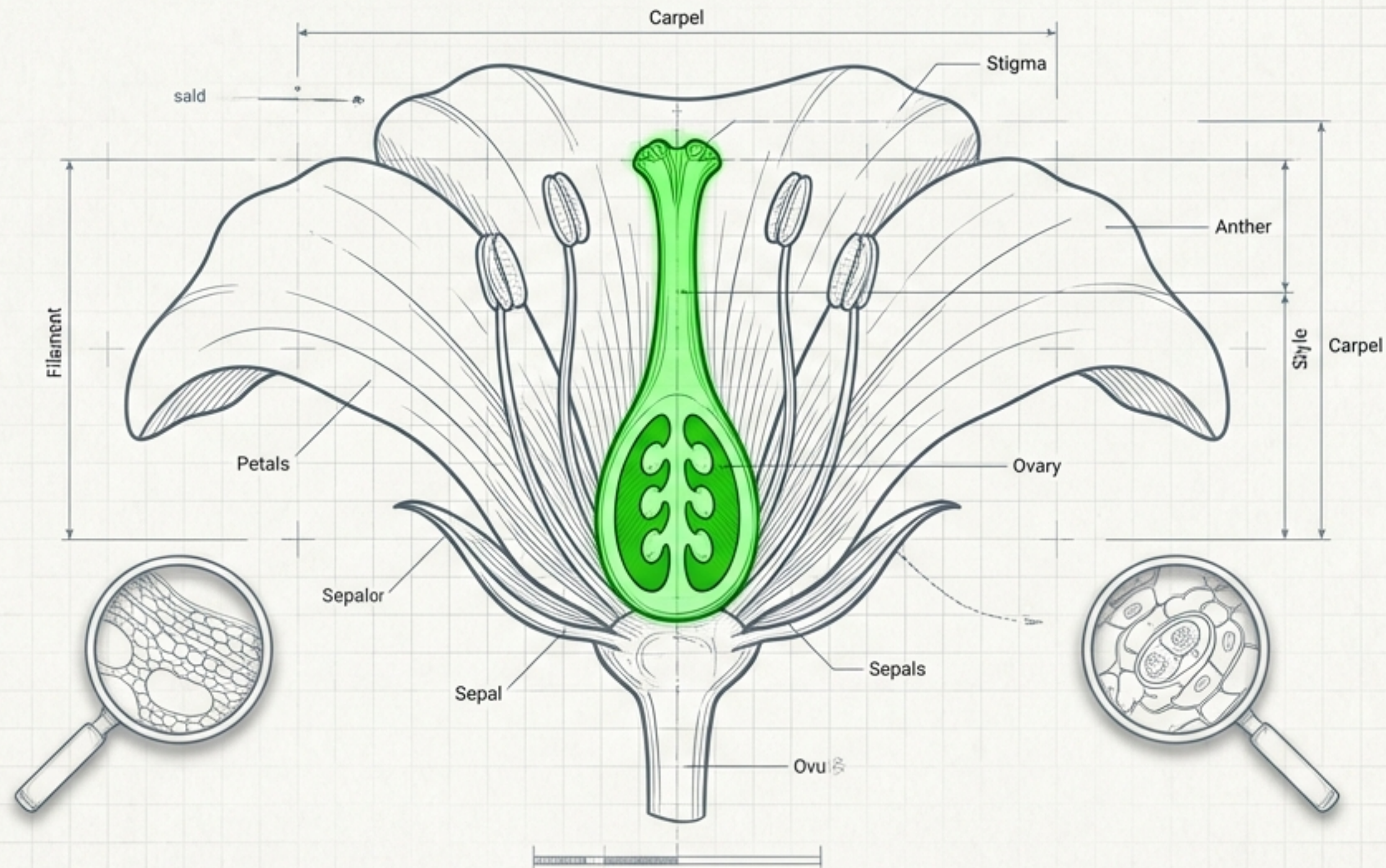


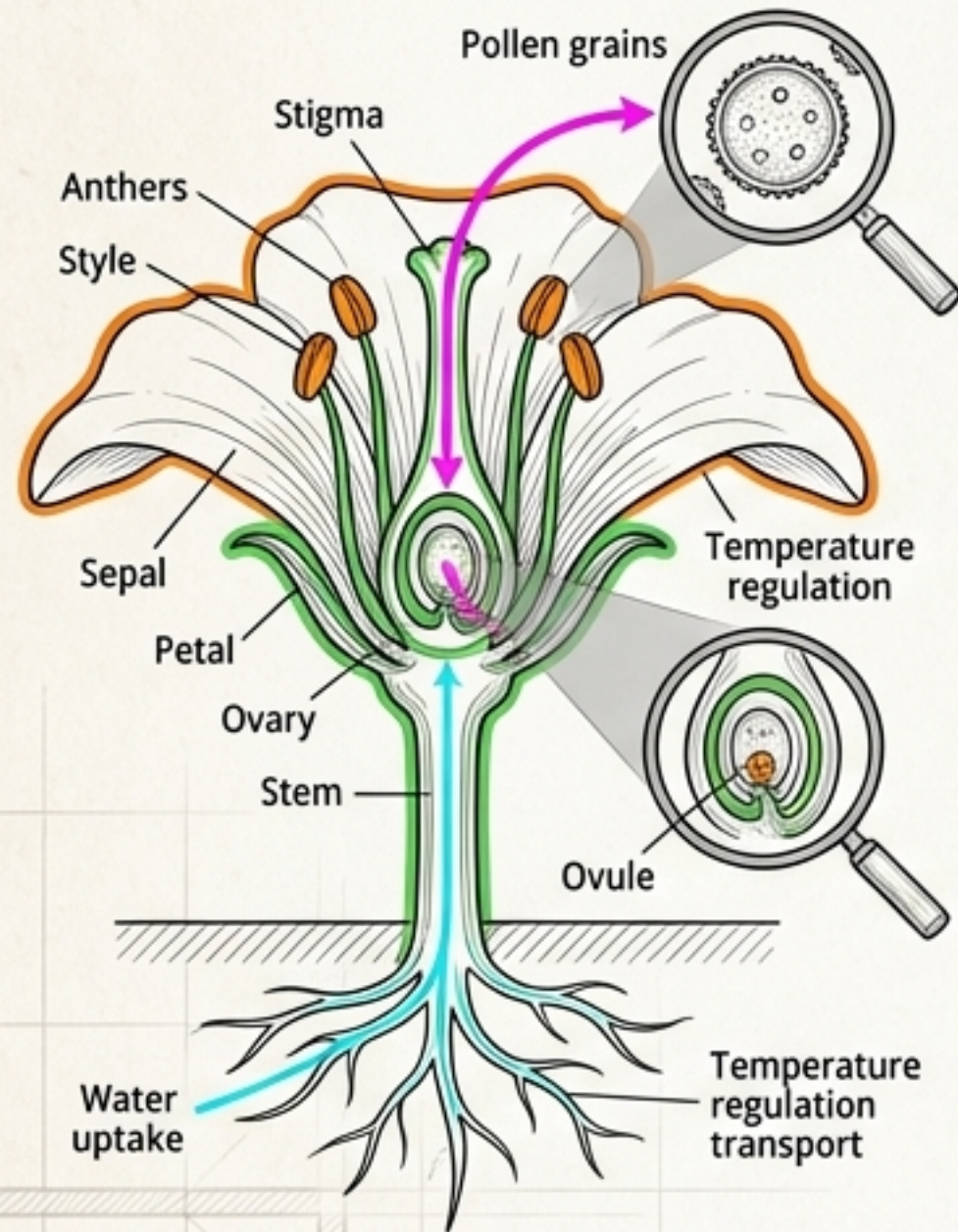
The Botanical Blueprint

The Mechanisms of Plant Reproduction

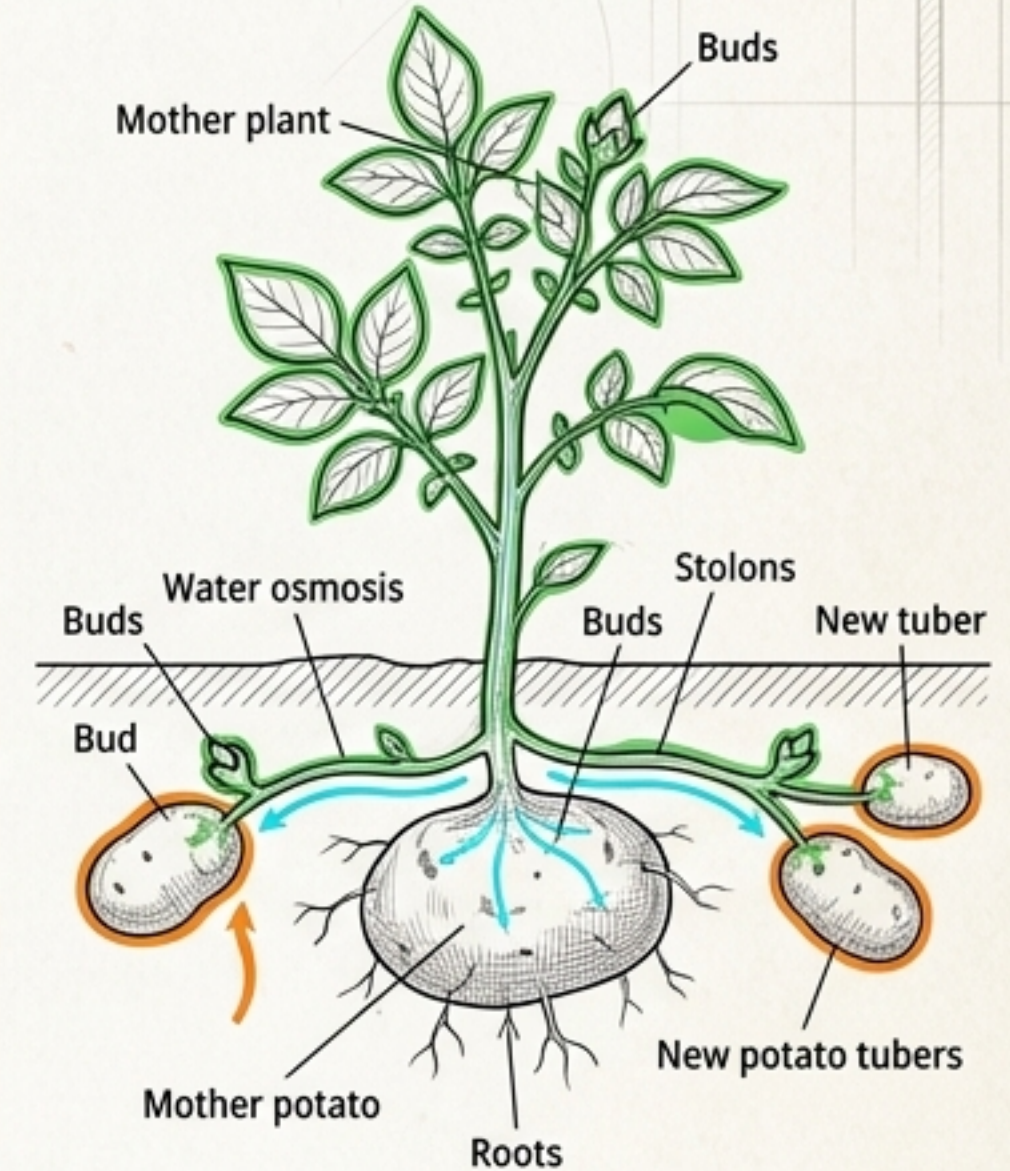


Two Pathways to Propagation

