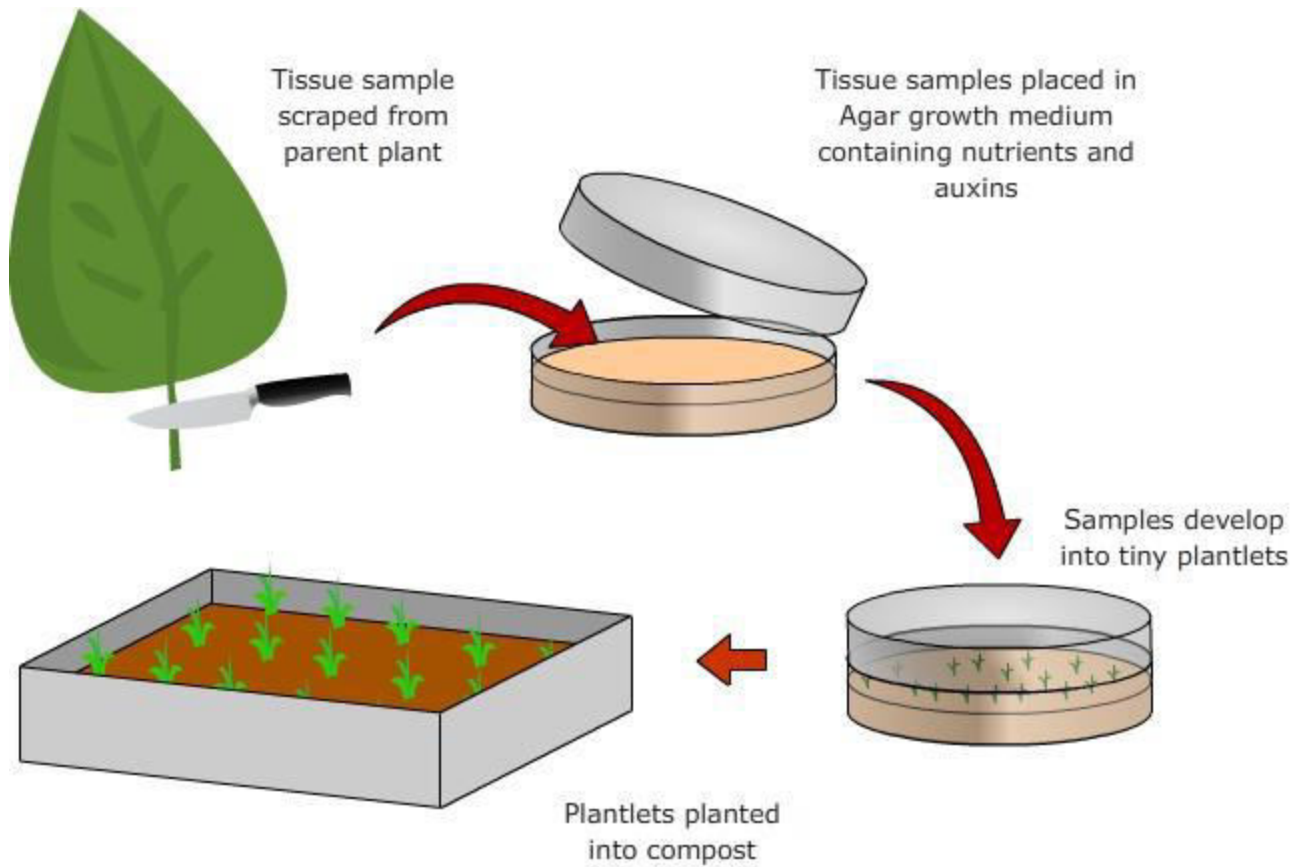


INTRODUCTION TO TISSUE CULTURE

-INDRESH KUMAR PANDEY



Overview of Process



Gottlieb Haberlandt- Father of plant tissue culture who conceived the concept of plant cell culture in 1902.



R.J. Gautheret



P. Nobecourt



P. R. White

In 1934, White was the pioneer to obtain indefinite cultures with root tips from tomato plants. Nobecourt, White and Gautheret achieved *in vitro cultivation of plant tissues for an indefinite time period in 1939*.

