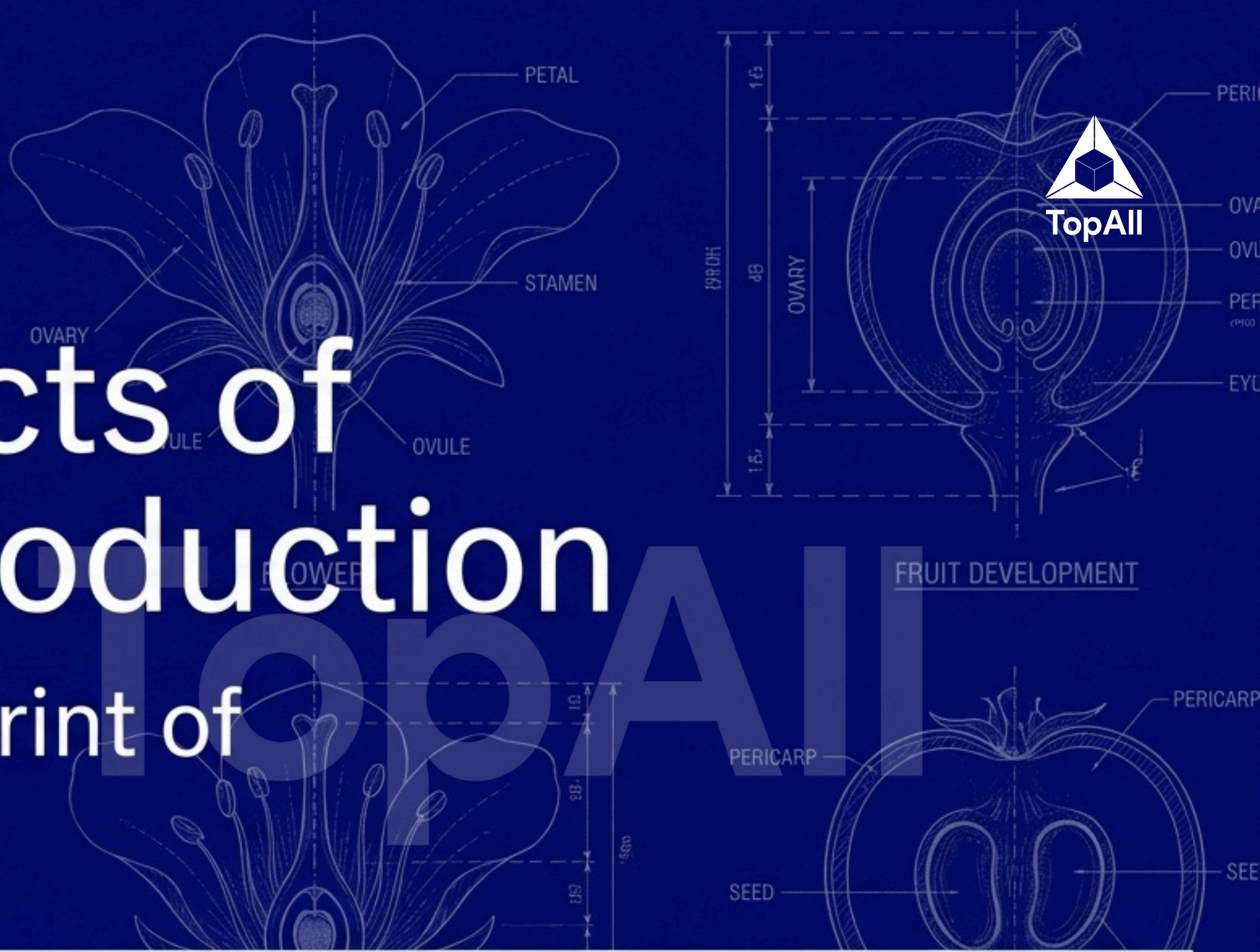


Final Products of Sexual Reproduction

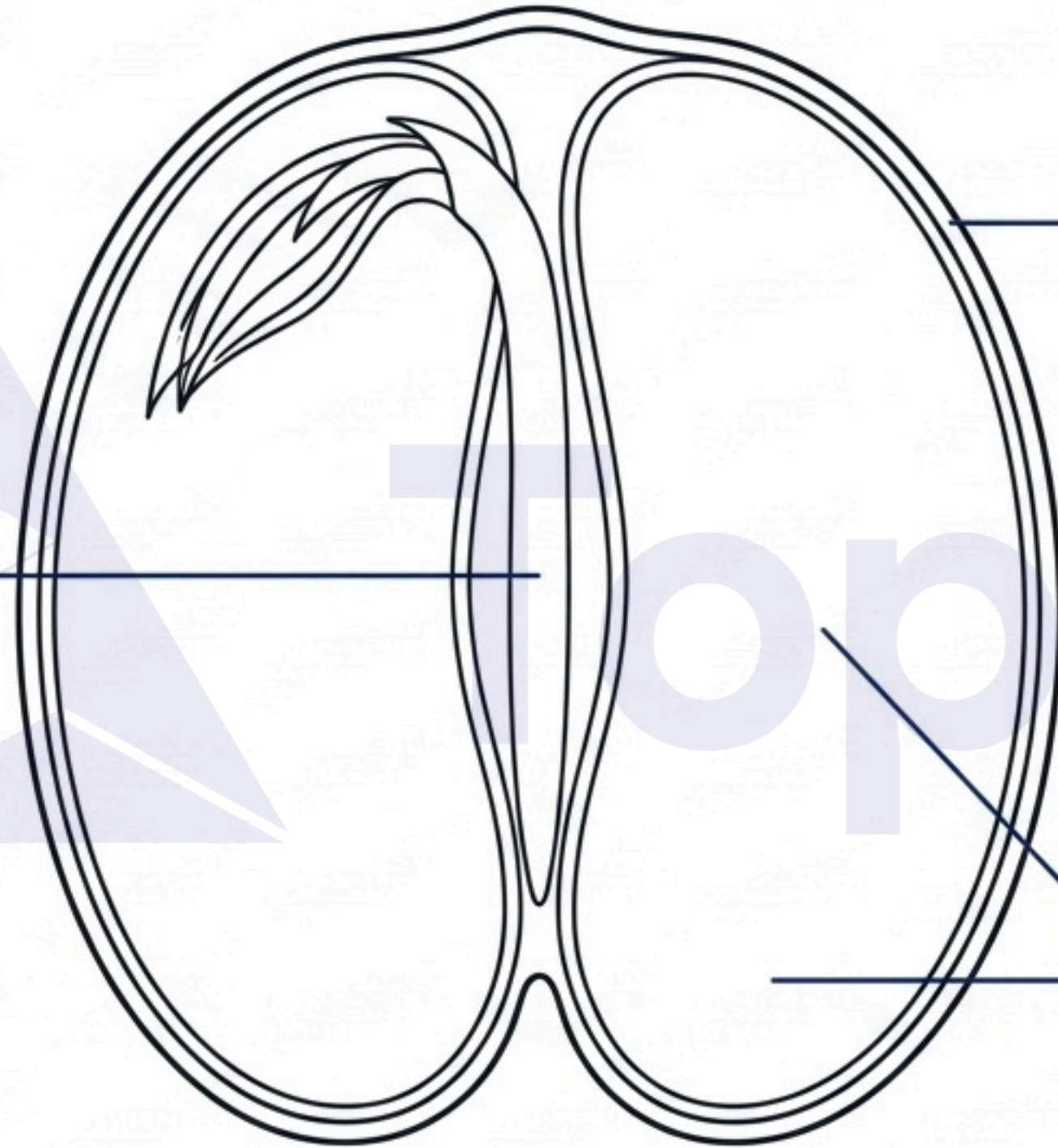
The Botanical Blueprint of Seeds and Fruits

In angiosperms, the simultaneous transformation of the ovule into a seed and the ovary into a fruit represents the culmination of the reproductive cycle.



Embryo Axis

The central structural spine of the developing plant, consisting of the radicle (root) and plumule (shoot).



Seed Coat

Formed from hardened integuments. Provides tough physical protection.

The micropyle remains as a small pore, facilitating the entry of oxygen and water during germination.

