Subject Code : P8BIE4B

STEM CELL IN HEALTH CARE

UNIT - I

Unique properties of stem cells – embryonic stem cells - adult stem cells – umbilical cord stem cells – similarities and differences between embryonic and adult stem cells. Properties of stem cells – pluripotency – totipotency

UNIT - II

Invitro fertilization –culturing of embryos-isolation of human embryonic stem cells – blastocyst – innercell mass – growing ES cells in lab – laboratory tests to identify ES cells – stimulation ES cells for differentiation – properties of ES cells.

UNIT - III

Somatic stem cells – test for identification of adult stem cells – adult stem cell differentiation – trans differentiation – plasticity – different types of adult stem cells.

UNIT - IV

Target identification – Manipulating differentiation pathways – stem cell therapy Vs cell protection - stem cell in cellular assays for screening – stem cell based drug discovery, drug screening and toxicology.

UNIT - V

Gene therapy – genetically engineered stem cells – stem cells and Animal cloning – transgenic animals and stem cells – Therapeutic applications – Parkinson disease - Neurological disorder – limb amputation – heart disease - spinal cord injuries – diabetes –burns - HLA typing- Alzheimer's disease – tissue engineering application – production of complete organ - kidney – eyes - heart – brain.

Reference Books

1. Kursad and Turksen, *Embryonic Stem cells*, Humana Press, 2002.
2. Committee on the Biological and Biomedical applications of Stem cell Research, *Stem cell and future of regenerative medicine*, National Academic press, 2002.