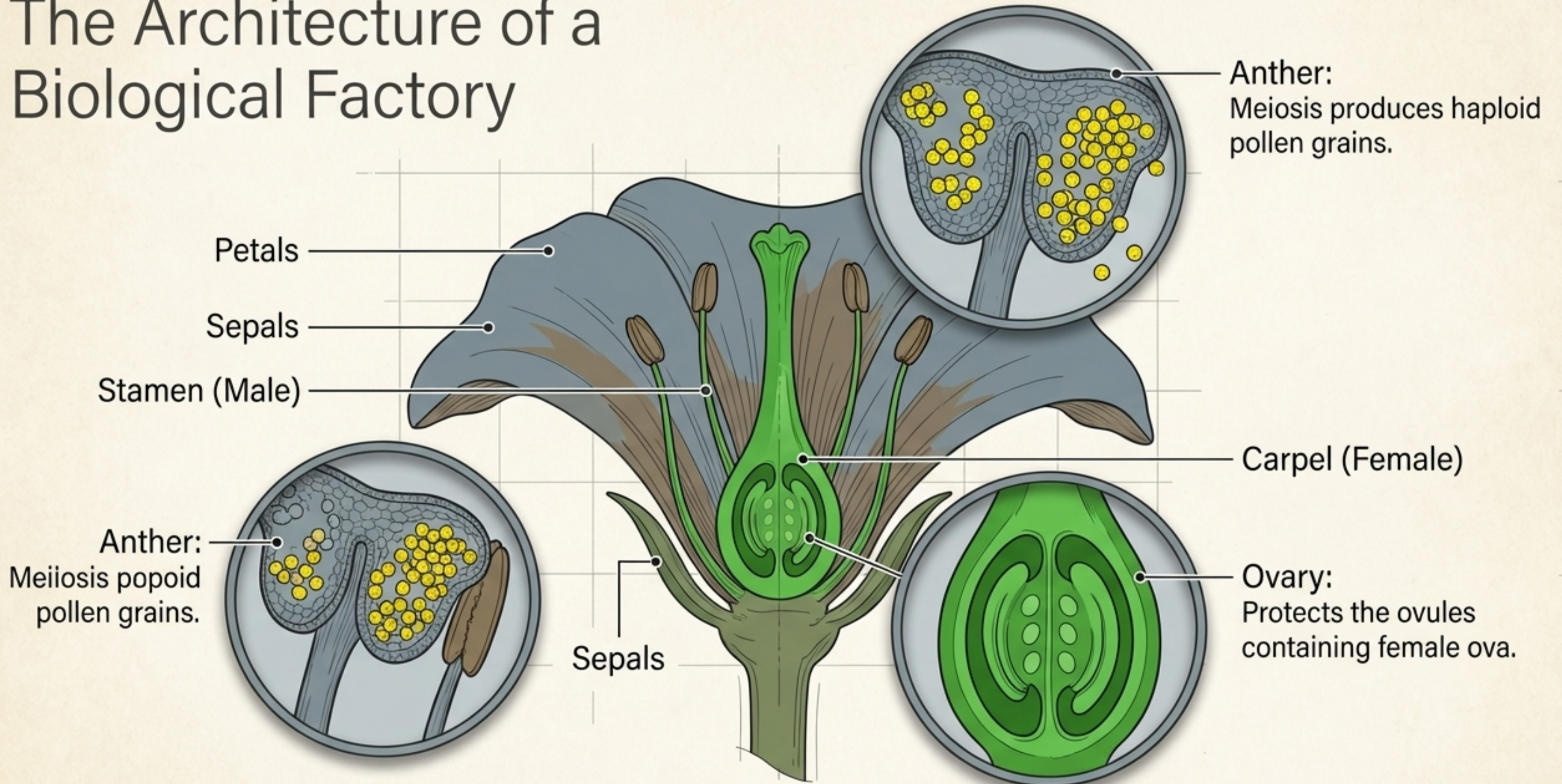
Plants possess a dual survival toolkit, utilizing both mitosis and meiosis depending on the evolutionary goal.



	Sexual Reproduction	Asexual Reproduction
Cell Division	Meiosis	Mitosis
Gametes Produced	Yes	No
Fertilisation Required	Yes	No
Genetic Output	Variation in offspring	Genetically identical (clones)
Optimal Environment	Changing environment	Stable environment



