

BME449 Tissue Engineering



Lecture #9

**Cell Culture Techniques in Tissue Engineering-I**

**Doç. Dr. Pınar Yılgör Huri**

**[phuri@ankara.edu.tr](mailto:phuri@ankara.edu.tr)**

**Ankara University**  
**Department of Biomedical Engineering**

# CELL CULTURE

- Cell culture is the process by which prokaryotic, eukaryotic or plant cells are grown under controlled conditions. But in practice it refers to the culturing of cells derived from animal cells.
- Cell culture was first successfully undertaken by Ross Harrison in 1907
- Roux in 1885 for the first time maintained embryonic chick cells in a cell culture

# Major developments in cell culture technology

- First development was the use of antibiotics which inhibits the growth of contaminants.
- Second was the use of trypsin to remove adherent cells to subculture further from the culture vessel
- Third was the use of chemically defined culture medium.

# Why is cell culture used for?

- **Model systems for**  
Studying basic cell biology, interactions between disease causing agents and cells, effects of drugs on cells, process and triggering of aging & nutritional studies
- **Toxicity testing**  
Study the effects of new drugs
- **Cancer research**  
Study the function of various chemicals, virus & radiation to convert normal cultured cells to cancerous cells
- **Virology**  
Cultivation of virus for vaccine production, also used to study there infectious cycle.

# Why is cell culture used for?

- Genetic Engineering

Production of commercial proteins, large scale production of viruses for use in vaccine production e.g. polio, rabies, chicken pox, hepatitis B & measles

- Gene therapy

Cells having a functional gene can be replaced to cells which are having non-functional gene

# TISSUE CULTURE

- In vitro cultivation of organs, tissues & cells at defined temperature using an incubator & supplemented with a medium containing cell nutrients & growth factors is collectively known as tissue culture.
- Different types of cell grown in culture includes connective tissue elements such as fibroblasts, skeletal tissue, cardiac, epithelial tissue (liver, breast, skin, kidney) and many different types of tumor cells.

Type

Primary

transformed (cell line)

Source

human

animal

genetically engineered

stem cells

Autologous vs Allogeneic vs Xenogeneic