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Supporting Information

Scheme S1

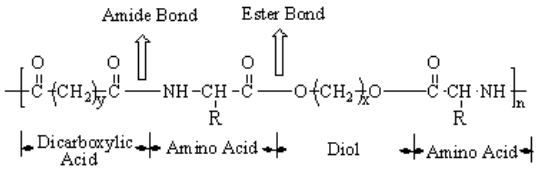

Table S1, the combinations of Monomers **I** and **II** for the Synthesis of Arg-Phe-PEAs

Monomer **I**	Monomer **II** (L-arginine)	Monomer **II** (L- Phenylalanine)	Molar percent of L-Arg Monomer **II**	Arg-Phe-PEA
NS	Arg-4-S	Phe-4	10 %	8-Arg-4-S-8-Phe-4-10%
NS	Arg-4-S	Phe-4	20 %	8-Arg-4-S-8-Phe-4-20%
NS	Arg-6-S	Phe-4	10 %	8-Arg-6-S-8-Phe-4-10%
NS	Arg-6-S	Phe-4	20 %	8-Arg-6-S-8-Phe-4-20%
NA	Arg-4-S	Phe-4	10 %	4-Arg-4-S-4-Phe-4-10%
NA	Arg-4-S	Phe-4	20 %	4-Arg-4-S-4-Phe-4-20%
NA	Arg-6-S	Phe-4	10 %	4-Arg-6-S-4-Phe-4-10%
NA	Arg-6-S	Phe-4	20 %	4-Arg-6-S-4-Phe-4-20%

Table S2, Solubility of Arg-Phe-PEA

Arg-Phe-PEAs	Water	Methanol	Acetone	THF	Chloroform	DMF	DMSO
4-Arg-4-S-4-Phe-4-10%	-	-	-	-	-	+	+
4-Arg-4-S-4-Phe-4-20%	-	-	-	-	-	+	+
8-Arg-6-S-8-Phe-4-10%	-	-	-	-	-	+	+
8-Arg-6-S-8-Phe-4-20%	-	-	-	-	-	+	+
8-Arg-6-S	+	+	-	-	-	+	+
4-Arg-4-S	+	+	-	-	-	+	+
8-Phe-4	-	-	-	+	+	+	+

Note: + means soluble, - means insoluble

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Materials

L-Arginine (L-Arg), L-phenylalanine (L-Phe), p-toluenesulfonic acid monohydrate, adipoyl chloride, sebacoyl chloride, 1, 4-butanediol, 1, 6-hexaniol and p-nitrophenol, triethylamine, bovine serum albumin (BSA), poly(vinyl alcohol) (PVA, MW 13,000-23,000, 87-89% hydrolyzed), BCA kit and MTT (3-(4, 5-Dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide) were all purchased from Sigma-Aldrich (St. Louis, MO) and used without further purification. Poly (n-butyl methacrylate) (PBMA) was purchased from Polysciences (Warrington, PA) and used directly. Organic solvents like methanol, toluene, ethyl acetate, acetone, 2-propanol and dimethyl sulfoxide (DMSO) were purchased from VWR Scientific (West Chester, PA) and were purified by standard methods before use. α-Chymotrypsin (Type II, from bovine pancreas, 66 units/mg, solid) was purchased from Sigma-Aldrich (St. Louis, MO) and chosen as the model enzyme because it can hydrolyze ester linkages at C-terminal of hydrophobic α-amino acids like L-phenylalanine.

Characterizations

The physicochemical properties of the prepared monomers and polymers were characterized by various standard methods. NMR spectra were recorded by a Varian Unity Inova 400-MHz spectrometer (Palo Alto, CA). Deuterated dimethyl sulfoxide (DMSO-*d*6; Cambridge Isotope Laboratories) was used as the solvent. MestReNova software was used for the data analysis. The solubility of the resulting polymers in common organic solvents at room temperature was assessed by using 1.0 mg/mL as solubility criteria. The static contact angle of the resulting polymers was measured by a Ramé-Hart Model 500 Advanced Goniometer/Tensiometer. The round micro cover glasses (diameter, 12 mm, no.2,VWR, West Chester, PA) were coated with a polymer DMF solutions (2 wt%) and vacuum drying before the contact angle testing. The static contact angle was measured by dropping distilled water (4 μL) onto the polymer-coated cover glass surface. An average of triplicates was used. For the molecular weight (MW) measurement, polymers were prepared at a concentration of 1 mg/mL in a 0.1 % (w/v) LiCl in DMAc solution. The sample MWs were determined from a standard curve generated from polystyrene standards with MWs ranging from 841.7 kDa to 2.93 kDa that were chromatographed under the same conditions as the samples. The standard curve was generated from a 3rd order polynomial fit of the polystyrene standard MWs.

Glass transition temperature measurement

The thermal properties of Arg-Phe-PEAs were measured by a DSC 2920 (TA Instruments, New Castle, DE). The thermal scanning was carried out from -10 to 200 ℃ at a scanning rate of 10 ℃/min and at a nitrogen gas flow rate of 25 mL/min. TA Universal Analysis software was used for thermal data analysis. The glass transition temperature of 8-Arg-6-S-8-Phe-4-10% and 8-Arg-6-S-8-Phe-4-20% are 45±2 ℃ and 42±2 ℃, respectively.

Cell culture

The cell-surface interaction of Arg-Phe-PEAs was studied to determine the level of cell attachment, proliferation and inflammatory response. Bovine Endothelial Aorta Cells (BAECs) were used as the model cells for attachment and proliferation tests. BAECs were purchase from VEC Technologies and maintained at 37 ℃ in 5 % CO_2 in Medium 199 (Invitrogen, Carlsbad, CA) supplemented with 10 % Fetal Clone III (HyClone, Logan, UT), and 1 % each of penicillin–streptomycin, MEM amino acids (Invitrogen, Carlsbad, CA), and MEM vitamins (Mediatech, Manassas, VA). BAECs were used from passages 8–12. J774 mouse peritoneal macrophages were used as the model cells for *in vitro* inflammatory response tests, which were obtained from ATCC and cultured at 37 ℃ in 5 % CO_2 in DMEM supplemented with 10 % FBS. J774s were used from passage 5-10. For all the cells, the cell media was changed every 2 days. Cells were grown to 70 % confluence before splitting or harvesting.

Statistics

Where appropriate, the data are presented as mean ± standard deviation calculated over at least three data points. JMP software (version 8.0, from SAS Company) was used for data analysis. Significant differences compared to control groups were evaluated by unpaired Student's t-test or Dunnet test at p 0.05, and between more than two groups by Tukey's test with or without one-way ANOVA analysis of variance.