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Self-assembly behavior and sustained drug release properties of amphiphilic poly(amino acid)s

Support information

S1. Chemical bonding of model drugs to polymers

A certain amount of polymer was dissolved in DMF, and DOX solution was slowly added to the system by drops. Under continuous agitation, the carbon group would be reacted with the amino group to form imine bond. The reaction process was shown in Fig.S1.

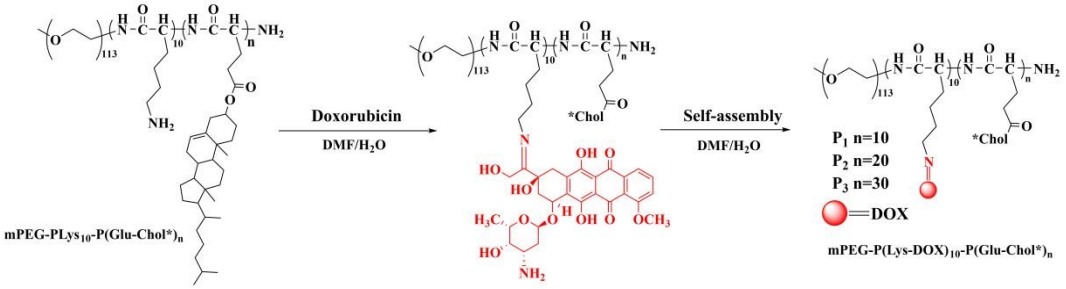

Fig.S1. The formation principle of Schiff base

S2. DLS of polymers after self-assembly

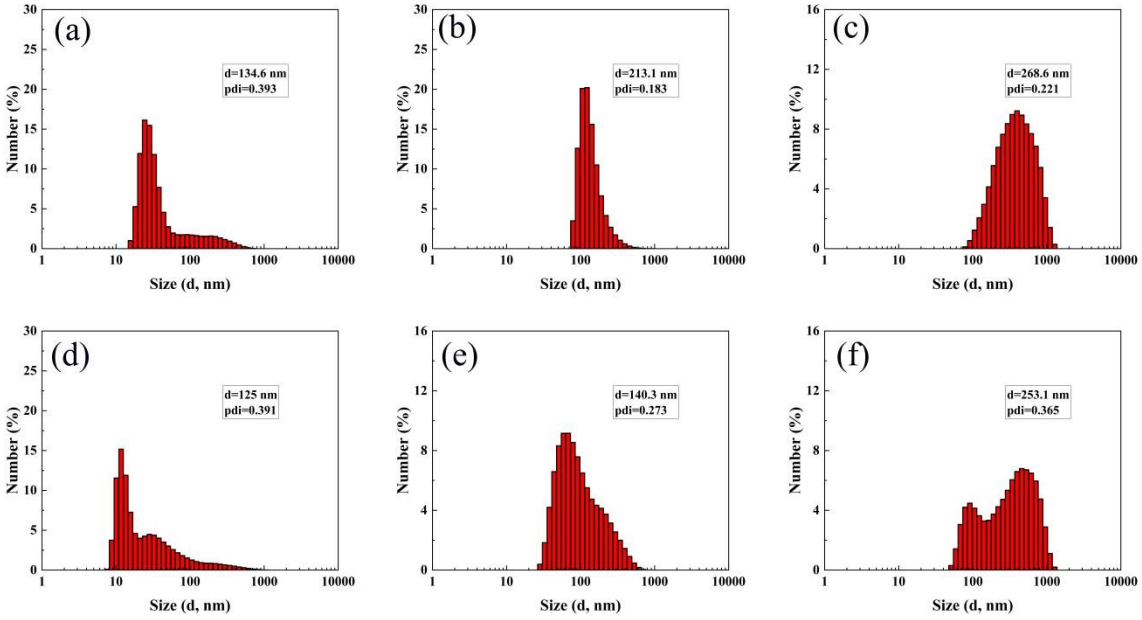

Fig.S2. DLS of self-assembly of polymers (a) P1, pH=5.0, (b) P2, pH=5.0, (c) P3, pH=5.0, (d) P1, pH=7.4, (e) P2, pH=7.4, (f) P3, pH=7.4

S3. Drug release kinetics of nanoparticles

Table S1. Zero order kinetic fitting of drug release behavior at different pH, T=37 °C

	pH	Fitting curve equation	R^2
DOX-P1-M	5.0	Mt = 0.7180 t + 32.94	0.7325
	6.2	Mt = 0.4563 t + 29.02	0.7042
	7.4	Mt = 0.1796 t + 24.81	0.4679
DOX-P2-M	5.0	Mt = 0.7606 t + 31.02	0.7133
	6.2	Mt = 0.3800 t + 24.75	0.6602
	7.4	Mt = 0.2754 t + 21.67	0.6123
DOX-P3-M	5.0	Mt = 0.7692 t + 31.51	0.7160
	6.2	Mt = 0.5393 t + 26.16	0.7508
	7.4	Mt = 0.2136 t + 22.62	0.5100

Table S2. Zero order kinetic fitting of drug release behavior at different temperature, pH=7.4.

