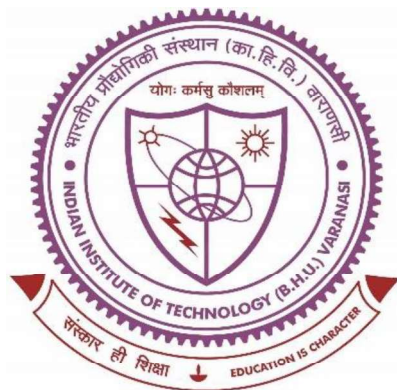


Development and Evaluation of Nanoformulation for Targeted Delivery of Gemcitabine for the treatment of Lung Cancer



Thesis submitted in partial fulfilment

for the Award of Degree

DOCTOR OF PHILOSOPHY

By

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*Dedicated to the Almighty, My
Family*

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Abbreviations

Acronym	Definition
%	Percentage
¹ H-NMR	Proton nuclear magnetic resonance
A-549 cells	Human lung cancer cells
ADC	Adenocarcinoma
Afb	Afatinib
AFM	Atomic force microscopy
ANOVA	Analysis of variance
Ap	Aptamer
AT	Actein
ATS	American Thoracic Society
AUC	Area under the curve
AUC _{total}	Total Area under the curve
B[a]P	Benzo(a)pyrene
BBD	Box Behnken Design
bEGF	Biotinylated EGF
BER	Berberine
°C	Degree Celsius
C6	Coumarin-6
CDA	Cytidine deaminase
CDDP	Cis-diamminedichloroplatinum- II
CL _T	Total body clearance
C _{max}	Maximum plasma drug concentration
CR	Curcumin
CSN	Chitosan
CSN- Neu5Ac	5-N-acetyl-neuraminic acid conjugated chitosan
CSN-Cxmab	Cetuximab conjugated chitosan
CSN-NPs	Chitosan nanoparticles
CT	Computerized tomography
Cxmab	Cetuximab
DAPI	4',6-diamidino-2-phenylindole
DCT	Docetaxel
dFdU	Difluorodeoxyuridine
DiD	Diiododecyl-3,3,3,3-Tetramethylindodicarbocyanine Perchlorate
DLS	Dynamic light scattering
DMEM	Dulbecco's modified Eagle's medium
DMSO	Dimethyl sulfoxide
DNA	Deoxyribonucleic acid
DoE	Design of experiments
DOTAP	1,2-dioleoyl-3-trimethyl ammonium propane
DOX	Doxorubicin
DSC	Differential scanning calorimetry
EDC	1-Ethyl-3-(3-dimethylaminopropyl) carbodiimide

EE	Entrapment efficiency
EGFR	Epidermal growth factor receptor
EPR	Enhanced permeability and retention
ERS	European Respiratory Society
ETP	Etoposide
FA	Folic acid
FBS	Fetal bovine serum
FDA	Food and Drug Administration
F _R	Relative bioavailability
FRs	Folate receptors
FTIR	Fourier transform infrared spectroscopy
GA	Gambogic acid
GF	Growth factors
GFR	Growth factor receptors
GMC	Gemcitabine
h	Hour
h	Hour (s)
H&E	Haematoxylin and eosin
HClO ₄	Perchloric acid
HR-MS	High resolution mass spectrometry
HPLC	High-performance liquid chromatography
<i>i.v.</i>	Intravenous
IASLC	International Association for the Study of lung cancer
IC ₅₀	Half-maximal inhibitory concentration
KBr	Potassium bromide
kDa	Kilodalton
K _e	Elimination rate constant
LC	Lung cancer
LC/MS	Liquid chromatography/Mass spectrometry
LCC	Large-cell carcinoma
LMT	Lomustine
mAb	Monoclonal antibody
mg	Milligram
mg/mL	Milligram per millilitre
min	Minute
miRNA	microRNA
mL	Milliliter
MNPs	Magnetic nanoparticles
MRI	Magnetic resonance imaging
MRT	Mean residence time
MS	Mass spectrometry
MTT	3-(4,5-dimethylthiazolyl-2-yl)-2, 5 diphenyl-tetrazolium-bromide
mV	Milli volts
NaOH	Sodium hydroxide
Na-TPP	Sodium tripolyphosphate
NCCS	National Centre for Cell Science

ND	Nanodiamond
Neu5Ac	5-N-acetyl-neuraminic acid
Neu5Gc	N-glycolyl-neuraminic acid
NHS	N-hydroxy succinimide
NLCs	Nanostructured lipid carriers
nm	Nanometers
NMR	Nuclear magnetic resonance
NP/NPs	Nanoparticles
NPs	Nanoparticles
ns	non-significant
NSCLC	Non-small cell lung cancer
O/W	Oil-in-water
PAMAM	Polyamidoamine
PBS	Phosphate buffer saline
PCL	Poly caprolactone
PDI	Polydispersity index
PEG	Polyethylene glycol
PET	Positron emission tomography
P-gp	P-glycoprotein
PLA	Poly (lactic) acid
PLGA	Poly (lactic-co-glycolic acid)
PRT	Parthenolide
Pt	Platinum
PTX	Paclitaxel
QNC	Quinacrine
QTOF	Time of flight
RAP	Rapamycin
RES	Reticuloendothelial system
ROS	Reactive oxygen species
RP-HPLC	Reverse-phase high-performance liquid chromatography
rpm	Revolutions per minute
RVT	Resveratrol
SA	Sialic acid
SAD	Selected area diffraction
SCC	Squamous-cell carcinoma
SCLC	Small cell lung cancer
SD	Standard deviation
SEM	Scanning electron microscopy
siRNA	Small interfering RNA
SL	Stealth liposomes
SLNs	Solid lipid nanoparticles
SPIONs	Superparamagnetic iron oxide nanoparticles
SRL	Sisco Research Laboratories
T _{1/2}	Half-life
TEM	Transmission electron microscopy
Tf	Transferrin

T_{\max}	Maximum Time
TNF	Tumor necrosis factor
TPP	Triphosphosphate
TRAIL	Tumor necrosis factor related apoptosis inducing ligand
V_d	Volume of distribution
VEGF	Vascular endothelial growth factor
VRB	Vinorelbine
W/O	Water-in-oil
WHO	World Health Organization
XPS	Surface chemistry by X-ray photoelectron spectroscopy
XRD	X-ray diffraction
$\mu\text{g/mL}$	microgram per millilitre
μL	Microliter
μg	Microgram