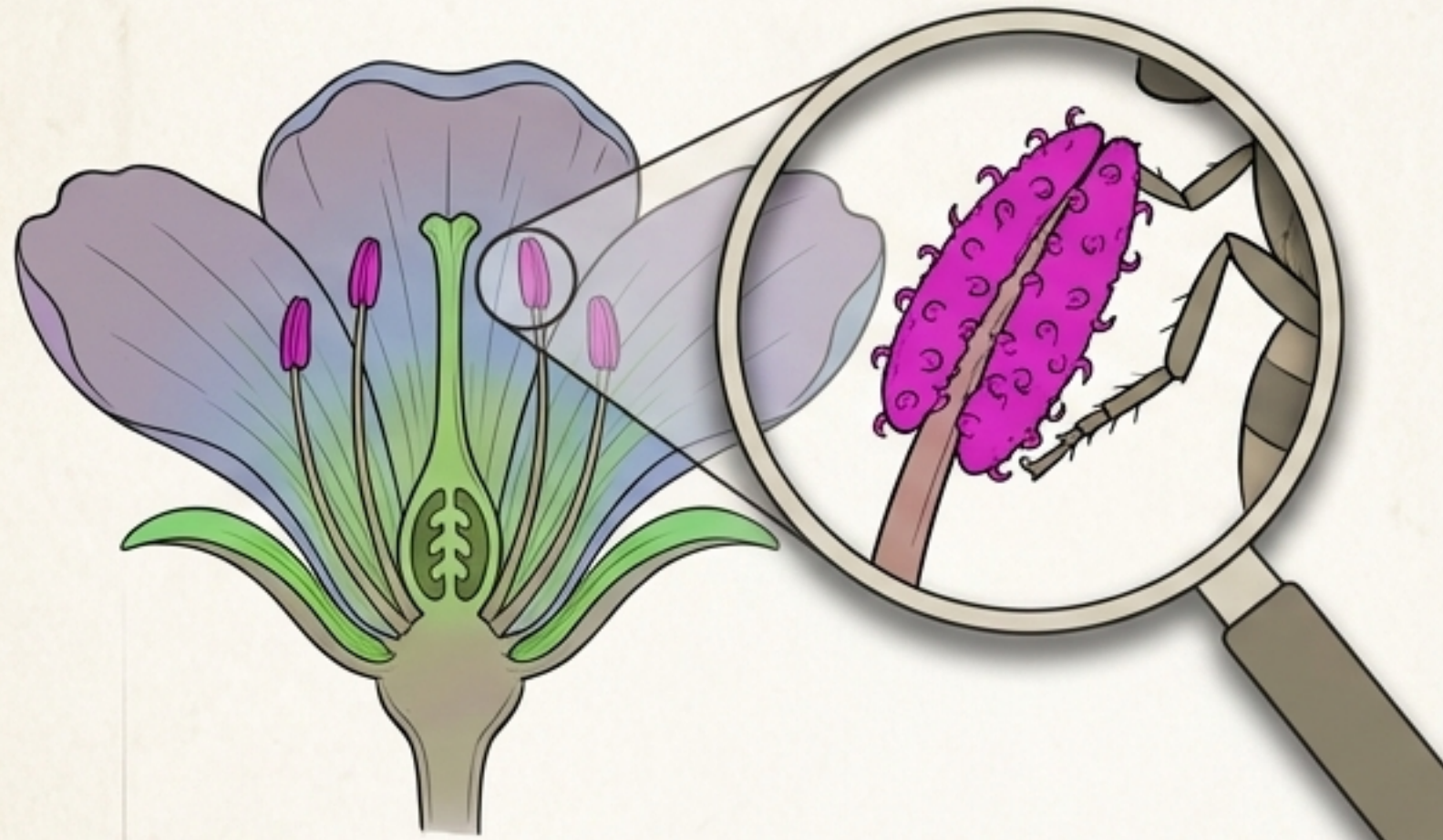
The Architecture of a Biological Factory



The Pollination Divide

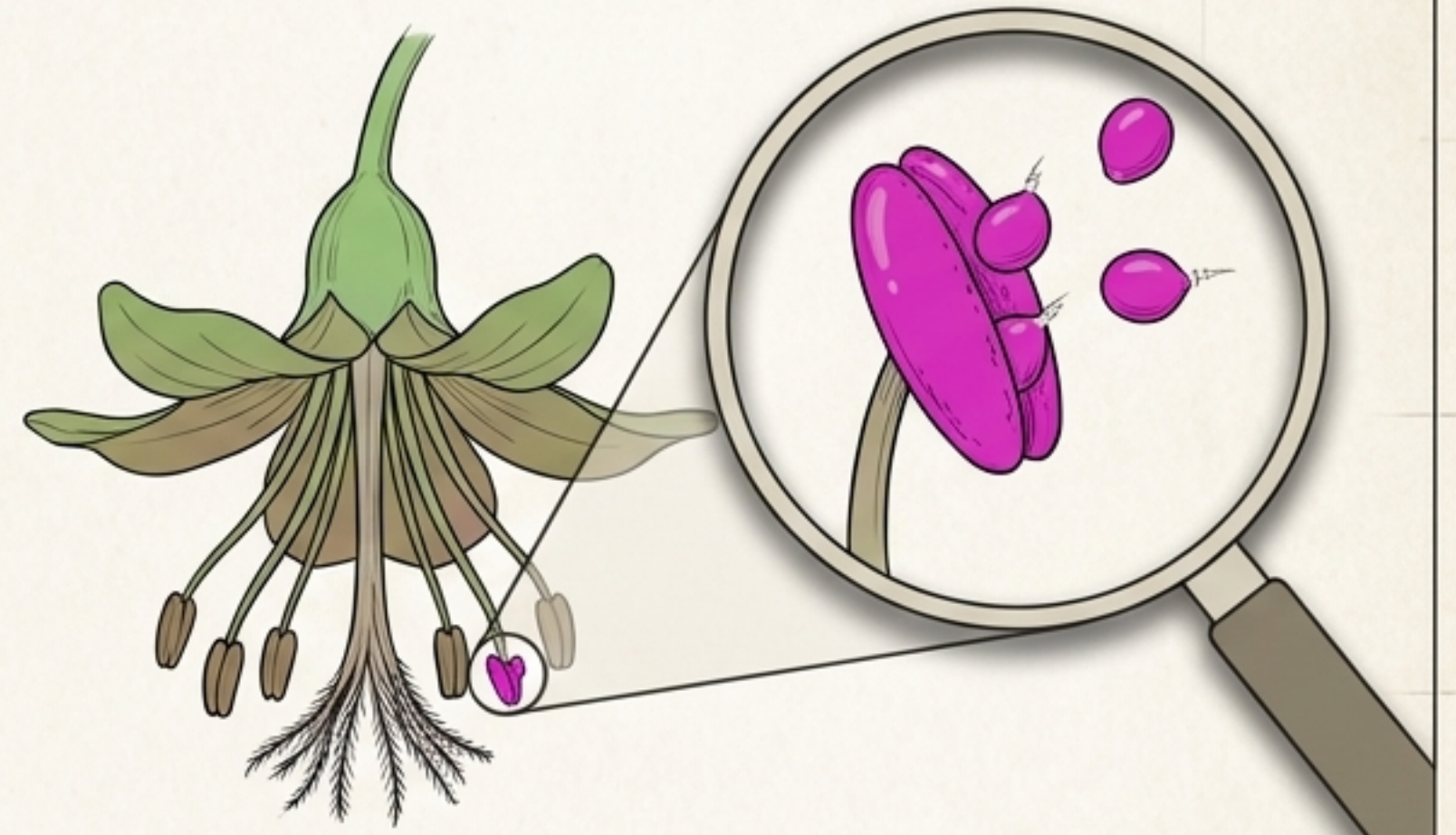
How plants adapt their architecture to exploit different transport vectors.

