

Preparation of Multifunctional Silk-Based Microcapsules loaded with DNA Plasmids Encoding RNA Aptamers and Riboswitches

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Materials

Name	Company	Catalog Number	Comments
(Z)-4-(3,5-difluoro-4-hydroxybenzylidene)-2-methyl-1-(2,2,2-trifluoroethyl)-1H-imidazol-5(4H)-one (DFHBI-1T)	Lucerna	DFHBI-1T	
5x T4 DNA Ligase Buffer	ThermoFisher Scientific	46300-018	
6x Blue Gel Loading Dye	New England BioLabs	B7021S	
96-well plates, black circular	Corning	3601	
Agarose	Sigma-Aldrich	A9539	BioReagent, for molecular biology, low EEO
Ampicillin sodium salt	Sigma-Aldrich	A0166	powder or crystals, BioReagent, suitable for cell culture
BlnI restriction enzymes	New England BioLabs	R0585S	
Corning Disposable Vacuum Filter/Storage Systems	FisherScientific	09-761-1	
Dimethyl sulfoxide, DMSO	Sigma-Aldrich	472301	ACS reagent, ≥99.9%
DNA Plasmid, pET28c-F30-2x Broccoli (5.4 kb), BrocApt.	Addgene	Plasmid #66788	
DyLight™550 Antibody Labeling kit (Invitrogen)	ThermoFisher Scientific	84530	
E. coli S30 extract system for circular DNA	Promega	L1020	
Falcon Conical centrifuge tubes, 15 mL	FisherScientific	14-959-53A	
Falcon Conical centrifuge tubes, 50 mL		14-432-22	
Fisherbrand Microcentrifuge tubes, 1.5 mL	FisherScientific	05-408-129	
Hydrofluoric acid, HF	Sigma-Aldrich	695068	ACS reagent, 48%

Kanamycin sulfate	Sigma-Aldrich	60615	mixture of Kanamycin A (main component) and Kanamycin B and C
KpnI restriction enzymes	New England BioLabs	R0142S	
LB agar plate supplemented with 100 µg/mL ampicillin	Sigma-Aldrich	L5667	pre-poured agar plates with 100 µg/mL ampicillin
LB agar plate supplemented with 50 µg/mL kanamycin	Sigma-Aldrich	L0543	pre-poured agar plates with 50 µg/mL kanamycin
LB broth (Lennox grade)	Sigma-Aldrich	L3022	
Lithium bromide, LiBr	Sigma-Aldrich	213225	ReagentPlus, ≥99%
Max Efficiency DH5-α competent E. coli strain	ThermoFisher Scientific	18258012	
Methanol	MilliporeSigma	322415	anhydrous, 99.8%
MilliQ-water	EMD MilliPore		Milli-Q Reference Water Purification System
MinElute PCR Purification Kit	Qiagen	28004	
N-(3-Dimethylaminopropyl)-N'-ethylcarbodiimide hydrochloride, EDC	Sigma-Aldrich	E1769	
PBS (phosphate buffered saline)	ThermoFisher Scientific	10010023	1x PBS, pH 7.4
Phusion High-Fidelity DNA Polymerase	New England Biolabs	M0530S	
Polyethylenimine, branched	Sigma-Aldrich	408727	average Mw ~25,000
PURExpress In Vitro Protein Synthesis Kit	New England BioLabs	E6800S	
QIAEX II Gel Extraction Kit	Qiagen	20021	
QIAprep Spin Miniprep Kit	Qiagen	27104	
Quick-Load 2-Log DNA Ladder (0.1-10.0 kb)	New England BioLabs	N0469S	
SiO ₂ silica microspheres, 4.0 µm	Polysciences, Inc.	24331-15	10% aqueous solution
Slide-A-Lyzer G2 Dialysis Cassettes, 3.5K MWCO, 15 mL	ThermoFisher Scientific	87724	
Sodium carbonate, Na ₂ CO ₃	Sigma-Aldrich	222321	ACS reagent, anhydrous, ≥99.5%, powder
Spectrum Spectra/Por Float-A-Lyzer G2 Dialysis Devices	FisherScientific	08-607-008	Spectrum G235058
SYBR Safe DNA gel stain	ThermoFisher Scientific	S33102	
T4 DNA Ligase (5 U/µL)	ThermoFisher Scientific	EL0011	
Theophylline	Sigma-Aldrich	T1633	anhydrous, ≥99%, powder
Tris Acetate-EDTA buffer (TAE buffer)	Sigma-Aldrich	T6025	Contains 40 mM Tris-acetate and 1 mM EDTA, pH 8.3.
UltraPure DNase/RNase-Free Distilled Water	FisherScientific	10-977-023	
ZymoPURE II Plasmid MaxiPrep kit	ZymoResearch	D4202	