

4 Chapter 4: Materials, instruments, and software used in the experiments

Table 4. 1 List of materials used and their sources

Materials	Source
2-log DNA ladder	New England BioLabs Inc., USA
2-well inserts	Ibidi [®] , Munich, Germany
4',6- diamidino-2-phenylindole (DAPI)	Sigma-Aldrich St. Louis, MO, USA
Absolute ethanol	Merck Chemicals (Darmstadt, Germany)
AUTOSPAN [®] ALP (Alkaline Phosphatase)	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
AUTOSPAN [®] Glucose	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
AUTOSPAN [®] Liquid Gold ALT (Alanine Transaminase)	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
AUTOSPAN [®] Liquid Gold AST (Aspartate Transaminase)	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
AUTOSPAN [®] Liquid Gold Cholesterol	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
AUTOSPAN [®] Liquid Gold Creatinine	ARKRAY Healthcare Pvt. Ltd. (Mumbai, India)
AUTOSPAN [®] Liquid Gold Triglyceride	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
AUTOSPAN [®] Liquid Gold Urea	ARKRAY Healthcare Pvt. Ltd., Mumbai, India
BigDye Terminator v3.1 Cycle sequencing Kit	Applied Biosystems, USA
Carbon-coated copper grid	400 Mesh, 3.05 mm diameter, Ted Pella, USA
Coumarin 6 (CU-6, Purity: >98.0%)	TCI Chemicals Pvt. Ltd. Tamilnadu, India
Dacarbazine (DTIC, IP, Purity: >99.54%)	Gifted by Neon Laboratories Ltd., Mumbai, India
Dialysis Membrane-70, MWCO 12000-14,000 Daltons, pore size: 2.4 nm, average flat width - 28.46 mm, average diameter- 17.5 mm, capacity approx. - 2.41 mL/cm	Himedia, Laboratories, Pvt. Ltd., Mumbai, India
Dimethyl Sulfoxide (DMSO)	Sigma-Aldrich St. Louis, MO, USA
Double distilled water	From double distilled unit, Borosil Technologies Limited, Mumbai, India
DTS 0012 polystyrene disposable cuvette	Malvern Panalytical Ltd., UK
Dulbecco's Modified Eagle's Medium (DMEM/F-12)	Sigma-Aldrich, St. Louis, MO, USA
Empty gelatin capsules (size 00)	Pacto Pharmaceuticals Ltd., Mumbai, India

Exonuclease I and Shrimp Alkaline Phosphatase (SAP) (ExoSAP-IT™)	Amersham Bioscience, Tokyo, Japan
Fetal bovine serum (FBS)	Sigma-Aldrich St. Louis, MO, USA
Gelucire® 44/14 (HLB value: 11-14)	Gifted by Gattefosse (Saint-Priest, Cedex, France)
HPLC grade methanol	Finar Limited, Ahmedabad, India
Human embryonic kidney 293 cells (HEK 293)	NCCS, Pune, India
Hydroxy propyl cellulose (HPC, Avg MW: 80000)	Sigma-Aldrich, St. Louis, MO, USA
Kolliphor® P 188 (Avg MW: 7680 to 9510 g/mol, HLB value: ~29.0)	Gifted by BASF Corporation (Ludwigshafen, Germany)
Kolliphor® RH 40 (HLB value: 14-16)	Gifted by BASF Corporation, Ludwigshafen, Germany
Melanoma cell line (B16F10)	NCCS, Pune, India
Membrane filters (0.45 µm cellulose nitrate)	AXIVA Sichem Pvt. Ltd., New Delhi, India
Methylparaben	Merck Chemicals, Darmstadt, Germany
MTT reagent (3-(4, 5-dimethylthiazol- 2-yl)-2, 5-diphenyltetrazolium bromide)	Sigma-Aldrich St. Louis, MO, USA
Na-CMC	Sisco Research Laboratory (Mumbai, India)
NucleoSpin® Plant II Kit	Macherey-Nagel, Germany
p-dimethylaminobenzaldehyde (p-DMAB)	Spectrochem Pvt. Ltd., Mumbai, India
Penicillin	Sigma-Aldrich, St. Louis, MO, USA
Phire Master Mix	Thermo Fisher, USA
Phospholipon® 90 H (PL-90H, Hydrogenated phosphatidylcholine from soybean lecithin, >90% purity)	Received as gift samples from Lipoid GmbH, Ludwigshafen, Germany
PIP (MW: 285.34 g/mol, Purity: ≥ 97%)	Sigma-Aldrich, St. Louis, MO, USA
<i>Piper longum</i> fruits	Jayachandrapur, Odisha, India
PLGN (MW: 273.3 g/mol, Purity: ≥ 98%)	Cayman Chemical Company, Michigan, USA
Poloxamer 407	Sigma-Aldrich, St. Louis, MO, USA
Polyethylene glycol 4000 (PEG-4000)	Sisco Research Laboratory, Mumbai, India
Polyethylene glycol 9000 (PEG-9000)	Sisco Research Laboratory, Mumbai, India
Polyvinylidene fluoride or PVDF, 0.2 µm	AXIVA Sichem Pvt. Ltd., New Delhi, India