Gautheret in 1939 obtained continuously growing cultures from carrot root cambium employing Indole-acetic acid and B vitamins.



Folke Skoog

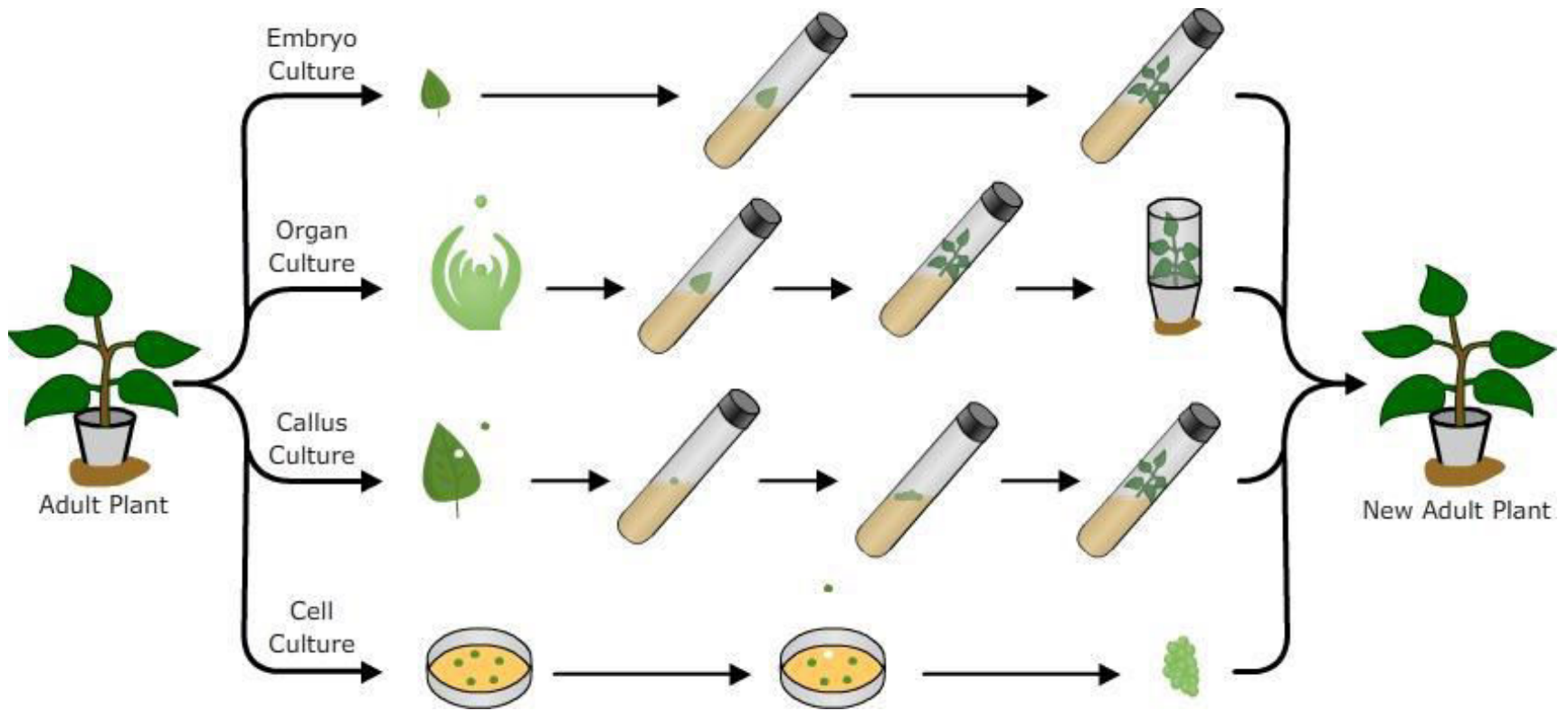
Skoog alongwith Miller in 1957 by manipulating the relative concentrations of auxin and kinetin put forth the concept of chemical control of organogenesis (root and shoot differentiation). Furthermore, he alongwith Murashige in 1962 formulated the most widely used plant tissue culture medium (Murashige & Skoog"s medium).