Cotyledons

Simple, generally thick structures. Swollen with stored food reserves (highly visible in legumes) to nourish the young seedling.



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Endosperm Retention Strategies

Endosperm: 0%

Non-albuminous Seeds (Ex-albuminous)

The endosperm is completely consumed during embryo development. No residual endosperm remains in the mature seed.



Pea, Groundnut

Endosperm: Persistent

Albuminous Seeds

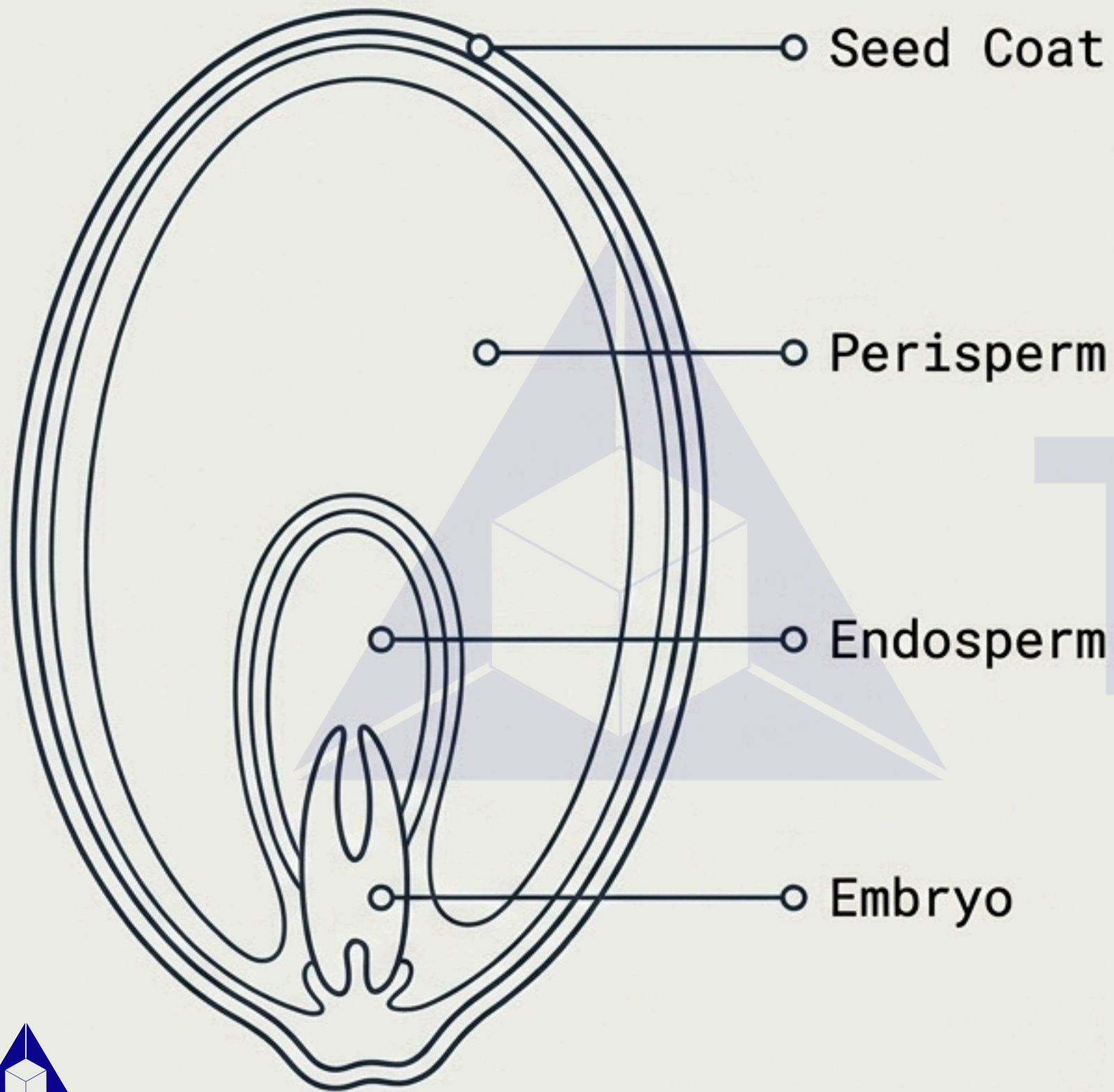
Retains a portion of the endosperm as it is not entirely used up during early embryo development.



