

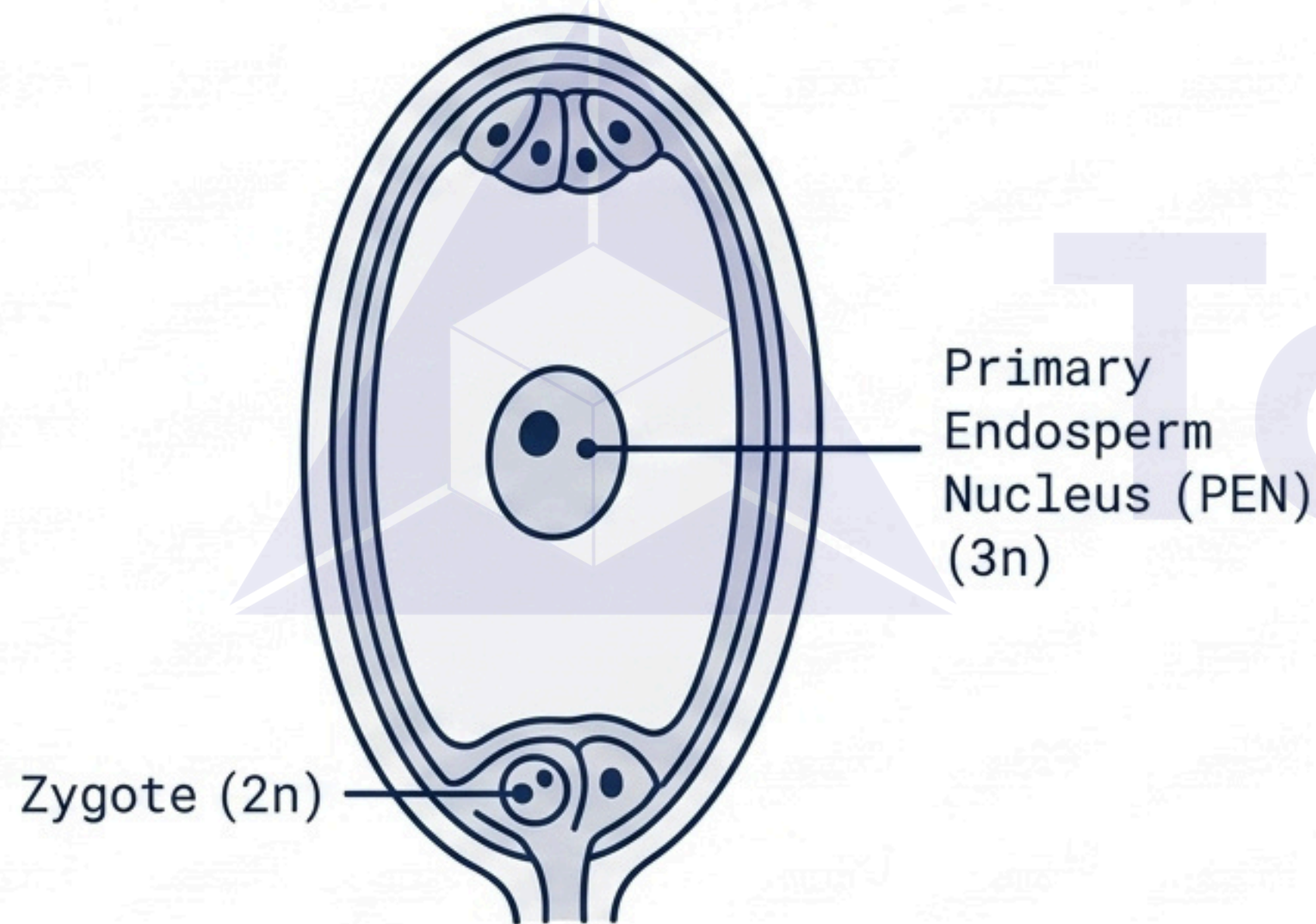


TopAll

From Zygote to Plant Body Plan

The Stages of Embryogenesis in Angiosperms

The Prerequisite for Growth

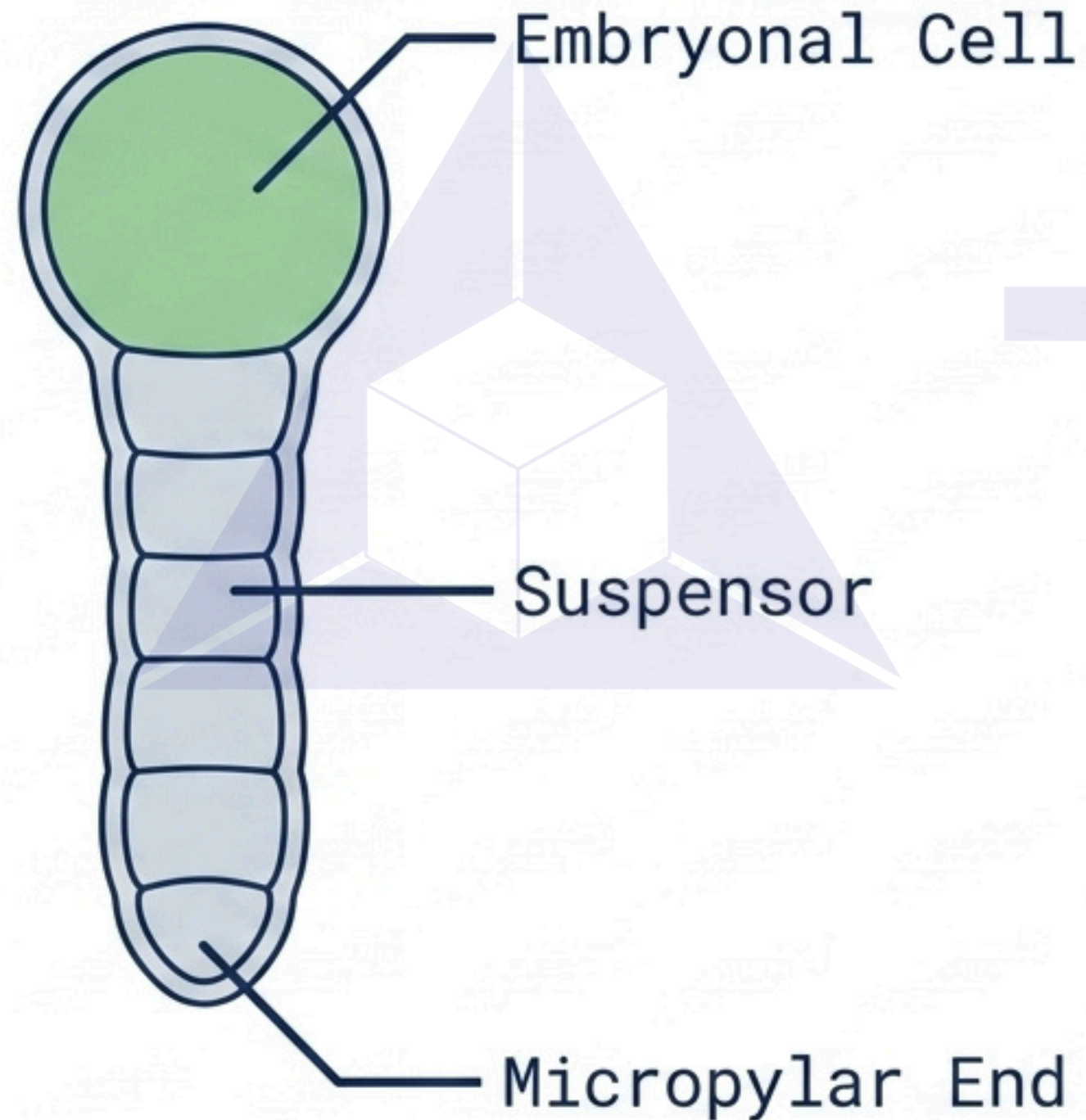


Assured Nutrition

The zygote deliberately remains dormant after fertilization. Most zygotes divide only after a certain amount of endosperm is formed from the primary endosperm cell to guarantee a food source.