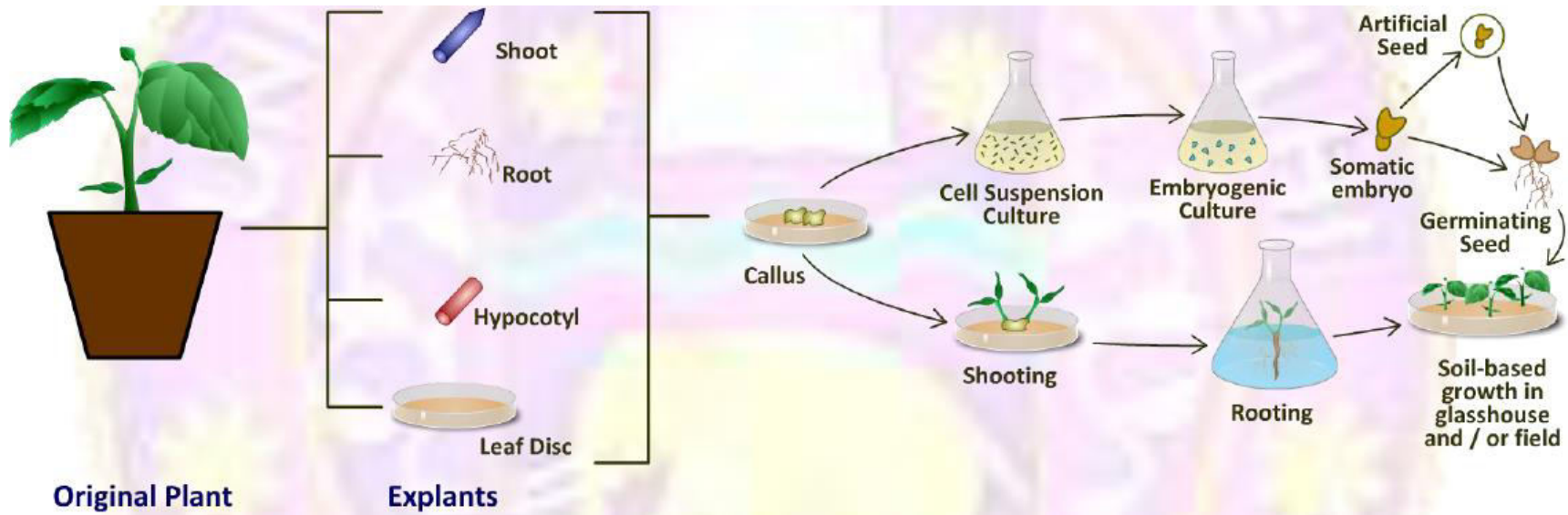
S. Guha Mukherjee along with S. C. Maheshwari discovered the technique of production of haploid plants via anther culture in *Datura innoxia* in 1964.



P. Maheshwari; He was one of the leading plant embryologists who successfully established the technique of test-tube fertilization of angiosperms (1961).