Vector: Insects



Petals: Large & brightly colored to attract.
Stamen/Stigma: Enclosed to force physical contact.
Pollen: Sticky grains with hooks to cling to bodies.
Nectaries: Present to provide a reward.

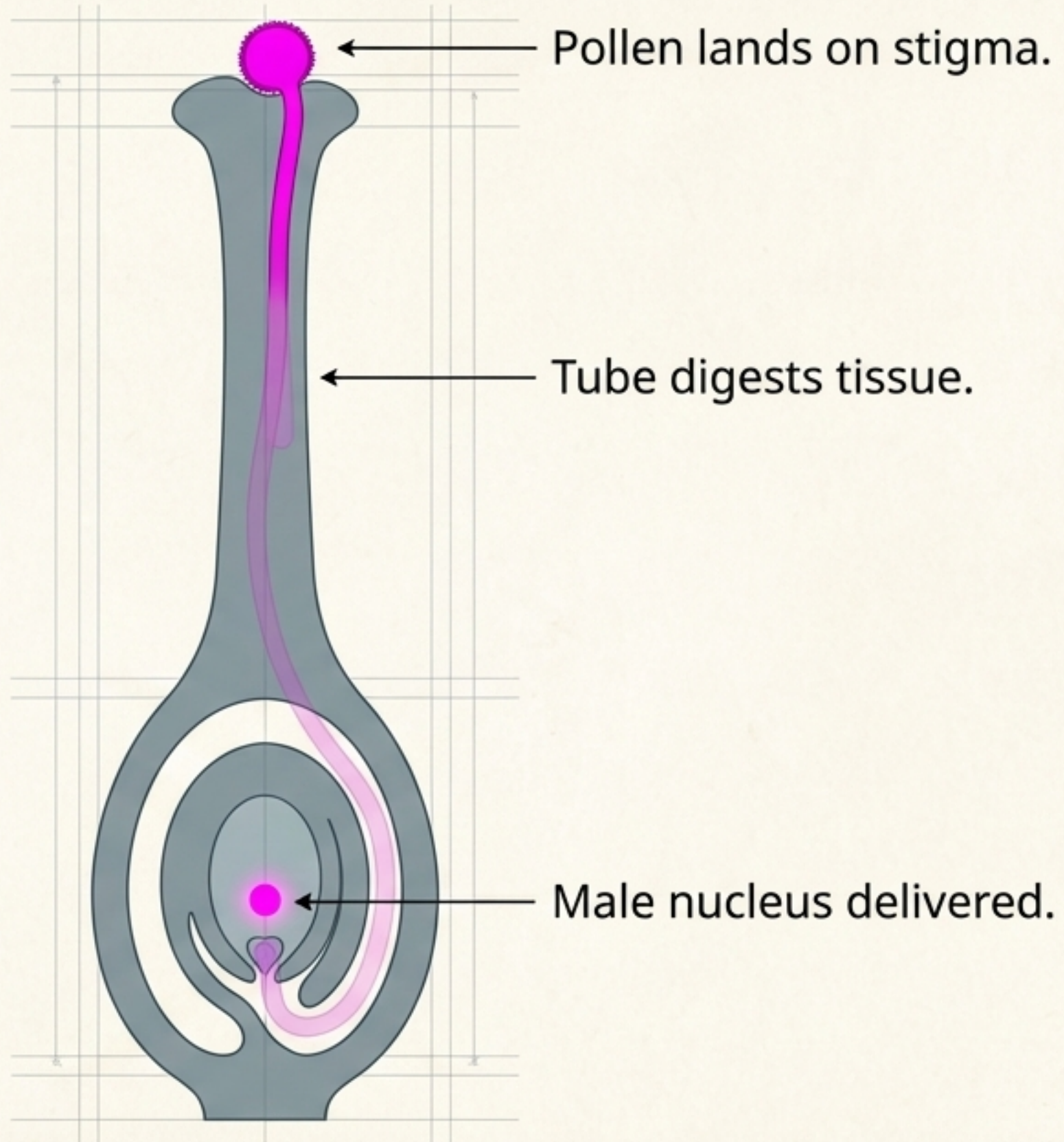
Vector: Wind



Petals: Small, dull, conserving energy.
Stamen: Exposed outside the flower to catch gusts.
Stigma: Feathery nets to catch airborne particles.
Pollen: Smooth, inflated, aerodynamically optimized.