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Propylene glycol	GS Chemical Testing Lab and Allied Industries, Delhi, India
Propylparaben	Merck Chemicals, Darmstadt, Germany
Silica gel 60 F254 precoated aluminum plates	Merck Chemicals, Darmstadt, Germany
Soluplus [®] (Avg MW: 90,000 to 140,000 g/mol, HLB value: ~14.0) Span [®] 80	Gifted by BASF Corporation, Ludwigshafen, Germany Sisco Research Laboratory, Mumbai, India
Streptomycin	Sigma-Aldrich, St. Louis, MO, USA
T75 Flasks	Tarson, Kolkata, India
Tween [®] 20 (MW:522.7 g/mol, HLB value: 16.7)	Sisco Research Laboratory (Mumbai, India)
Tween [®] 80 (MW: 1310 g/mol, HLB value: 15.0)	SD Fine-Chem Limited (Mumbai, India)
Type-I HPLC grade water	Laboratory-grade Water Purification Systems, Arium [®] mini, Sartorius, Sartorius Lab Instruments, Germany
Xanthan Gum (ExiPlus, Multi-Compendial)	Sisco Research Laboratory (Mumbai, India)
ZEN1002 universal dip cell	Malvern Panalytical Ltd., UK

Table 4. 2 List of Instruments used

Instrument	Model	Make
Abbe refractometer	LMAR-1317	Labman Scientific Instruments Pvt. Ltd., India
HPLC	Agilent 1260 Infinity II	Agilent, USA
ATR-FTIR spectrophotometer	Bruker Alpha II	Bruker Optics, Ettlingen, Germany
Centrifuge	Remi CM 12 PLUS	Mumbai, India
CLSM	CLSM 900	Carl Zeiss Microscopy, GMBH, Germany
Desk sputter coater	DSR 1	Nanostructured Coating Co., Iran)
Digital pH meter	PC 700	Eutech Instrument, Singapore
Digital tapped density apparatus	ZAS-ANZ	IKON Instruments, Delhi, India
Drop shape analyzer	DSA25S	KRÜSS GmbH, Hamburg, Germany
DSC	DSC 60 Plus	Shimadzu, Japan
Fluorescence microscope	EVOS FLC Invitrogen	Life Technologies, Fisher Scientific, USA
GC-HS instrument	Agilent 7890	Agilent, USA
Gel documentation system	Gel Doc XR+	Bio-Rad, USA
Hair drier	HP8100/60	Philips, India
HPTLC		CAMAG, Switzerland
HRSEM equipped with Everhart–Thornley detector (ETD)	FEI NovaTM, Nano SEM 450	FEI, USA
HRTEM equipped with a high-angle annular dark field (HAADF) detector	TECNAI G2 F20 TWIN	FEI, USA
Inverted microscope	Victory Plus	Dewinter, New Delhi, India
Light microscope	Magnus MLX Plus	Olympus Opto Systems India Pvt. Ltd., Uttar Pradesh, India)
Microtiter plate reader	680 XR	Bio-Rad Laboratories, Munchen, Germany
Microwave oven	HOTBLAST™	Samsung, South Korea
Mixture grinder	HL7756/00	Phillips, India
Moisture analyzer	AGS60T260	AXIS, Poland
Orbital shaker	RS 12 plus	REMI, Mumbai, India
Particle size analyzer	Zetasizer Pro	Malvern Panalytical Ltd., UK
PCR thermal cycler	GeneAmp PCR System 9700	Applied Biosystems, USA