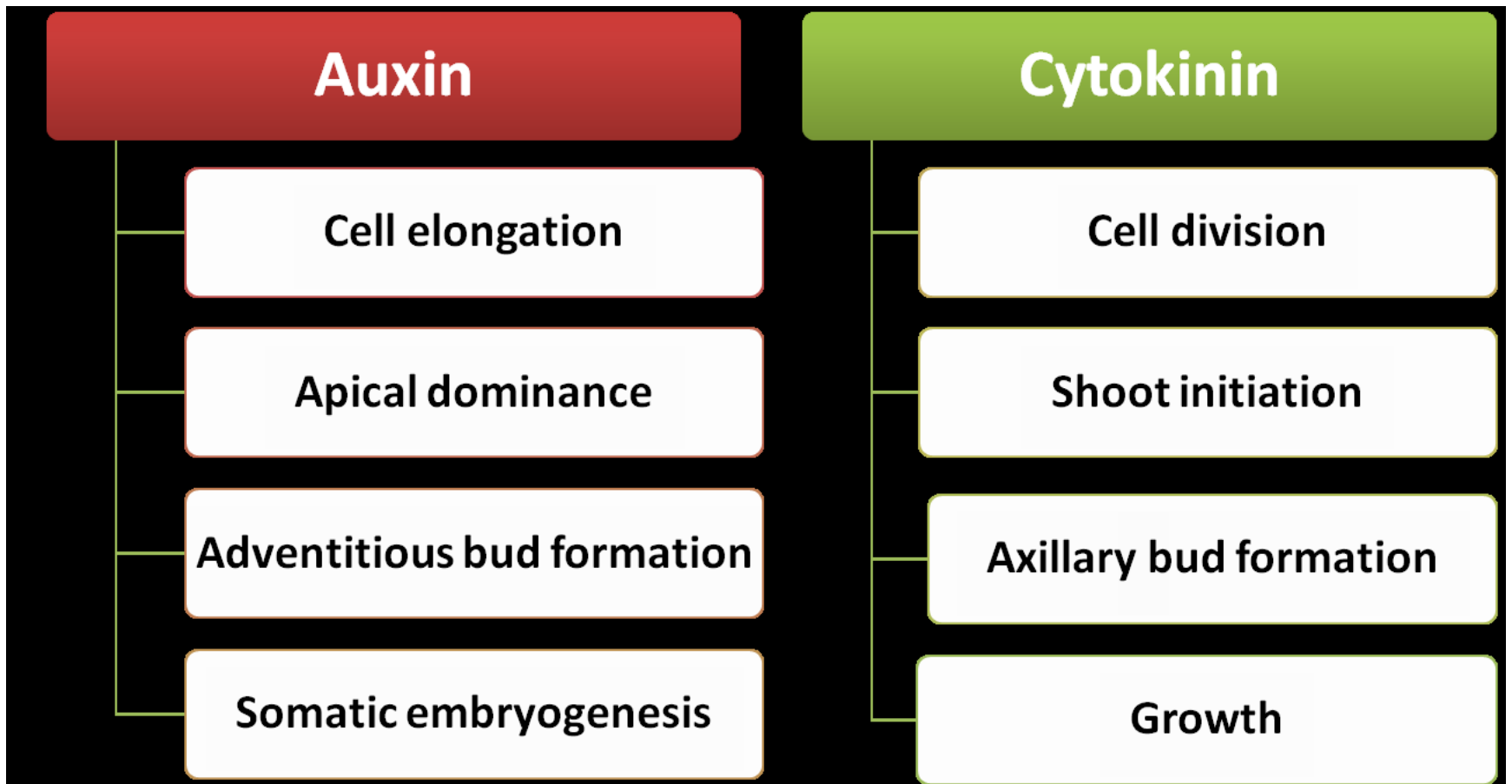
Depiction of the various approaches for *in vitro* regeneration of a complete plant



An overview of the steps involved in tissue culture. A number of tissues can be used as explants and used for *in vitro culture to regenerate whole plants by various methods of tissue culture.*

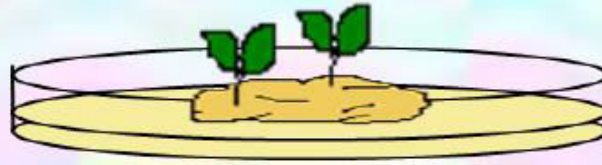
Scientist	Type of medium	Year
Knop	Salt solution	1865
Uspenski and Uspenskaia	Culture medium for algae	1925
Gautheret	Callus culture medium	1939
White	Root culture medium for tomato roots	1943
Murashige and Skoog medium	Basic medium for tissue culture and callus culture	1962
Nitsch and Nitsch	Anther culture medium	1969
Gamborg	Soyabean callus culture medium	1969
Schenk and Hildebrandt	Medium for callus culture of monocots and dicots	1972
Lloyd and McCown	Woody plant medium	1980

List of some tissue culture media developed by various scientists for different systems.