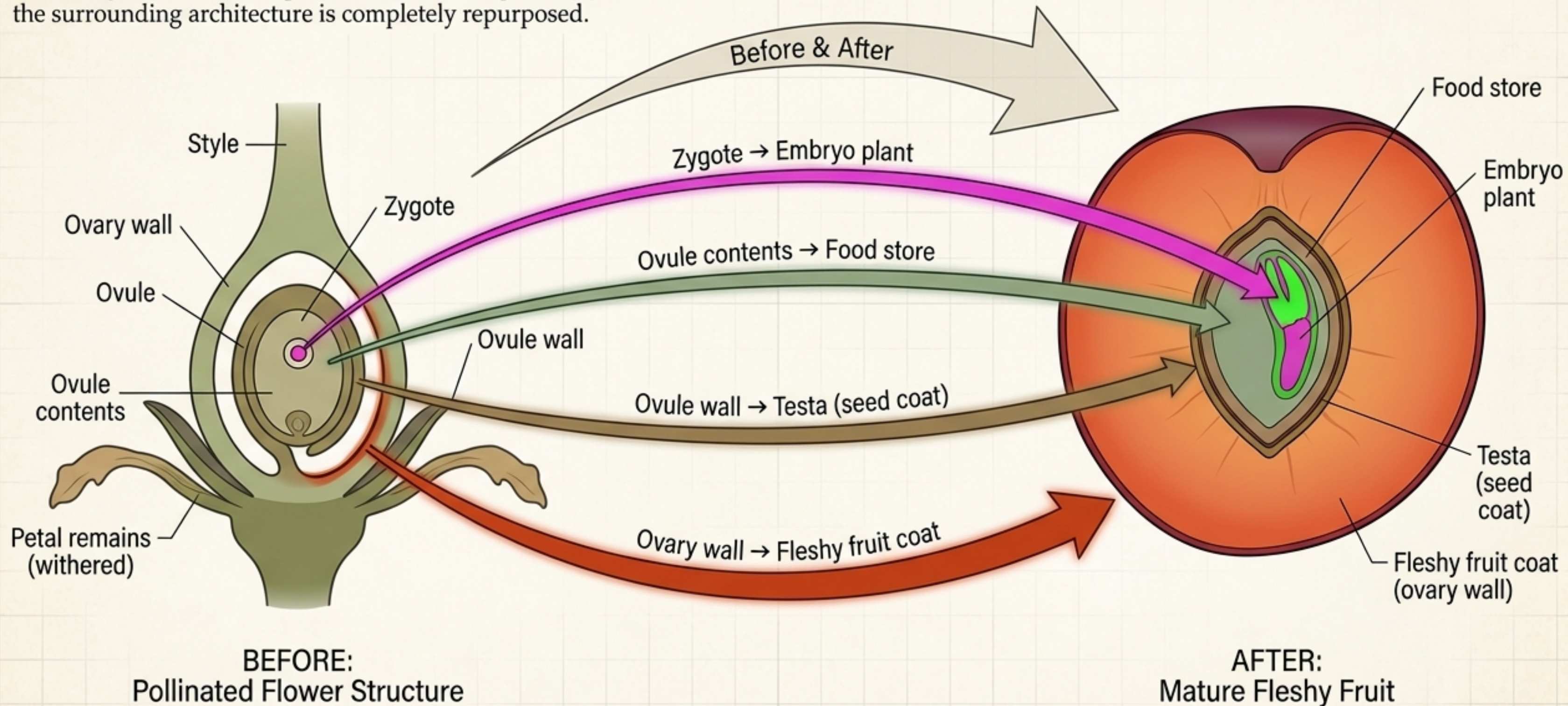
The Descent: Pollen Tube Formation

The male nucleus must travel to the female nucleus. The biological solution is active, chemically-driven structural growth.

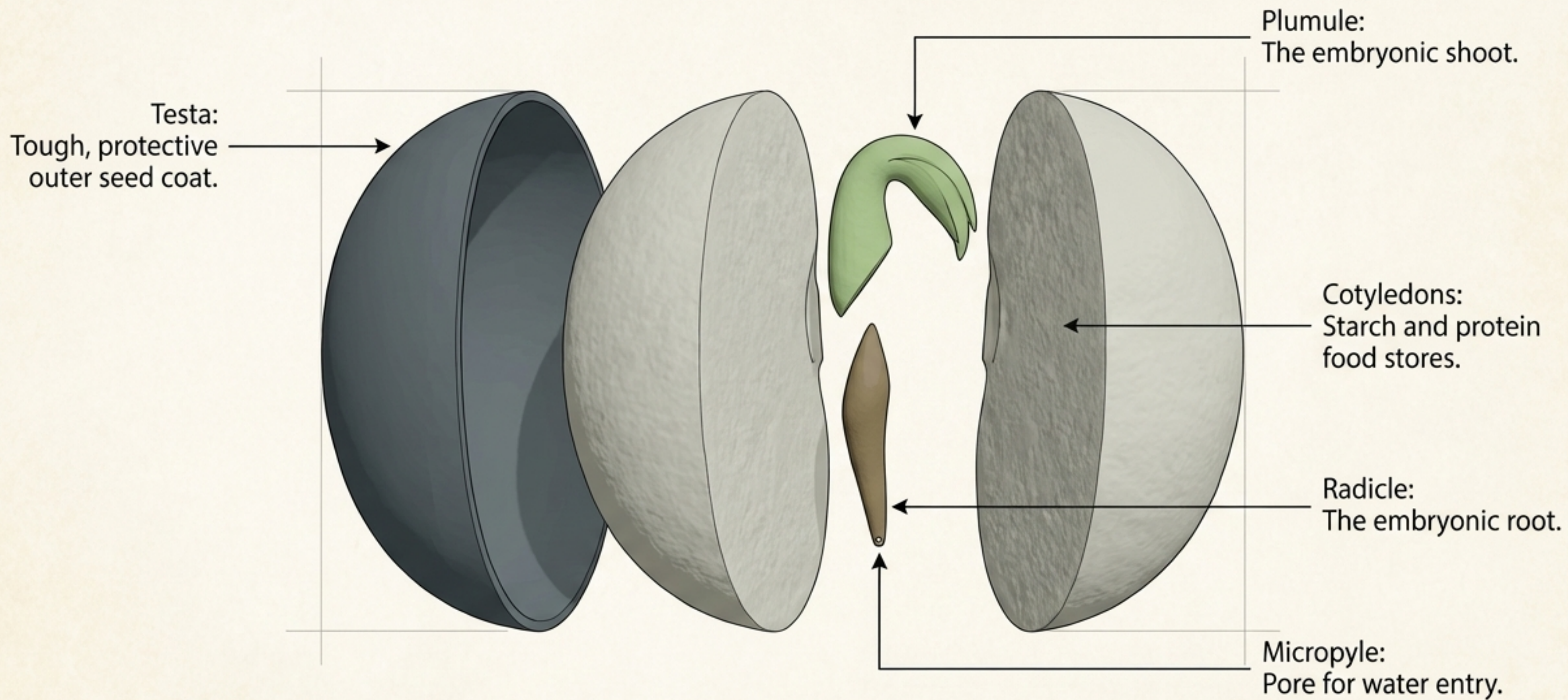


Metamorphosis: From Flower to Fruit

Following the fusion of haploid nuclei into a diploid zygote, the surrounding architecture is completely repurposed.