	T	Fitting curve equation	R^2
DOX-P1-M	25 °C	Mt = 0.1896 t + 18.25	0.6287
	37 °C	Mt = 0.1796 t + 24.81	0.4679
	45 °C	Mt = 0.3223 t + 26.38	0.6858
DOX-P2-M	25 °C	Mt = 0.2046 t + 17.45	0.6882
	37 °C	Mt = 0.2754 t + 21.67	0.6123
	45 °C	Mt = 0.3827 t + 25.34	0.6175
DOX-P3-M	25 °C	Mt = 0.1529 t + 17.61	0.5873
	37 °C	Mt = 0.2136 t + 22.62	0.5100
	45 °C	Mt = 0.2701 t + 34.19	0.4684

Table S3. First order kinetic fitting of drug release behavior at different pH, T=37 °C

	pH	Fitting curve equation	R^2
DOX-P1-M	5.0	ln (100-Mt) = -0.0184 t + 4.21	0.8902
	6.2	ln (100-Mt) = -0.0082 t + 4.25	0.7822
	7.4	ln (100-Mt) = -0.0025 t + 4.31	0.5019
DOX-P2-M	5.0	ln (100-Mt) = -0.0191 t + 4.23	0.8439
	6.2	ln (100-Mt) = -0.0059 t + 4.31	0.7247
	7.4	ln (100-Mt) = -0.0039 t + 4.35	0.6573
DOX-P3-M	5.0	ln (100-Mt) = -0.0199 t + 4.23	0.8695
	6.2	ln (100-Mt) = -0.0098 t + 4.30	0.8296
	7.4	ln (100-Mt) = -0.0029 t + 4.34	0.5429

Table S4. First order kinetic fitting of drug release behavior at different temperature, pH=7.4.

	T	Fitting curve equation	R^2
DOX-P1-M	25 °C	ln (100-Mt) = -0.0024 t + 4.40	0.6640
	37 °C	ln (100-Mt) = -0.0025 t + 4.31	0.5019
	45 °C	ln (100-Mt) = -0.0051 t + 4.29	0.7505
DOX-P2-M	25 °C	ln (100-Mt) = -0.0026 t + 4.41	0.7202
	37 °C	ln (100-Mt) = -0.0039 t + 4.35	0.6573
	45 °C	ln (100-Mt) = -0.0061 t + 4.31	0.6980
DOX-P3-M	25 °C	ln (100-Mt) = -0.0019 t + 4.41	0.6188
	37 °C	ln (100-Mt) = -0.0029 t + 4.34	0.5429
	45 °C	ln (100-Mt) = -0.0045 t + 4.17	0.5378

Table S5. Higuchi model fitting of drug release behavior at different pH, T=37 °C

	pH	Fitting curve equation	R^2
DOX-P1-M	5.0	$Mt = 8.3566\ t^{1/2} + 14.52$	0.9022
	6.2	$Mt = 5.3523\ t^{1/2} + 17.11$	0.8833
	7.4	$Mt = 2.2339\ t^{1/2} + 19.48$	0.6783
DOX-P2-M	5.0	$Mt = 8.8983\ t^{1/2} + 11.27$	0.8896
	6.2	$Mt = 4.5036\ t^{1/2} + 14.59$	0.8486
	7.4	$Mt = 3.3064\ t^{1/2} + 14.11$	0.8111
DOX-P3-M	5.0	$Mt = 8.9925\ t^{1/2} + 11.58$	0.8909
	6.2	$Mt = 6.2413\ t^{1/2} + 12.51$	0.9128
	7.4	$Mt = 2.6345\ t^{1/2} + 16.40$	0.7229

Table S6. Higuchi model fitting of drug release behavior at different temperature, pH=7.4.

	T	Fitting curve equation	R^2
DOX-P1-M	25 °C	$Mt = 2.2598\ t^{1/2} + 13.12$	0.8187
	37 °C	$Mt = 2.2339\ t^{1/2} + 19.48$	0.6783
	45 °C	$Mt = 3.7882\ t^{1/2} + 17.93$	0.8641
DOX-P2-M	25 °C	$Mt = 2.4047\ t^{1/2} + 12.09$	0.8671
	37 °C	$Mt = 3.3064\ t^{1/2} + 14.11$	0.8111
	45 °C	$Mt = 4.5754\ t^{1/2} + 14.92$	0.8108
DOX-P3-M	25 °C	$Mt = 1.8348\ t^{1/2} + 13.40$	0.7788
	37 °C	$Mt = 2.6345\ t^{1/2} + 16.40$	0.7229
	45 °C	$Mt = 3.3383\ t^{1/2} + 26.28$	0.6695