

3.0 AIM AND OBJECTIVES

AIM

- To decipher the impact of radiofrequency electromagnetic field (RF-EMF) radiation on bone marrow stem cell and histopathology of *Cavia porcellus* (guinea pig) through molecular cytology and histology.

3.2 OBJECTIVES

3.2.1 RF-EMF EXPOSURE SOURCE, ANIMAL CAGE DESIGN AND MEASUREMENT OF RADIATION

- To locate an appropriate RF-EMF exposure source in order to place the animals at its vicinity to simulate a real-life exposure situation, in cages designed exclusively to shelter animals in such locations.

3.2.2 STEM CELL CULTURE

- To isolate and culture the mesenchymal stem cells (MSCs) from two different group of guinea pigs, RF-EMF radiation exposed and sham-exposed control groups
- To expand MSCs from passage 1 to passage 3 (P1 to P3) using *in vitro* culture strategy to study the impacts of prolonged RF-EMF radiation exposure.

3.2.3 FLOW CYTOMETRY

- To characterize the MSCs in terms of standard phenotypic criteria, such as morphology and surface-antigen expression based on specific CD markers and FACS.
- To decipher the mechanisms of differentiation of MSCs into hematopoietic stem cells by confocal microscopy.

3.2.4 RT- PCR ANALYSIS

- To profile the effects of RF-EMF radiation from cell phone towers on guinea pig stem cell gene expression through a high-throughput technique, Real-Time Polymerase Chain Reaction (RT-PCR) on genes of interest such as Fos (a proto-oncogene), TNF-alpha (a

pro-inflammatory cytokine), GFAP (a marker of neuro inflammation), TGF-beta (both a tumor suppressor and a promoter), HSB1 (a stress responsive gene) and VEGF (an angiogenesis inducer).

3.2.5 HISTOPATHOLOGY

- To assess and diagnose any changes in the brain, kidney, lung, heart, liver, muscles and skin of *Cavia porcellus* due to prolonged exposure to RF- EMF.