Key Terminology: Plant Embryogenesis & Seed Development

Embryo Development Stages

Zygote: The diploid cell formed by the fusion of male and female gametes during fertilization; the first cell of the new sporophyte generation.

Globular Stage: Early embryonic stage where the embryo forms a spherical mass of cells through rapid cell division, before tissue differentiation begins.

Heart Stage: Embryonic stage characterized by the formation of cotyledon primordia, giving the embryo a distinctive heart-shaped appearance.

Torpedo Stage: Stage where the embryo elongates and begins to differentiate various tissue types, including vascular tissues.

Mature Embryo: Fully developed embryo within the seed, containing all essential organs and ready for dormancy.

Seed Anatomy - General

Cotyledon: Seed leaf; serves as nutrient storage organ or photosynthetic structure in developing seedlings.

Epicotyl: The portion of the embryo above the cotyledons that develops into the leaves and upper stem.

Hypocotyl: The embryonic stem region between the cotyledons and the radicle.

Radicle: The embryonic root; the first structure to emerge during germination.

Plumule: The embryonic shoot, consisting of the epicotyl and young leaves.

Testa: The protective seed coat derived from the integuments of the ovule.

Seed Anatomy - Monocot Specific

Coleoptile: Protective sheath covering the plumule in monocot embryos.

Coleorhiza: Protective sheath covering the radicle in monocot embryos.

Scutellum: The single, modified cotyledon in grass embryos that absorbs nutrients from the endosperm.

Seed Types and Tissues

Endosperm: Nutritive tissue that provides nourishment to the developing embryo; triploid tissue formed by double fertilization.

Albuminous Seed: Seed that retains endosperm as a food storage tissue at maturity (e.g., corn, wheat).

Exalbuminous Seed: Seed that has no endosperm at maturity because it is completely consumed during embryo development (e.g., bean, pea).

Pericarp: The fruit wall; in some seeds (like corn) it is fused with the seed coat.

Developmental Processes

Apical Meristem: Regions of active cell division at the tips of roots and shoots that produce new growth.

Dormancy: A period of suspended growth and metabolic activity that allows seeds to survive unfavorable conditions.

Imbibition: The absorption of water by dry seeds, which initiates the germination process.

Germination: The process by which a dormant seed resumes growth and develops into a seedling.

Plant Classification

Monocotyledon (Monocot): Flowering plants with one cotyledon, parallel leaf venation, and scattered vascular bundles (e.g., grasses, lilies, orchids).

Dicotyledon (Dicot): Flowering plants with two cotyledons, net-like leaf venation, and vascular bundles arranged in a ring (e.g., beans, roses, sunflowers).

GBIO 100 - Developmental Biology Laboratory

Laboratory Exercise No. 4: Essential Terminology - Study these terms for the pre-lab quiz and lab activities