

Materials List for:

Composite Scaffolds of Interfacial Polyelectrolyte Fibers for Temporally Controlled Release of Biomolecules

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Materials

Name	Company	Catalog Number	Comments
Pullulan	Hayashibara Inc Okayama Japan		Molecular weight (MW) 200 kDa. This material is pharmaceutical grade pullulan used to make pullulan frames and PD-IPC scaffolds.
Dextran	Sigma Aldrich	D1037	MW 500 kDa. This material is no longer being produced by Sigma Aldrich. Alternative suggested is catalog number 31392 (Sigma Aldrich). This material is used to make PD-IPC scaffolds.
Sodium Bicarbonate	Sigma Aldrich	S5761	Sodium bicarbonate must be slowly added to the pullulan-dextran polysaccharide solution. Rapid addition of sodium bicarbonate will result in precipitation.
Sodium Trimetaphosphate	Sigma Aldrich	T5508	This chemical is hygroscopic and must be stored in the dehumidifying cabinet. Aqueous solution of sodium trimetaphosphate must always be made fresh.
Sodium Hydroxide	Sigma Aldrich	S5881	This material is hazardous and must be handled with proper protective equipment such as nitrile gloves.
Chitosan	Sigma Aldrich	448877	MW 190-310 kDa. Acetylation degree of 75% to 85%. Purification of chitosan is required to create stable IPC fibers.
Acetic Acid	Merck		This can be replaced by another brand type. This material is corrosive and flammable. Protective equipment such as face shield, nitrile gloves, lab coat and shoe cover must be worn when handling this chemical in the fume hood.
Alginate sodium salt from brown algae, low viscosity	Sigma Aldrich	A2158	Dissolve in water overnight. Filter through sterile 0.2 µm syringe filter before use. Store at 4 °C.
Bovine Serum Albumin	Sinopharm Chemical Reagent		Dissolve in sterile PBS and filter using 0.2 µm syringe filter before use.

BCA assay kit	Pierce	23225	This kit was used to measure BSA release from PD-IPC scaffolds.
Human Recombinant Vascular Endothelial Growth Factor	R&D systems	293-VE	Dissolve growth factor in 0.2% heparin solution to a final concentration of 5 mg/ml.
Heparin Sodium Salt From Porcine	Sigma Aldrich	H3393	This can be replaced by another brand type. Dissolve heparin salt in sterile water at a final concentration of 1% and filter through 0.2 µm syringe filter before use.
Human Umbilical Vein Endothelial Cells (HUVEC)	Lonza	C2517A	This primary cell type was used in the assay to determine VEGF bioactivity after release from PD-IPC scaffolds.
Alamar blue	Life Technologies	DAL1025	This is used to measure cell metabolic activity. Incubate Alamar blue with cells and maintain in standard cell culture conditions for 2 to 4 hours. Measure absorbance at 570 nm to determine Alamar blue percent reduction, which is correlated to the cell activity.
ScanVac Coolsafe Lyophilizer	Labogene	7.001.200.060	This is a non-programmable freeze dryer that operates at -105 to -110 °C. This can be replaced by other standard lab lyophilizers.
Polycaprolactone (PCL)	Sigma Aldrich	181609	MW 65 kDa. This is no longer being manufactured by Sigma Aldrich. This can be replaced by Sigma Aldrich catalog number 704105.
Dichloromethane	Sigma Aldrich	V800151	This can be replaced by another brand type. This material is hazardous and must be handled in the fume hood. Protective equipment must be worn at all times when handling this chemical.
Polydimethylsiloxane (PDMS; 184 Silicone Elastomer Kit)	Dow Corning	(240)4019862	The elastomer kit comes with polymer base and crosslinker. Mixing the polymer base and crosslinker in different ratios will result in different stiffness of the PDMS.
Human Recombinant Beta-Nerve Growth Factor (NGF)	R&D systems	256-GF	Reconstituted in sterile DI water to a final concentration of 100 µg/ml. Aliquot and store in -20 °C until use.
Human Mesenchymal Stem Cells (hMSC)	Cambrex		This cell type was used in the assay to determine synergistic effect of NGF and nanotopography.
Rat PC12 Pheochromocytoma Cells	ATCC		This cell type was used in the neurite outgrowth assay to determine bioactivity of NGF. After exposure to release media with NGF, measure number of cells with neurite extensions and normalize to total number of cells.
Grade 93 filter paper	Whatman	Z699675	This is used for the purification of chitosan after its precipitation with sodium hydroxide at pH 7.

Swing bucket centrifuge	Eppendorf	5810R	To be used during the purification of chitosan using 1,200 x g speed.
Motor with mandrel rotating at constant speed	Rhymebus	RM5E	The motor is used for the fabrication of IPC fibers on pullulan or PCL frame.
Phosphate buffered saline	FirstBase		Sterilize through filtration (0.2 µm filter) and autoclave.
10-mm diameter Tissue Culture Polystyrene Dish (TCPS)	Greiner		The TCPS dish is used for casting of pullulan frame.
Human VEGF ELISA kit	R&D systems	DVE00	The ELISA kit is used for detection of VEGF in the release medium.
Human NGF ELISA kit	R&D systems	DY256	The ELISA kit is used for detection of NGF in the release medium.
Plastic Coated Adhesive Tape	Bel-Art	9040336	The adhesive tape is used to securely stick the alligator clip to the rotating mandrel