Wheat, Maize, Barley, Castor

The Perisperm Anomaly

While most seeds rely on cotyledons or endosperm for storage, some species retain a unique tissue layer from the original ovule.



Perisperm

The residual, persistent nucellus that occasionally survives into the mature seed.

Classic Examples: Black pepper, Beet

WARNING: Do not confuse with endosperm! Endosperm originates from triple fusion, while the perisperm is a diploid maternal tissue (the persistent nucellus).



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Entering Dormancy

Dehydration

As the seed matures, water content drops dramatically. The seed becomes relatively dry, reaching a critical threshold of 10-15% moisture by mass.

Metabolic Deceleration

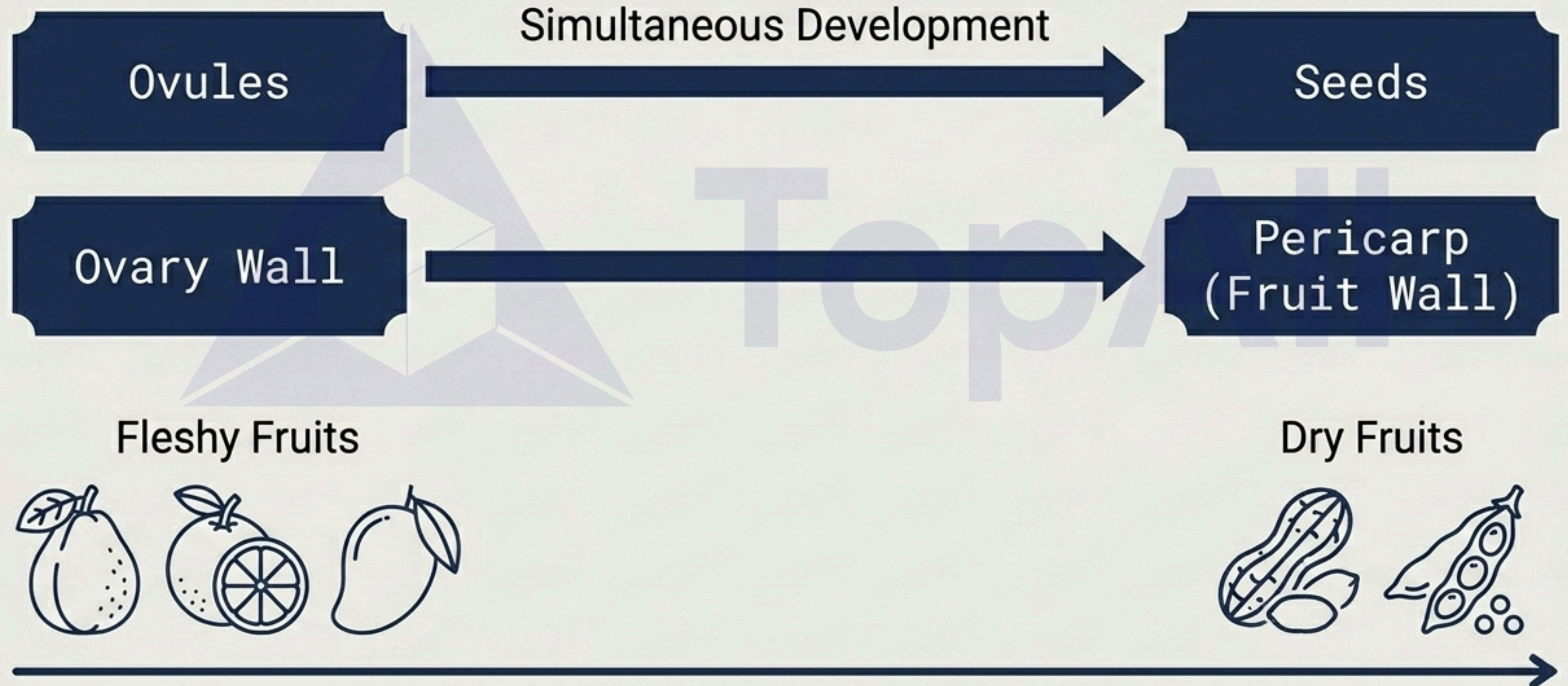
In response to dehydration, the general metabolic activity of the embryo aggressively slows down to conserve energy.

