



VIKRAMA SIMHAPURI UNIVERSITY
NELLORE-524 320, AP, INDIA
DEPARTMENT OF BIOTECHNOLOGY

Semester: III; Paper: 303; Course Name: Animal Biotechnology

Unit-I: lesson Plan at a glance

I	Topics layout	<ol style="list-style-type: none">1. History and development of animal tissue culture2. Equipment and materials3. Principles of sterile techniques4. Sources of tissues and types of tissues5. Introduction to balanced salt solutions6. Cell culture media and role of serum7. Role of antibiotics in media8. Cell count9. Cell viability and cytotoxicity10. Measuring growth
II	Objective(s)	To enumerate the basic concepts of animal tissue culture
III	Teaching methodology	<ol style="list-style-type: none">1) Online teaching/lectures using software's available publicly in accordance to the University regulations;2) Moodle;3) Power point presentation;4) Providing E-content to the students;4) Conducting online assignments/discussions etc.
IV	Teleological view	The objective proposed in the lesson plan encompasses the basic knowledge on the components of animal cell culture such as developmental milestones, types of cells and their sources, prerequisite factors such as equipments, media and methods required for the propagation, growth and analysis of animal cells.
V	Major Outcome	The primary goal is to guide students through the basic concepts linked to animal cell culture such as cell types, cell culture media and growth and viability assays.
VI	Key questions	<ol style="list-style-type: none">1. Discuss about the components of culture media used in animal cell culture?2. Explain in detail about the muscle tissue, epithelial tissue, blood and nervous tissue?3. What is cytotoxicity? Write a note on the cell viability tests4. Balanced salt solution5. Plating efficiency
VII	Bottom line	The contents discussed in Unit I will provide basic knowledge with regards to sources of cells and different cell types, cell culture media used for specific cell types and also illuminate the analysis of growth related parameters.
VIII	References/links	<ol style="list-style-type: none">1. Cell Culture. Yadav, P.R and R. Tyagi. 2005. Discovery Publishing House, New Delhi.2. Cell Growth and Division: A Practical Approach . Basega, R. IRL Press, New Delhi.3. Cell Culture Lab Fax. Butler, M. and M. Dawson. Bios Scientific Publications Ltd. 5. Animal Cell culture and Technology. Butler, M.2004. Bios Scientific Publishers, New York.4. Culture of Animal Cells A Manual of Basic Technique. Freshney, R .I. 2006. 5th Edn. John Wiley and Sons, USA

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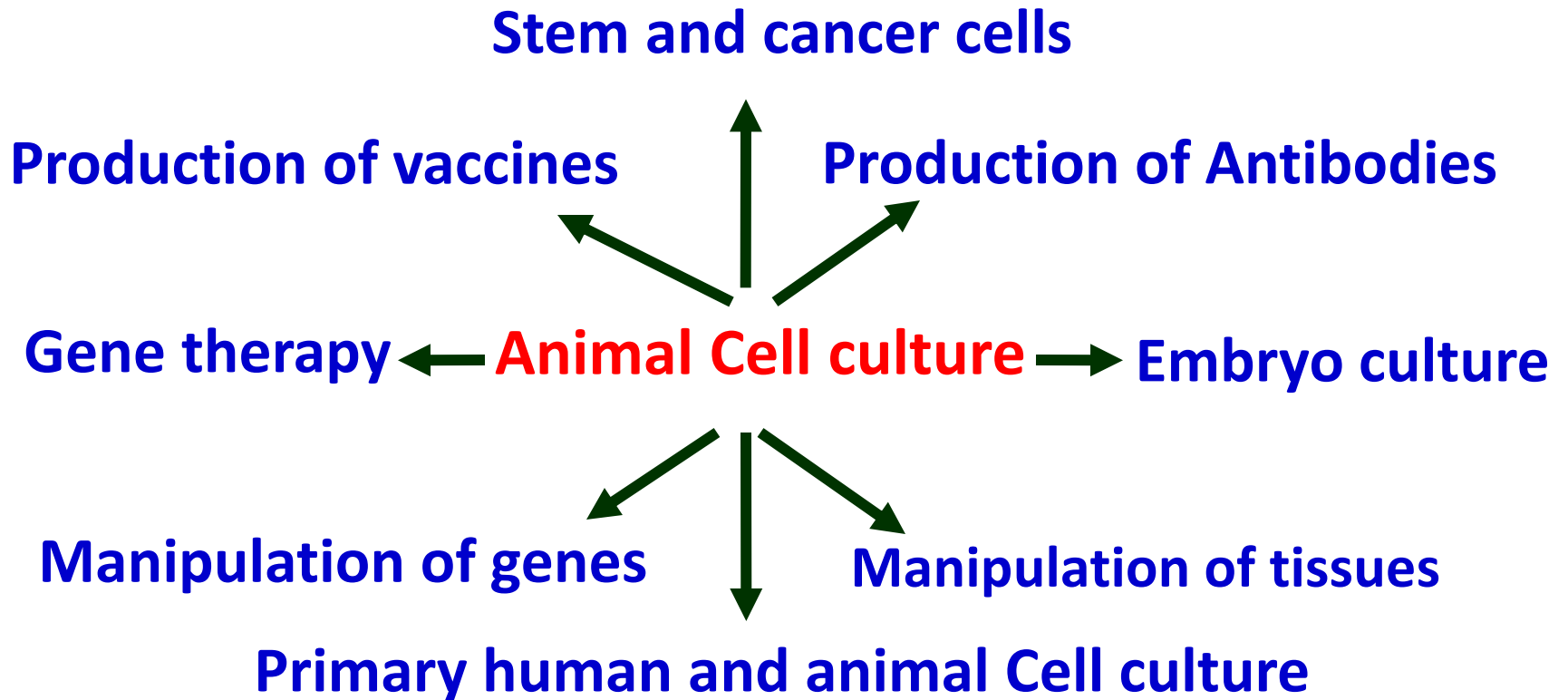
Course name: Animal Biotechnology

