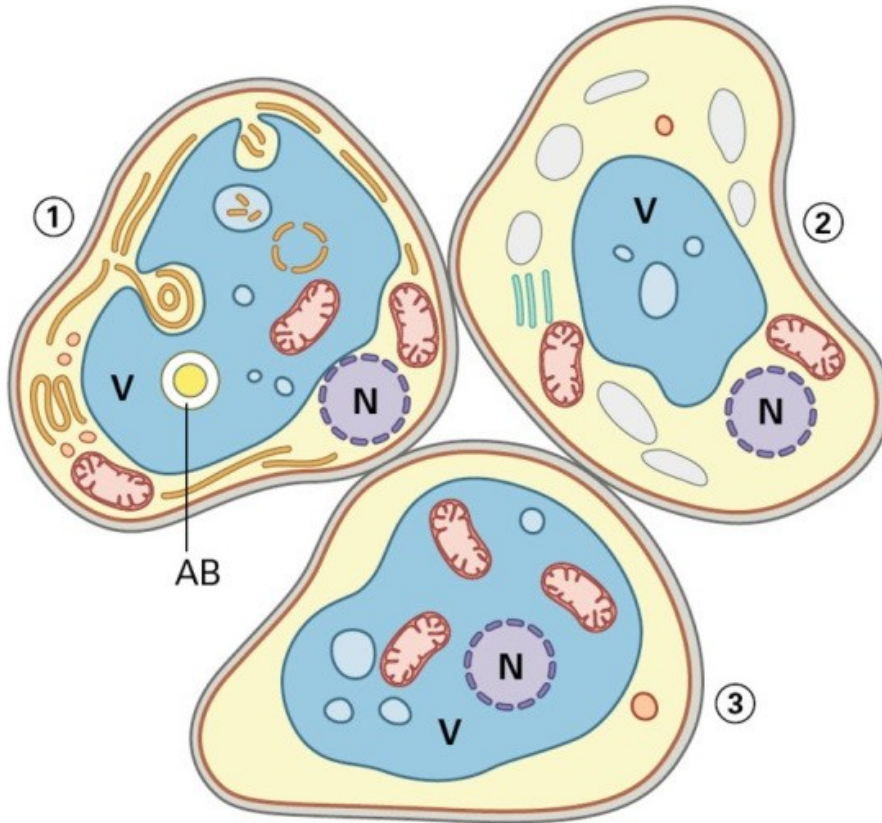


Environmental influences of senescence



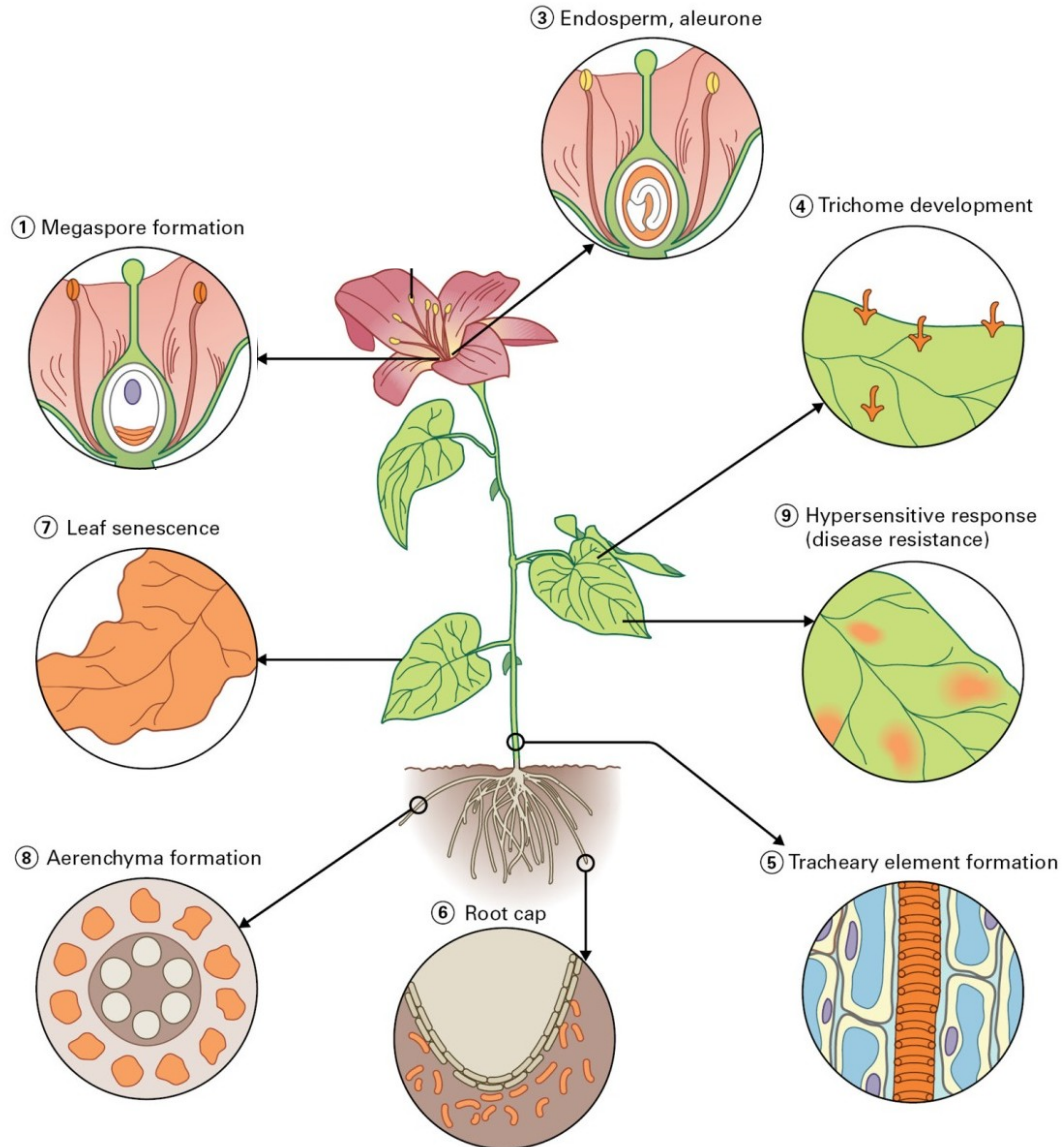
Cellular events during autumnal senescence in aspen