Deep Dormancy

The embryo enters a state of deep physiological inactivity, allowing it to survive extreme environmental conditions.

Germination Triggers: Dormancy is reversible. The seed will break dormancy and germinate only when favorable conditions return: adequate moisture, O₂, and suitable temperature.

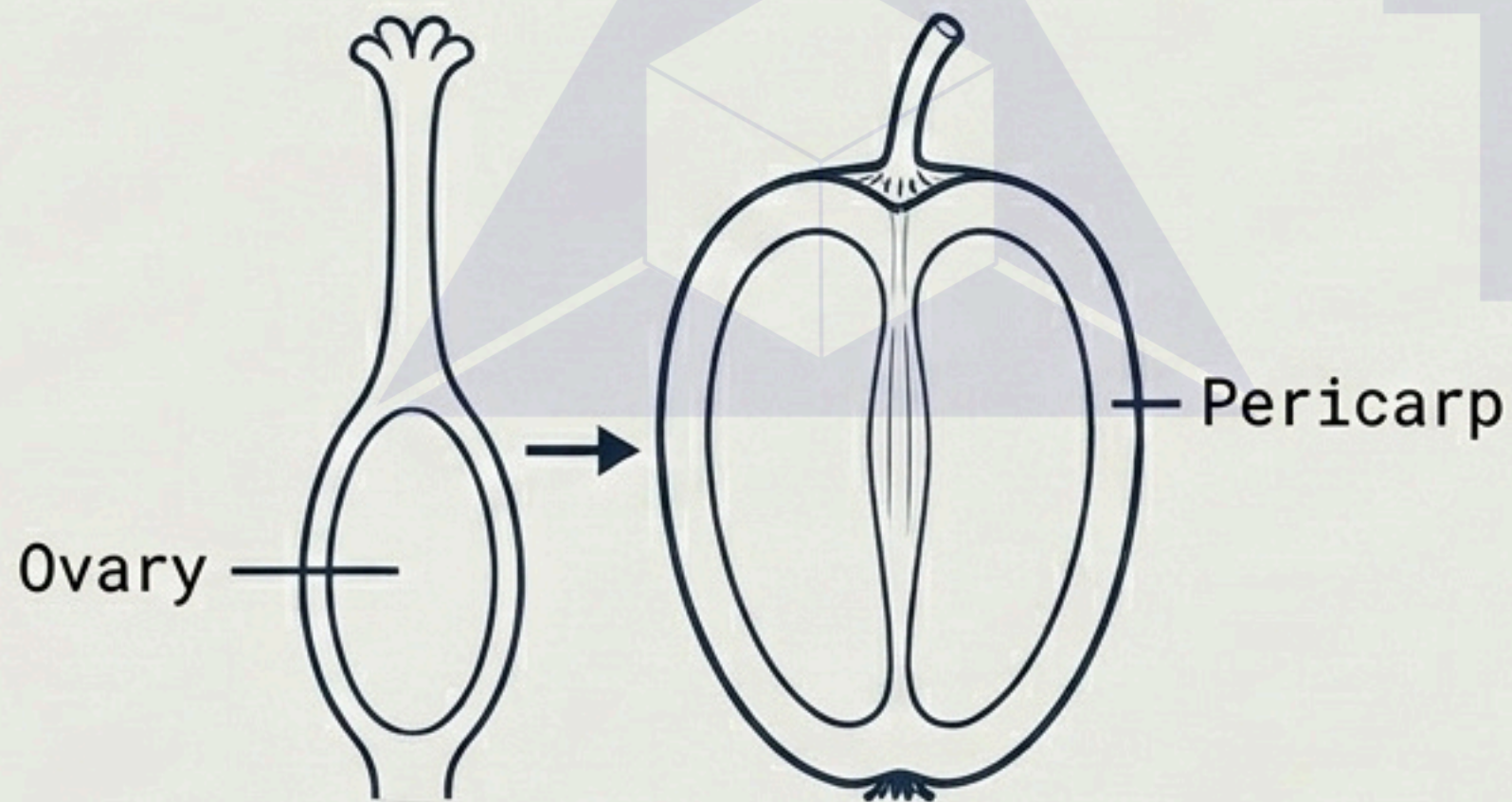
Post-Fertilisation Transformation



True Fruit vs. False Fruit

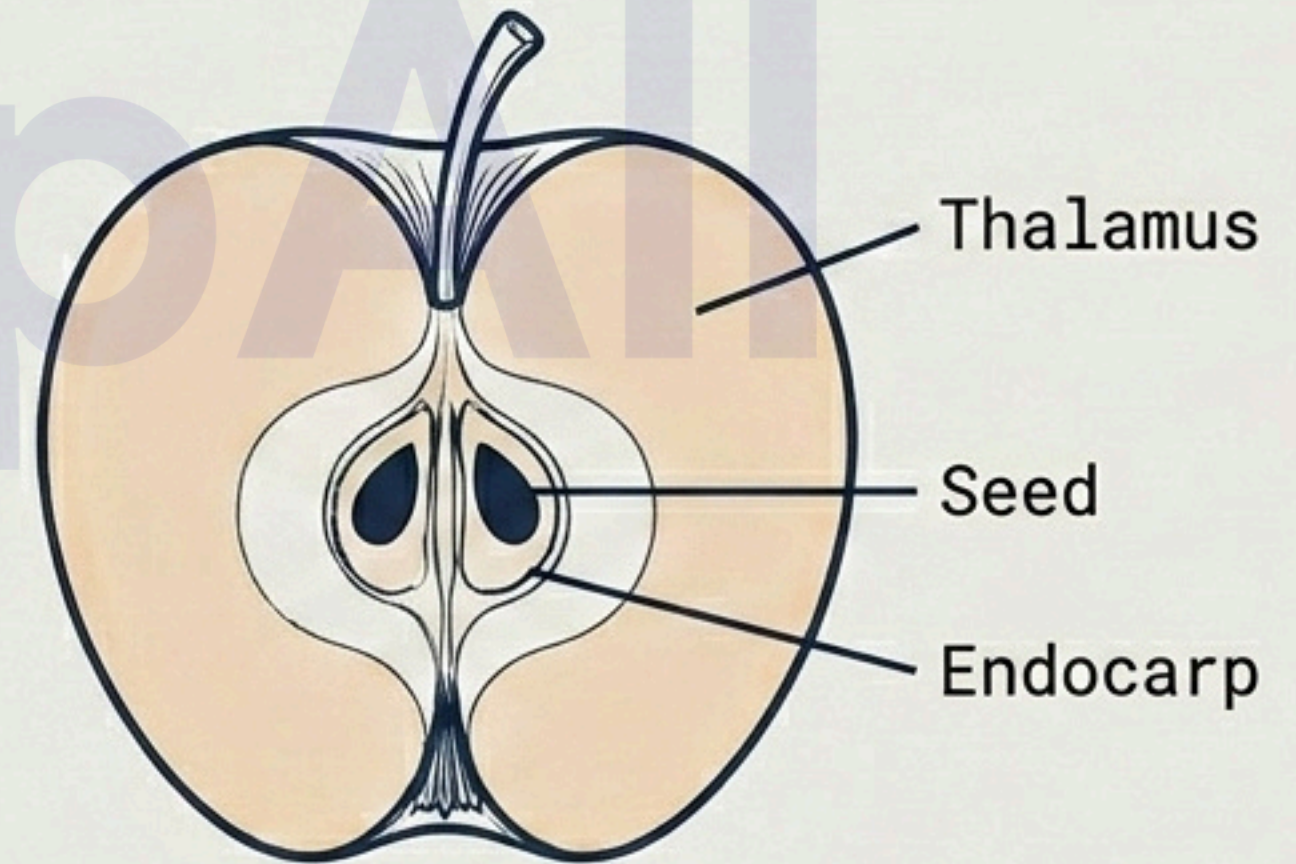
True Fruits

Fruit develops exclusively from the ovary.
Other floral parts degenerate and fall off.



