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DECLARATION

Certified that the thesis entitled **“DECIPHERING THE IMPACT OF RADIOFREQUENCY ELECTROMAGNETIC FIELD (RF-EMF) RADIATIONS ON BONE MARROW STEM CELLS AND HISTOLOGY OF GUINEA PIG, *CAVIA PORCELLUS*”** submitted for the Ph.D degree of the university of Madras as a record of work done by me within the period (2013-2015). This thesis represents entirely an independent work pursued by me and it has nor formed the basis for the award of any degree, diploma, associateship, fellowship or any other similar titles.

Place : Chennai- 600 034

(A.JAYAKUMAR)

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“Let me define a leader. He must have vision and passion and not be afraid of any problem. Instead, he should know how to defeat it. Most importantly, he must work with integrity”

Dr. A.P.J.Abdulkalam

“If I had my life to live over again, I would have made a rule to read some poetry and listen to some music at least once every week”

Charles Darwin

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LIST OF ABBREVIATION

SHORT FORM	ABBREVIATION
ABI	Applied Biosystem
ANOVA	Analysis of Variance
aRNA	Amplified RNA (Ribose Nucleic acid)
ASCs	Adult Stem Cells
ASP	Acetylation Stimulation Protein
BM	Bone Marrow
BMI	Bone Marrow Index
BMMSC	Bone Marrow Derived Mesenchymal Stem Cells
BMP	Bone Morphogenetic Proteins
BMP2	Bone Morphogenetic Protein2
BMP6	Bone Morphogenetic Protein6
BMPCs	Bone Marrow Progenitor cells
BMPs	Bone Morphogenic Proteins
BMSCs	Bone Marrow Stromal/Stem cell
BSP	Bone Sialoprotein
cDNA	Complementary Deoxy Ribose Nucleic Acid
CFUF	Colony Forming Unit Fibroblast
cRNA	Complimentary RNA (Ribose Nucleic Acid)
CTPCs	Connective Tissue Progenitor Cells
DMEM	Dulbecco's Modified Eagle's Medium

DMEM-LG	Dulbecco's Modified Eagle's Medium – Low Glucose
DNA	Deoxy Ribo Nucleic Acid
DPBS	Dulbecco's Phosphate Buffered Saline
dsDNA	Double Stranded Deoxy Ribo Nucleic Acid
dTTP	Deoxy Thymine Tri Phosphate
ECM	Extra Cellular Matrix
EST	Expressed Sequence Tag
FACS	Fluorescence Activated Cell Sorting/Flow Activated Cell Sorting
FBS	Fetal Bovine Serum
FSC	Forward Scatter
FSCs	Fetal Stem Cells
GOI	Gene of Interest
hESCs	Pluripotent Embryonic Stem Cells
HKG	Housekeeping Gene
HSCs	Haematopoietic Stem Cells
ICM	Inner Cell Mass
IPSCs	Induced Pluripotent Stem Cells
KEGG	Kyoto Encyclopedia of Genes and Genomes
MAPCs	Multipotent Adult Progenitor Cells
MNC	MonoNuclear Cells
MPCs	Mesenchymal Progenitor Cells
mRNA	Messenger-Ribose Nucleic Acid
MSCs	Mesenchymal Stem Cells

qRTPCR	Quantitative Reverse Transcription Polymerase Chain Reaction
RBCs	Red Blood Cells
RIN	RNA Integrity Number
RNA	Ribo Nucleic Acid
rRNA	Ribosomal RNA (Ribose Nucleic Acid)
RT-PCR	Reverse Transcription Polymerase Chain Reaction
TGF β	Transforming Growth Factor β
TNF α	Tumour Necrosis Factor α
HSB1	Heat Shock Protein1
FOS	FBJ murine osteosarcoma viral oncogene homolog
GAPDH	Glyceraldehyde 3-phosphate dehydrogenase
GFAB	Glial Fibrillary Acidic Protein
VEGF	Vascular Endothelial Growth Factor
RF-EMF	Radio Frequency-Electromagnetic Frequency
RFR	Radio Frequency Radiation
MW	Micro wave
HF	High Frequency
LF	Low Frequency
C1	Cage1
C2	Cage 2
C	Control-Cage
GMSCs	Guinea pig Mesenchymal Stem Cells
BM	Bone Marrow

BMSCs	Bone Marrow Stem Cells
MNCs	Mononuclear cells
T25	Tissue culture flask 25 cm ²
T75	Tissue culture flask 75 cm ²
CD90	Cluster of Differentiation 90
CD105	Cluster of Differentiation 105
CD29	Cluster of Differentiation 29
CD34	Cluster of Differentiation 34
CD45	Cluster of Differentiation 45
GSM	Global System for Mobile
TV	Television
FM	Frequency Modulation
WHO	World Health Organization
IARC	International Agency for Research on Cancer
IHHP	Institute for Health and Human Potential
ICNIRP	International Commission on Non-Ionizing Radiation Protection
NBT	National Bureau of Standard0
DCS	Distributed Control System
NCRP	National Cancer Registry Programme
IEEE	Institute of Electrical and Electronics Engineers
MHz	Mega Hertz
GZ	Ground Zero
GC	Gas chromatography

NRPB	National Radiological Protection Board
CDMA	Code division multiple access
PD	Power Density



*This Thesis is dedicated to my
Beloved Grandmother,
Mother and Palanikalamramu.*