

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.