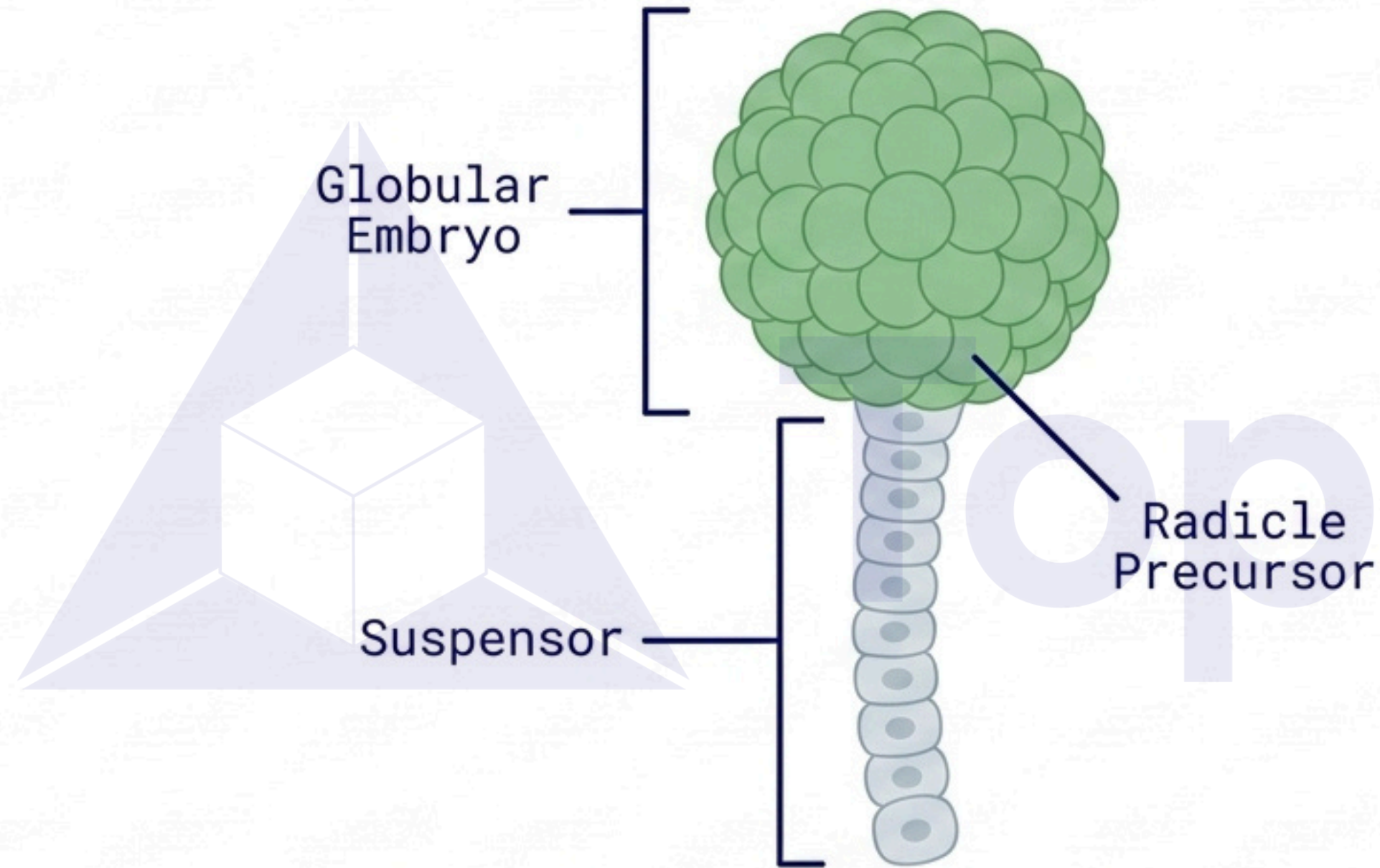
Adaptation for survival: No food, no growth. Endosperm development strictly precedes embryo development.

Stage 1: The Proembryo



Following the initial division of the zygote, the proembryo forms. Although mature seeds differ vastly between plant families, these early stages of embryogeny are fundamentally identical in both monocotyledons and dicotyledons.

Stage 2: The Globular Embryo



Continuous mitotic divisions transform the simple cell line into a dense, spherical 3D mass. The elongated suspensor acts to push the developing globular embryo deeper into the nutrient-rich endosperm tissue.

The transition from a linear cell chain to a complex, multi-cellular spherical mass.



