Tissue Culture Encyclopedia Article

Tissue Culture

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Tissue Culture

For a variety of purposes, plant cells, tissues, organs, and whole plants can be grown in labware containing a medium composed of defined molecules. Tissue culture media provide water, minerals, vitamins, hormones, carbon sources, and antibiotics depending on the plant material being cultured. Since most living plant cells are **totipotent**, scientists can manipulate the medium to regenerate whole plants from even a single genetically engineered plant cell or from a cluster of cells from a rare plant. Hormones in the medium determine what plant parts form from the cells (callus) in the culture: Auxins stimulate root formation and cytokinins stimulate shoot formation. The medium may contain agar, agarose, phytagel, or other **polysaccharides** to form a semisolid gel to support the plant tissue. The container must be colorless if photosynthesis is to be supported, and the light source should not be too intense to avoid the greenhouse effect inside the container. If the container is not ventilated, a carbon source such as sucrose will have to be used. Tissues must be subcultured periodically to avoid **solute** concentration buildup if the container is ventilated. Antibiotics may be used to keep the culture clear of bacteria, fungi, or other contaminants or to select for genetically engineered cells. Tissue culture techniques are also used to generate large numbers of genetically identical plants for agricultural applications, or to generate additional plants of rare or endangered species.

See Also

Genetic Engineering; Propagation; Reproduction, Asexual; Transgenic Plants.

A petri dish of Venus'sflytrap tissues.

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