

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

B. Sc. BIOTECHNOLOGY II YEAR TDC (2016-17)

Paper II : *Principles of Animal Cell Culture*

Unit-I

History of development of animal cell culture and methods of animal cell culture : culture media composition and preparation. Balanced salt solutions and simple growth medium. Chemical, physical and metabolic functions of different constituents of culture medium – role of CO₂, serum and other supplements. Growth factors promoting proliferation of animal cell (EGF, PDGF, NGF, GAP43 etc.). Serum and protein-free defined media and their applications.

15 Credit hours

Unit-II

Animal cell lines – their culturing and maintenance. Characterization of cultured cells, test of viability, cytotoxicity and measurement of growth. Primary cultures, anchorage dependent growth, non-anchorage dependent cells. Secondary cultures, transformed animal cells – established/continuous cell lines. Commonly used animal cell lines – their origin and characteristics.

15 Credit hours

Unit-III

Stem cell cultures, embryonic stem cells and their applications, cell culture based vaccines, measurement of cell death, apoptosis, scaling-up of animal cell cultures and production of recombinant gene products.

15 Credit hours

Unit-IV

Organ culture, whole embryo culture, transfection of animal cells : selectable markers, HAT selection, antibiotic resistance etc. Somatic cell fusion, transplantation of cultured cells. Differentiation of cells, culture of animal mycoplasma.

15 Credit hours

Unit-V

Growth kinetics of cells in culture, applications of animal cell culture for studies on gene expression. Cloning of cell lines, three-dimensional culture and tissue engineering (artificial skin and artificial cartilage), *In vitro* fertilization in humans, super ovulation, embryo transfer in humans and livestock.

15 Credit hours

Suggested Readings

1. Masters, J. *Animal Cell Culture*. Panima.
2. Freshney, I. *Culture of Animal Cell*. John Wiley.
3. Martin, C. (Ed). *Animal Cell Culture Techniques*. Springer.
4. Mather and Barnes. (Ed). *Methods in Cell Biology*. Vol. 5-7, *Animal Cell Culture Method*. Academic Press.
5. Paul, J. *Animal Tissue Culture*.
6. Butler, M. and Dawson, M. *Lab Fax : Cell Culture*. Bios Scientific Publications.
7. Jenkins, N. *Animal Cell Biotechnology*. Panima Books Distributors.