False Fruits

The thalamus contributes significantly to the formation of the fruit alongside the ovary.



Case Studies: Apple, Strawberry, Cashew

Parthenocarpic Fruit

The Definition:

Fruit production that occurs completely without fertilisation.

The Consequence:

Because no fertilisation of the ovules occurs, parthenocarpic fruits are naturally seedless.

Agricultural Application:

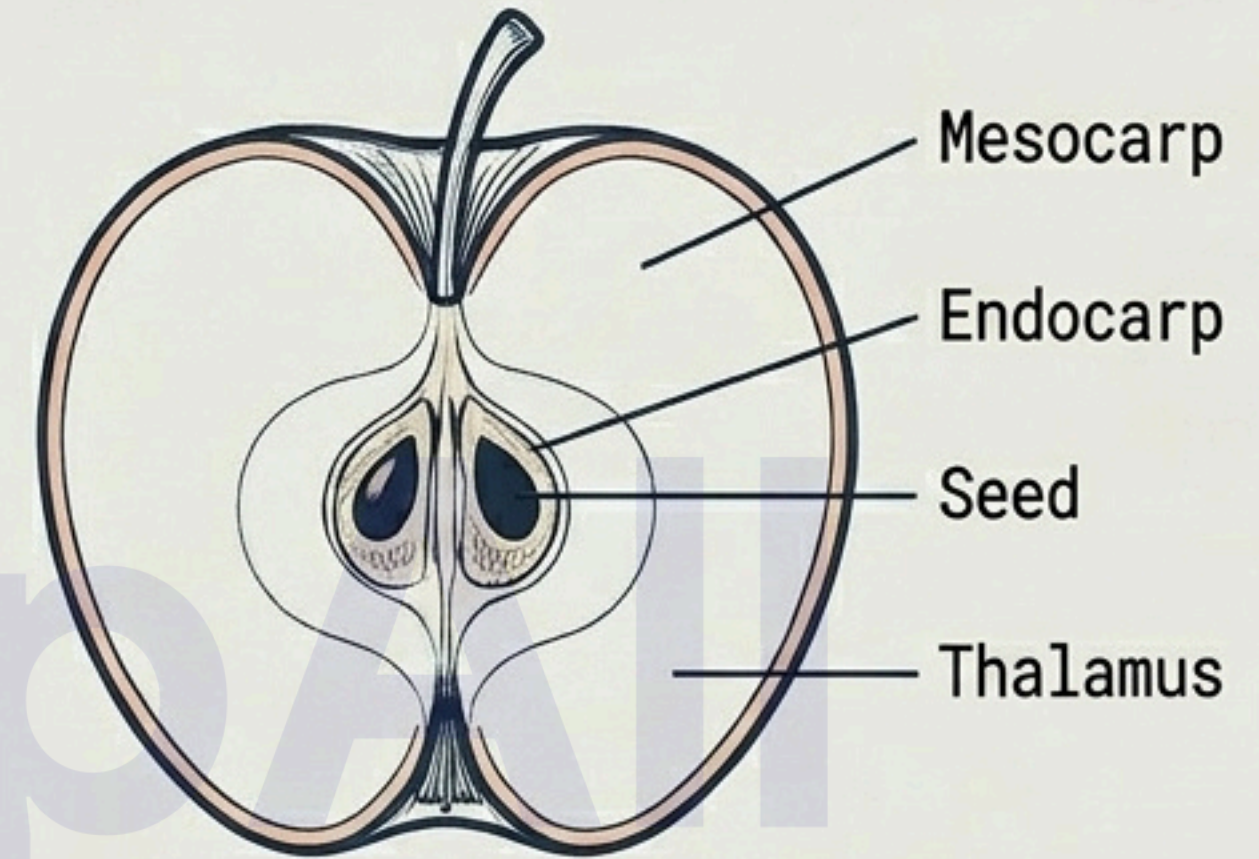
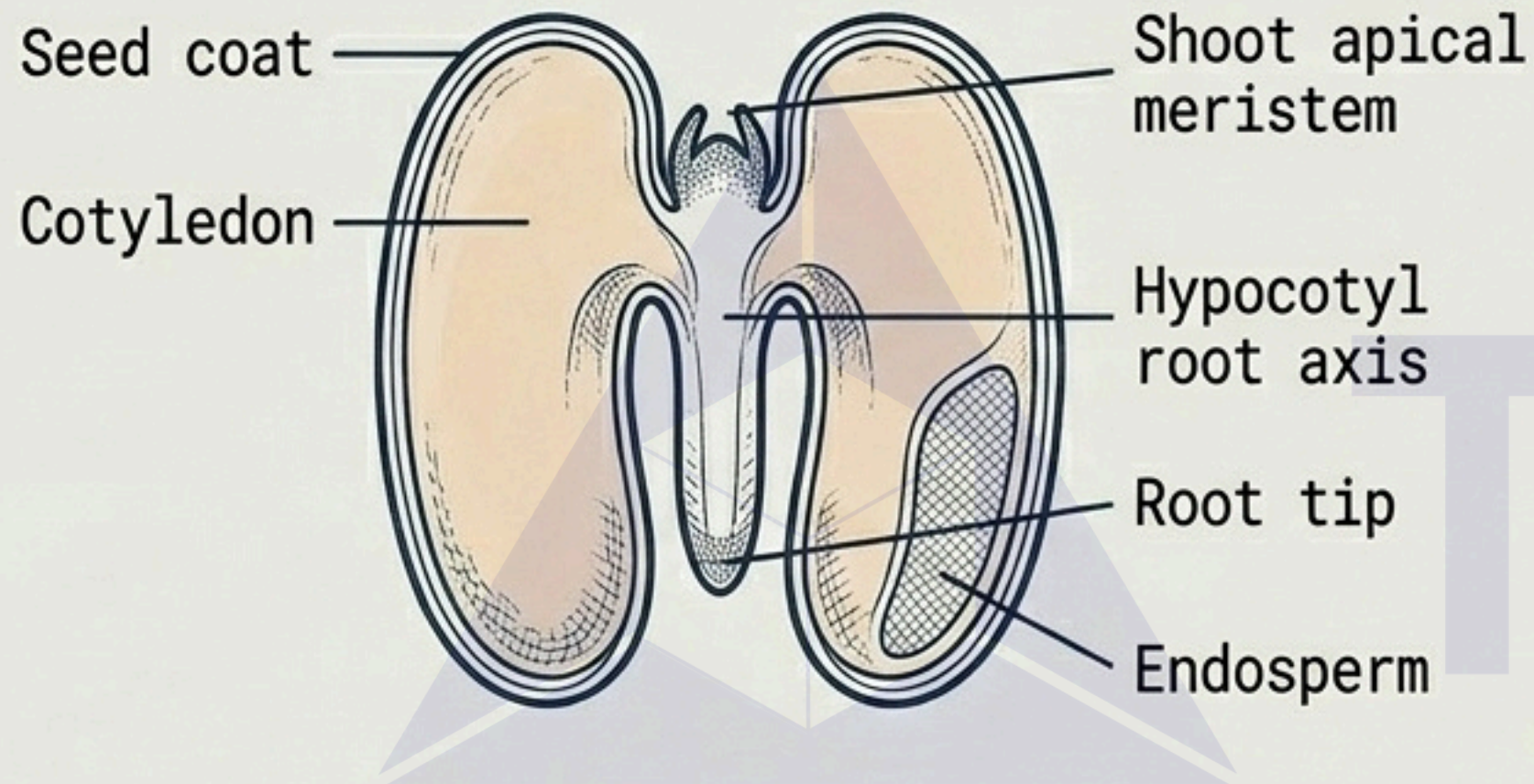
Parthenocarpy is highly desirable in agriculture and can be artificially induced through the application of specific plant growth hormones.

The Example:

Banana
(Naturally occurring parthenocarpy).



The Evolutionary Genius of Seeds and Fruits



The Evolutionary & Human Synthesis: Seeds and fruits offer dependable dispersal strategies, nourish vulnerable seedlings, and generate genetic variations. Crucially, the dehydration and dormancy of mature seeds form the foundational basis of human agriculture—allowing food storage and crop planning across seasons and years.



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