Programmed cell death

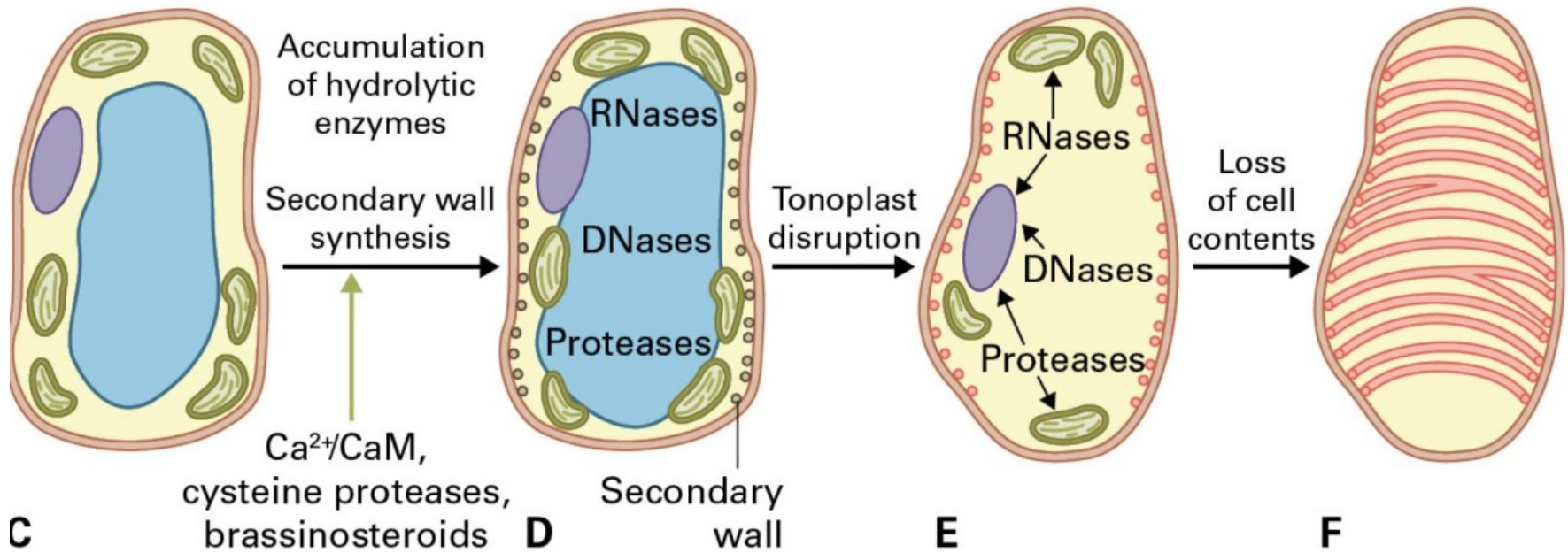


AB, autophagic body
AP, autophagosome

Programmed cell death

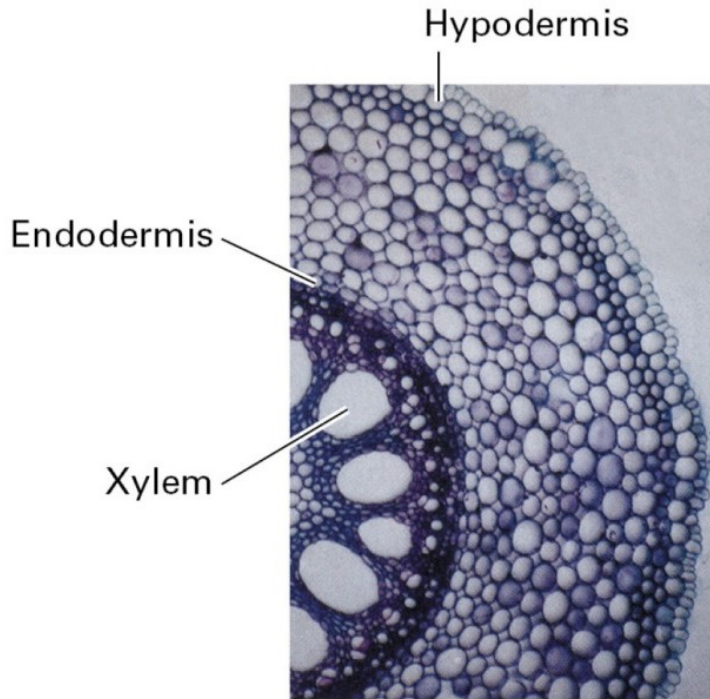


Programmed cell death