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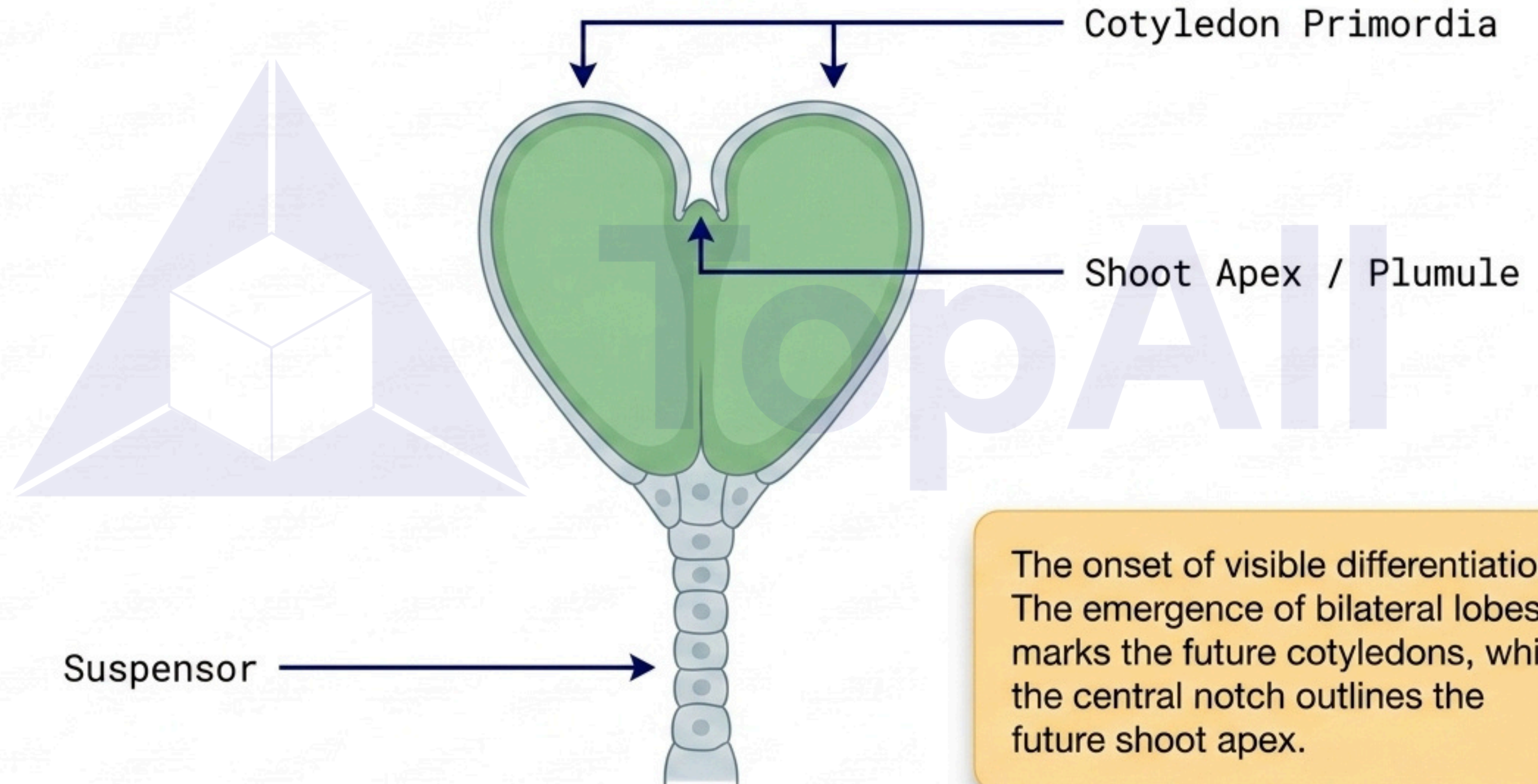
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Stage 3: The Heart-Shaped Embryo



The onset of visible differentiation. The emergence of bilateral lobes marks the future cotyledons, while the central notch outlines the future shoot apex.

The Mature Dicotyledonous Embryo



Cotyledons

Two prominent, simple structures, often thick and swollen due to the storage of food reserves (e.g., legumes) for seedling nourishment.