What is animal biotechnology

BIOTECHNOLOGY is defined as the application of genetic engineering principles or biotechnological principles to living organisms for the welfare of human beings.

Animal biotechnology is a broad field encompassing the divergence of fundamental and applied research, including development of diagnostics, production of vaccines, manipulation of genes and tissues.

Animal biotechnology includes all animals: livestock, poultry, fish, insects, companion animals and laboratory animals.



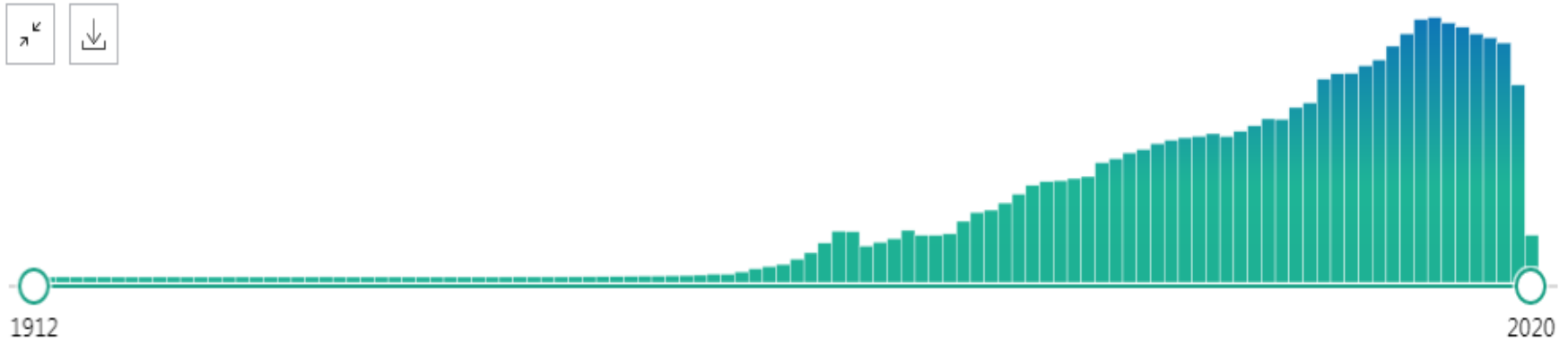
Unit I: Topics layout

- ✓ **History and development of animal tissue culture**
 - ✓ **Equipment and materials**
 - ✓ **Principles of sterile techniques**
 - ✓ **Sources of tissues and types of tissues**
 - ✓ **Cell culture media and role of serum**
 - ✓ **Cell viability and cytotoxicity**
 - ✓ **Measuring growth**
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Developments in the area of animal cell culture

RESULTS BY YEAR

231,912 results

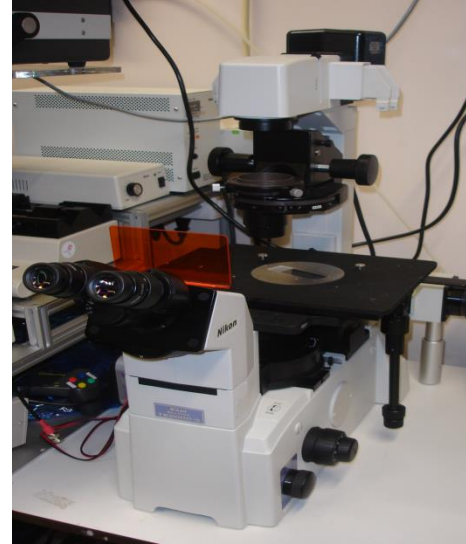


This figure illustrates the research articles that has been deposited in the PUBMED database with respect to the term animal cell culture

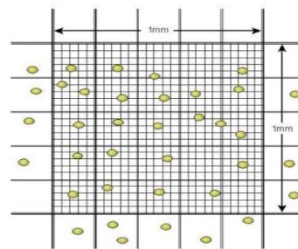
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- Experiments of Harrison in the year 1907 fueled the animal cell culture.
 - Major breakthroughs of his experiments include:
Lymph clots to cultivate frog nerve cells
and Hanging drop experiment to observe the growth of nerve fibers *in vitro*.