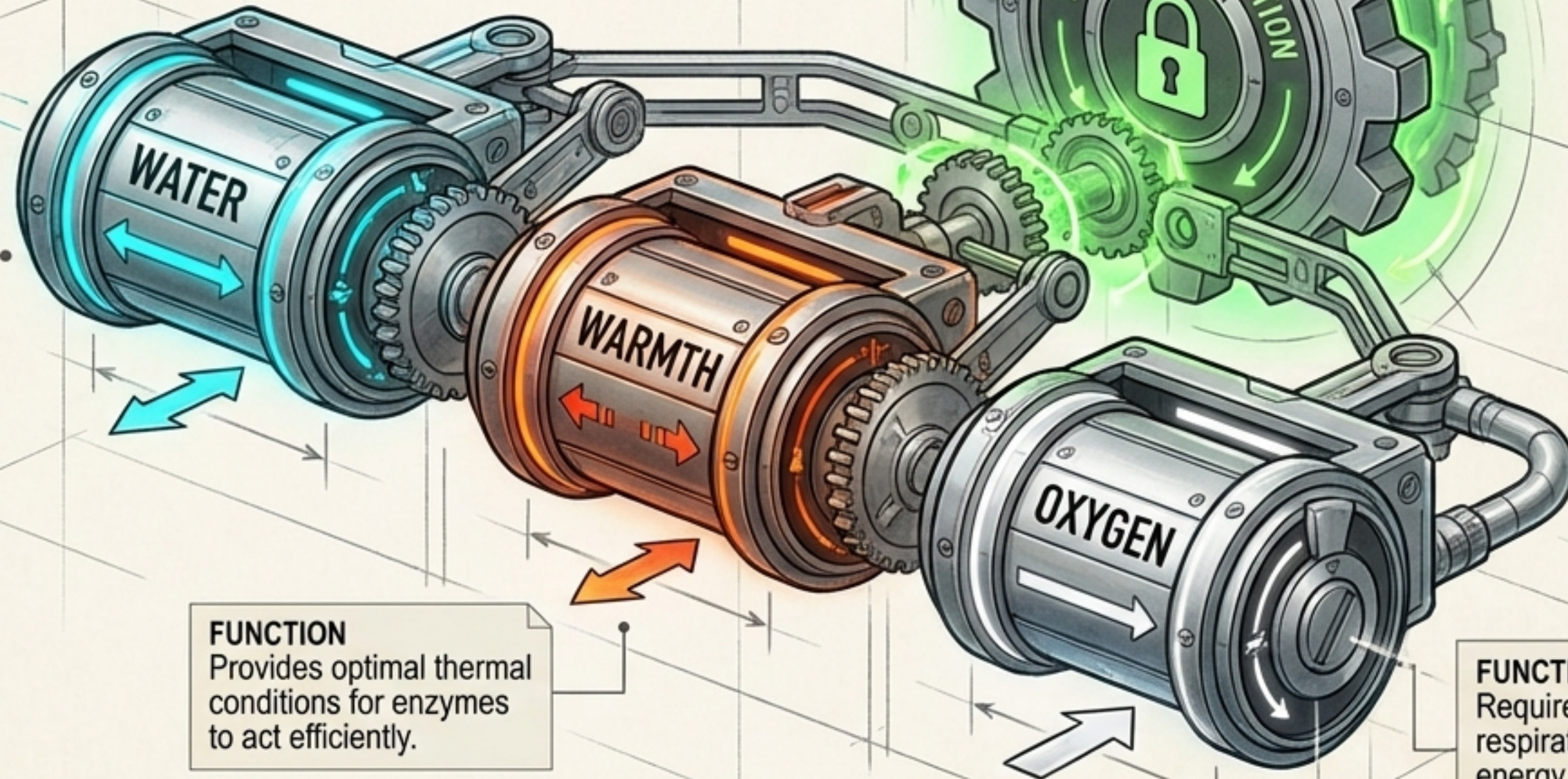
Anatomy of a Blueprint: The Dicot Seed



The Germination Lock Mechanism

Dormancy is only broken when three environmental 'tumblers' align to unlock aerobic respiration and enzyme activity.

FUNCTION
Required to trigger chemical reactions and activate dormant enzymes.