Polarized Microscope	Light	Radical RXLr-5	New Delhi, India
Probe sonicatior		UP200H	Hielscher ultrasound technology, Germany
Rotary vacuum evaporator		IKA® RV 10 digital	IKA®, Staufen, Germany
Rotational rheometer		MCR 72	Anton Paar GmbH, Austria
Shaking water bath		220-380V, 50-60 Hz	Hindustan Apparatus Mfg., Mumbai, India
SPINIX™ Vertex shaker		3020	Tarsons Products Pvt. Ltd., Kolkata, India
SPM instrument		NTEGRA Prima	NT-MDT Service and Logistics Ltd., Amsterdam, Netherlands
Stability chamber		SRL/SC-10A	SR Lab Instrument, Mumbai, India
Temperature-controlled magnetic stirrer with a hot plate		IKA C-MAG HS 7	IKA®, Staufen, Germany
TGA		TGA-50	Shimadzu, Japan
Ultracentrifuge		Beckman Optima XPN-100	Palo Alto, CA, USA
Ultrasonic bath		AN-SS-6L	GuangDong GT Ultrasonic Co., Ltd., China
USP Type-I dissolution apparatus		Trust-E08	Electrolab, Mumbai, India
UV transilluminator		107161GB	Genei, Bangalore, India
Vacuum pump		Axiva, chemVk V300	Haryana, India
XRD		Rigaku Miniflex 600 Desktop System	Tokyo, Japan

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Table 4. 3 List of software used

Software	Version	Country origin
AOT425STATPgm	v 1.0	United State Environmental Protection Agency
Design-Expert®	v 12	Stat-Ease Inc., Minneapolis, MN, USA
EZChrom	v 3.3.2	Agilent, USA
Gatan's Digital Micrograph	v 3.7.4	FEI, USA
Geneious Pro	v 5.1	Auckland, New Zealand
GraphPad Prism	v 5.01	GraphPad Software, Inc., San Diego, California
ImageJ	v 1.53e Java 1.8.0_172	National Institutes of Health (NIH), Bethesda, Maryland
KRUSS advance	v 1.6.2.0	KRÜSS GmbH, Hamburg, Germany
Magvision	v x36, 3.7.6820	Olympus Opto Systems Pvt. Ltd., Uttar Pradesh, India
MiniFlex Guidance	v 2.0.2.1	Tokyo, Japan
Nova Px	v 3.4.0	NT-MDT Service and Logistics Ltd., Amsterdam, Netherlands
Open LAB CDS Workstation VL	EZChrom v 4.1a	Agilent, USA
OPUS	v 7.0	Bruker, Germany
Radical ProCam	v 3.7	New Delhi, India
Sequence Scanner	v1	Applied Biosystems, Life Technologies, USA
TA-60WS Collection	v 2.21	Shimadzu, Japan
WinCATS	v 1.4.7.2018	CAMAG, Switzerland
xT Microscope control	v 1.0	FEI, USA
Zen (Blue edition)	v 3.6	Carl Zeiss Microscopy, GMBH, Germany
ZS Xplorer	v 2.3.1	Malvern Panalytical Ltd., UK