**the historical and developmental aspects will be discussed at the time of lecture.*

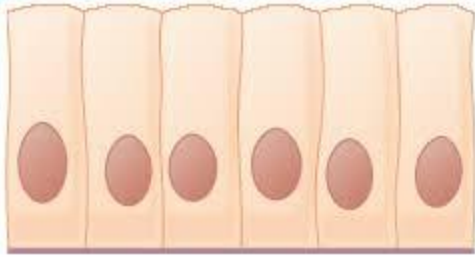
Equipments and Materials



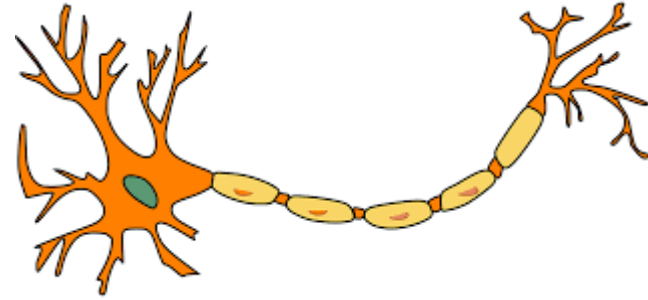
Close up view of a grid with cells



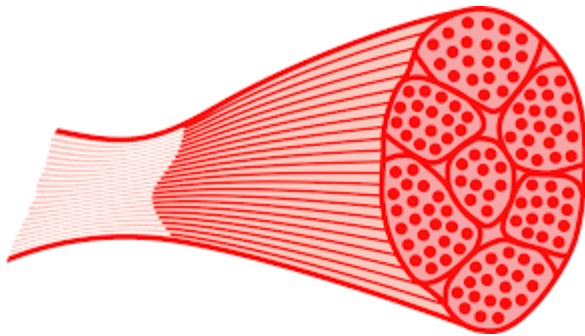
Tissues



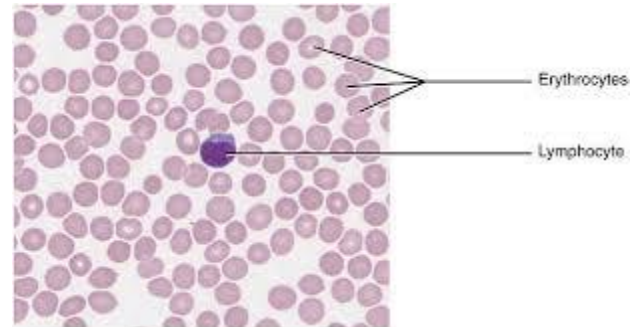
Epithelial



Nervous



Muscle



Blood

Erythrocytes

Lymphocyte

Media

Cell culture media is a key for the cell growth, and its functions.

Media types

- a. Natural media**
- b. Artificial media**

This topic will covers the physical, chemical and metabolic fuctions of media and also different types of media. Further this topic covers the composition of media and role of antibiotics.

Cell viability and cytotoxicity

In animal cell culture studies assessing cell viability and cytotoxicity is a key step in daily cell manipulation and also helpful for subsequent processing steps.

This topic will focus on the methods used to determine the cell viability and cytotoxicity.

Measuring growth

The growth of cell lines occur via either attached to a surface (anchorage dependent) or in suspension (anchorage independent) and they follow a characteristic growth pattern comprised of four stages: Lag, log or exponential, stationary or plateau and decline.

It is important to maintain the cell lines always in the exponential phase to ensure viability, genetic stability, and phenotypic stability. Therefore, determination of growth curves of each cell line is considered is useful to understand the growth characteristics of the cell line

This topic will focus on the growth curves, plating efficiency and factors influencing growth.

References/links

1. **Cell Culture. Yadav, P.R and R. Tyagi. 2005. Discoery Publishing House, New Delhi.**
 2. **Cell Growth and Division: A Practical Approach . Basega, R. IRL Press, New Delhi.**
 3. **Cell Culture Lab Fax. Butler, M. and M. Dawson. Bios Scientific Publications Ltd. 5. Animal Cell culture and Technology. Butler, M.2004. Bios Scientific Publishers, New York.**
 4. **Culture of Animal Cells A Manual of Basic Technique. Freshney, R .I. 2006. 5th Edn. John Wiley and Sons, USA**
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