Epicotyl & Plumule

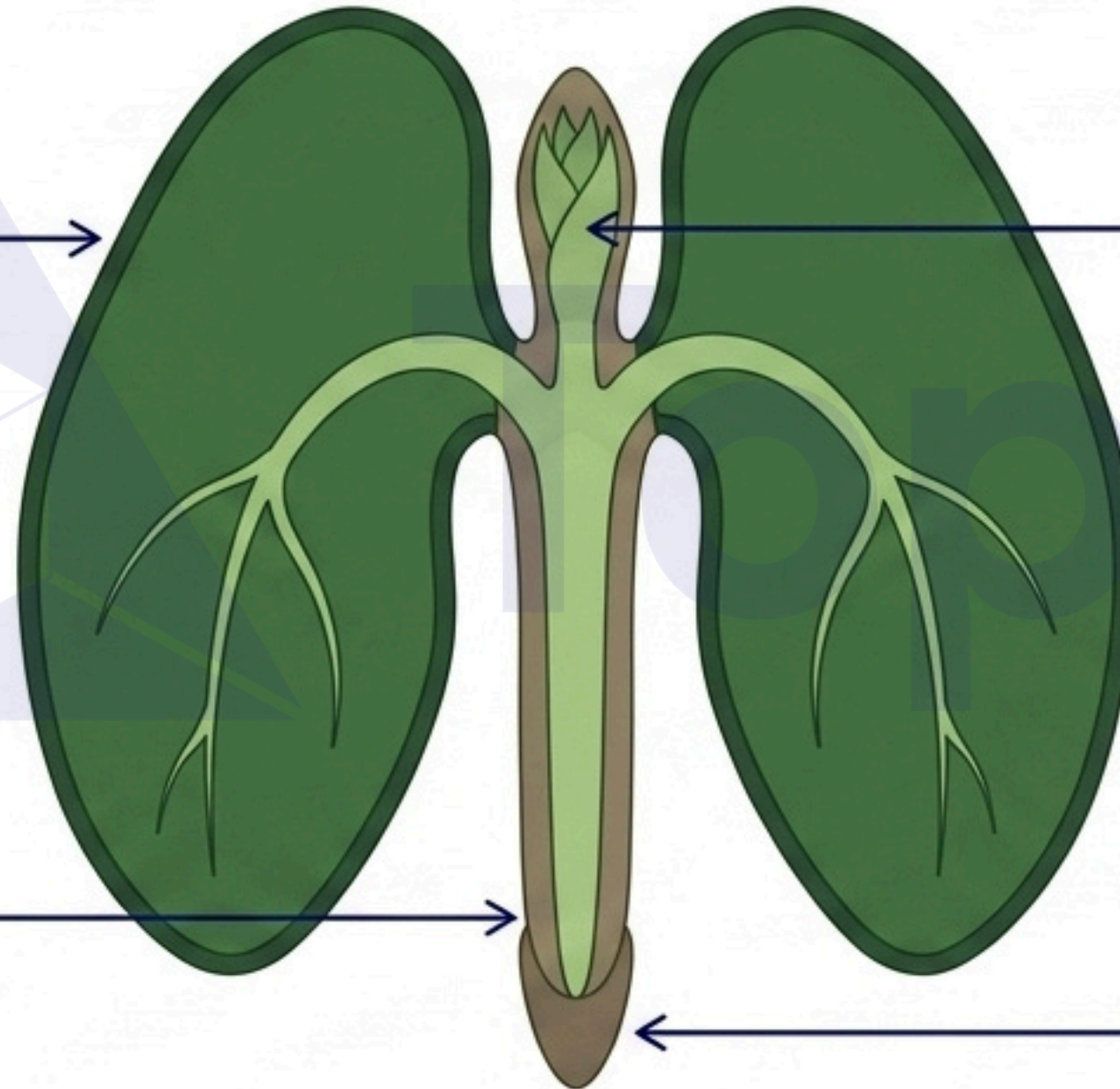
The portion of the embryonal axis above the cotyledons, terminating in the plumule (the future stem tip).

Hypocotyl & Radicle

The cylindrical portion below the cotyledons, terminating in the radicle (the future root tip).

Root Cap

A protective covering over the delicate radicle tip.



The Mature Monocotyledonous (Grass) Embryo

Scutellum

The single, lateral cotyledon situated to one side of the embryonal axis.

Coleorrhiza

An undifferentiated sheath enclosing and protecting the radicle and root cap at the lower end of the axis.

Coleoptile

A specialized, hollow foliar structure enclosing and protecting the epicotyl (shoot apex and leaf primordia).

Epiblast

A small appendage representing the rudimentary second cotyledon (in some species).



Morphological Synthesis: Dicot vs. Monocot



Anatomical Feature	Dicotyledon	Monocotyledon (Grass)
Cotyledons	Two (often thick/swollen)	One lateral (Scutellum)
Shoot Protection	Naked plumule / epicotyl	Enclosed in hollow Coleoptile
Root Protection	Radicle covered by Root cap	Radicle & root cap enclosed in Coleorrhiza

Despite divergent mature structures, both botanical blueprints originate from identical early embryonic stages (Proembryo → Globular → Heart) to ensure successful seed germination.



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