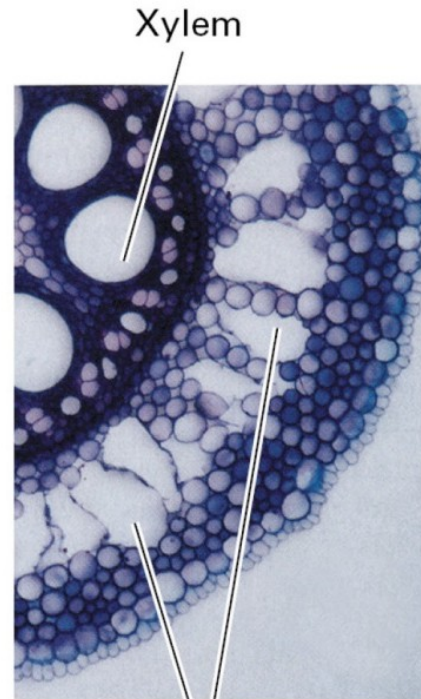


The differentiation of tracheary elements

Environmental influences of PCD

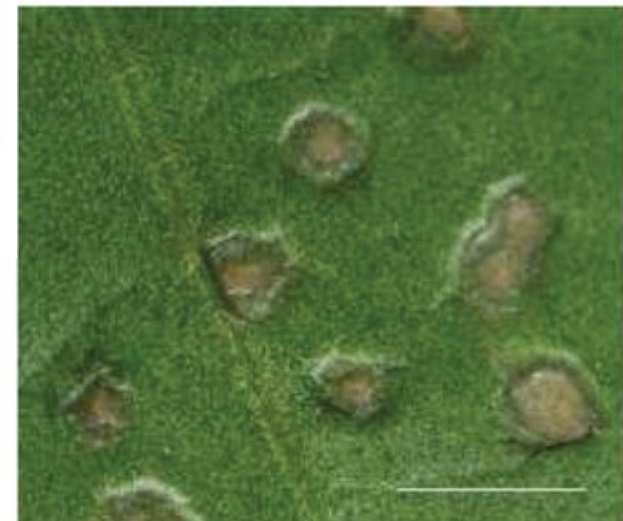


A



B

Aerenchyma



Cell death during the HR