Functions of auxin and cytokinin in plants growing *in vitro*

Low Auxin and high Cytokinin



Shooting occurs

Intermediate ratio of Auxin and Cytokinin



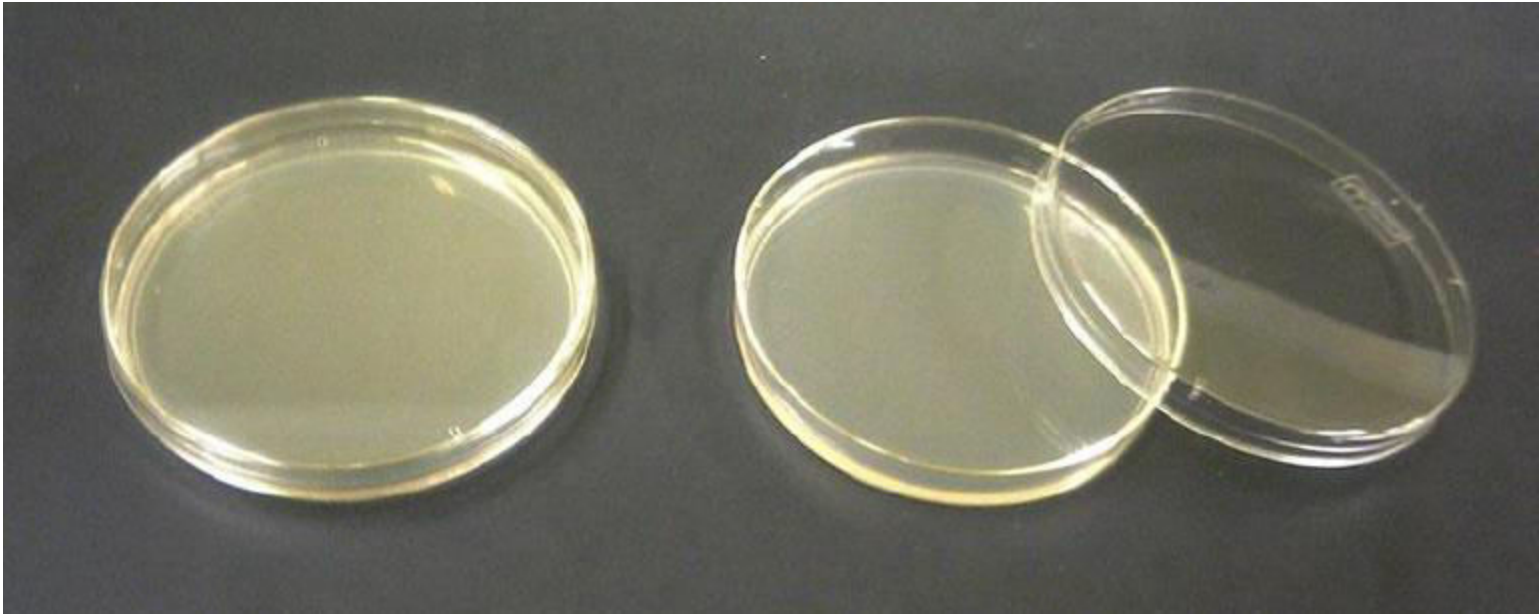
Callus formation takes place

Low Cytokinin and high Auxin

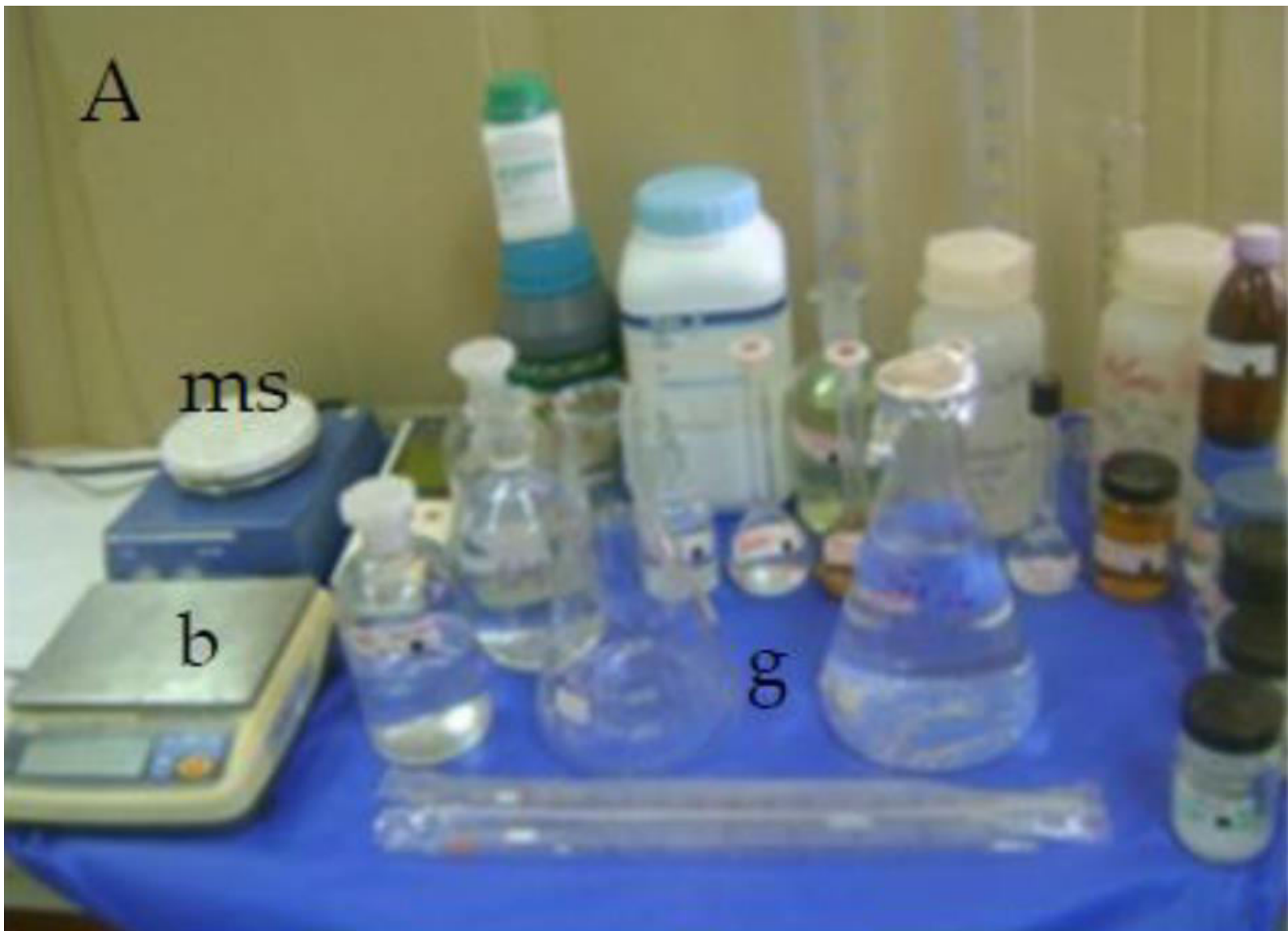


Rooting occurs

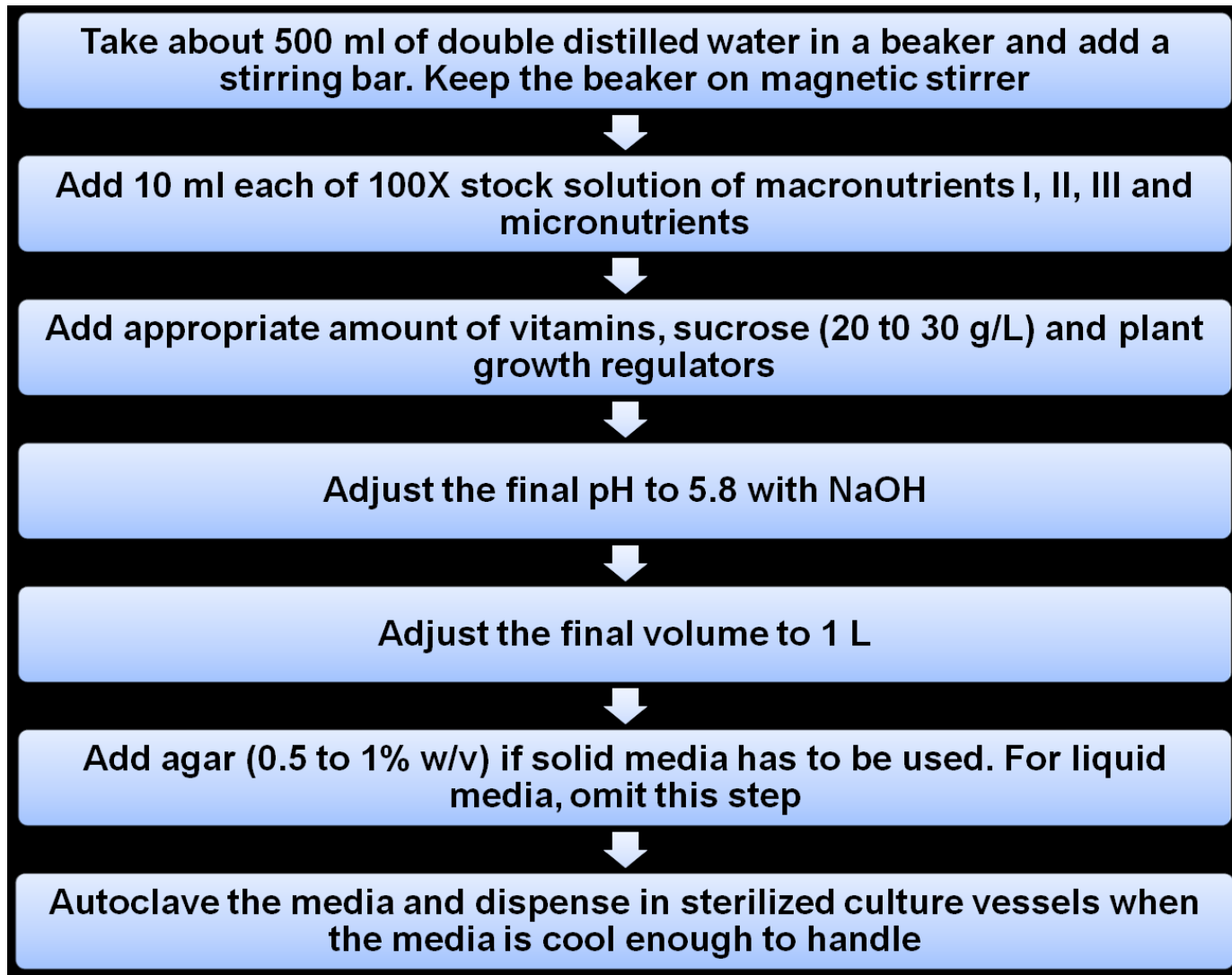
Effect of relative concentrations of auxin and cytokinin in tissue culture.