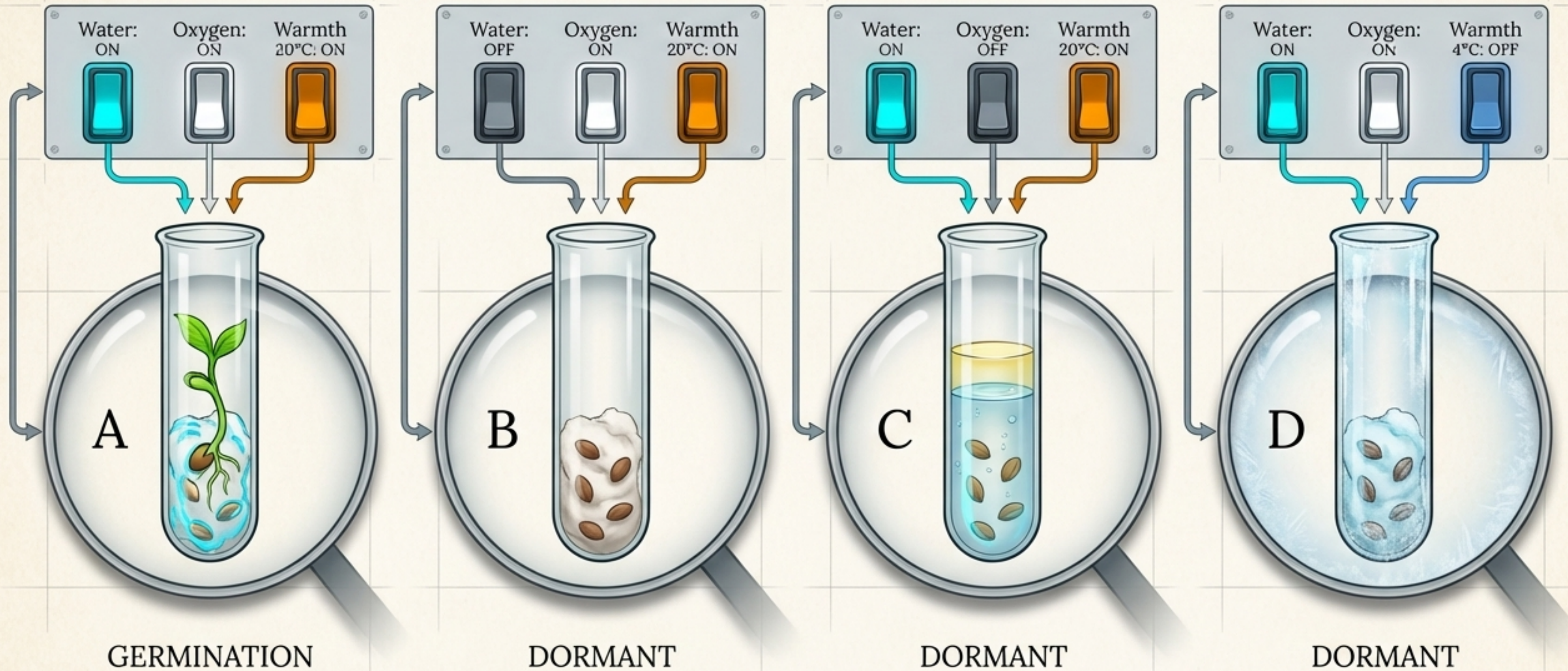


FUNCTION
Provides optimal thermal conditions for enzymes to act efficiently.

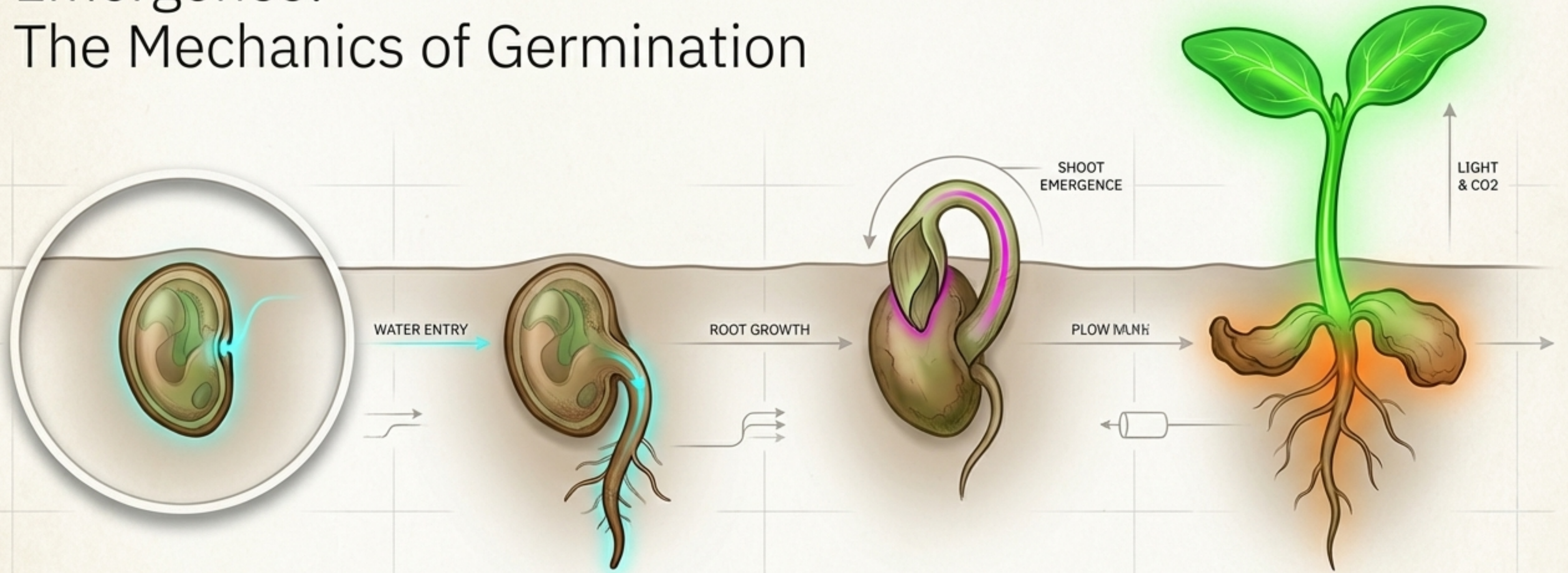
FUNCTION
Required for aerobic respiration to release energy from the food store.

Isolating the Variables of Life

Germination only occurs in Tube A, proving water, oxygen, and warmth are all strictly necessary.



Emergence: The Mechanics of Germination



1. Swelling

Water enters the micropyle, activating enzymes.

2. Anchorage

The radicle emerges first to absorb water and ions.

3. Arching

The plumule arches upward, protecting the delicate shoot tip from friction.

4. Photosynthesis

Leaves unfurl, food store is depleted, and autotrophic life begins.

The Botanical Blueprint Synthesised

A continuous, self-sustaining loop of genetic variation and survival.