Petri plates with agar containing media.

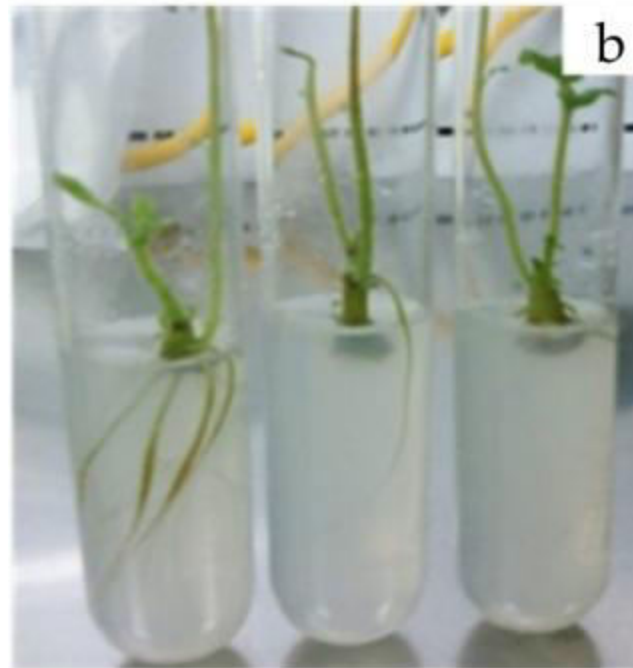


Different equipment and apparatus required for media preparation (ms – magnetic stirrer, b – weighing balance, g – glassware)



Flowchart showing the method of media preparation

The media can be dispensed in flasks, petri plates, bottles or culture tubes as per requirement. If the media is dispensed after autoclaving, then media should be poured into pre sterilized culture vessels, in sterile conditions that are inside laminar airflow hood. Alternatively, the media can be dispensed in culture tubes and then autoclaved.



Culture tubes containing solid medium.



A representative picture showing a laminar air flow hood.

Laminar air flow consists of –

- Cabinet
- HEPA (High – efficiency Particulate Air) filter
- Fan
- UV Lamp
- Light
- Gas connection