Supplementary Information

High Efficiency and Low Toxicity of Polyethyleneimine Modified Pluronics (PEI-Pluronic) as Gene Delivery Carriers in Cell Culture and Dystrophic *mdx* Mice

Mingxing Wang[1]*, Peijuan Lu[1], Bo Wu[1], Jay D. Tucker[1,2], Caryn Cloer [1], Qilong Lu[1]*

mingxing.wang@carolinashealthcare.org,

gi.lu@carolinashealthcare.org

1. Characterization of polymers:

The Pluronics were first activated by CDI followed by reaction with excess of the low molecular weight PEI (0.8k, 1.2k). This procedure should make the LPEI conjugate to the terminal ends of pluronics.[29,34] it's also confirmed by ^{1}H NMR (Fig. S1) and MALDI-TOF-MASS (PCM-05 in Fig. S2). The conjugate PEI % of polymers were further determined by nitrogen element analysis, the results showed that the Pluronics had very high conjugating percent with PEI from 77.5% to 95.4% (Table S1).

Table S1. Characteristics of PCM polymers)

Code	Mw of reactants			Mw of PCMs (Da, Calc.)	PEI % of PCMs (Calc.)	N /% (Calc.)*	N /% (Found)	Percentage of Pluronic modification (%)
	Pluronic		PEI					
	Mw(Da) [a]	HLB [b,]						
PCM-01	L64 (2900)	12-18	800	4500	35.6	11.85	10.94	92.3
PCM-02	P85 (4600)	12-18	800	6200	25.8	8.60	7.60	88.4
PCM-03	F127(12600)	18-23	800	14200	11.3	3.75	2.99	79.7

PCM-04	**L64 (2900)**	**12-18**	**1200**	**5300**	**45.3**	**15.09**	**13.08**	**86.7**
PCM-05	**P85 (4600)**	**12-18**	**1200**	**7000**	**34.3**	**11.43**	**9.76**	**85.4**
PCM-06	**F127(12600)**	**18-23**	**1200**	**15000**	**16.0**	**5.33**	**4.32**	**81.2**
PCM-07	**L35 (1900)**	**18-23**	**800**	**3500**	**45.7**	**15.23**	**13.83**	**90.8**
PCM-08	**L44 (2200)**	**12-18**	**800**	**3800**	**42.1**	**14.03**	**12.33**	**87.9**
PCM-09	**L35 (1900)**	**18-23**	**1200**	**4300**	**55.8**	**18.60**	**15.75**	**84.7**
PCM-10	**L44 (2200)**	**12-18**	**1200**	**4600**	**52.2**	**17.39**	**14.35**	**82.5**
PCM-11	**P123 (5750)**	**7-12**	**800**	**7350**	**21.8**	**7.26**	**5.62**	**77.5**
PCM-12	**P123 (5750)**	**7-12**	**1200**	**8150**	**29.5**	**9.82**	**7.86**	**80.2**
PCM-13	**PEG-6000** [e]	**hydrophilic**	**800**	**7600**	**21.1**	**7.02**	**6.70**	**95.4**
PCM-14	**PEG-6000** [e]	**hydrophilic**	**1200**	**8400**	**28.6**	**9.52**	**8.79**	**92.3**

- Nitrogen content was calculated theoretically as 33 wt% in PEI.
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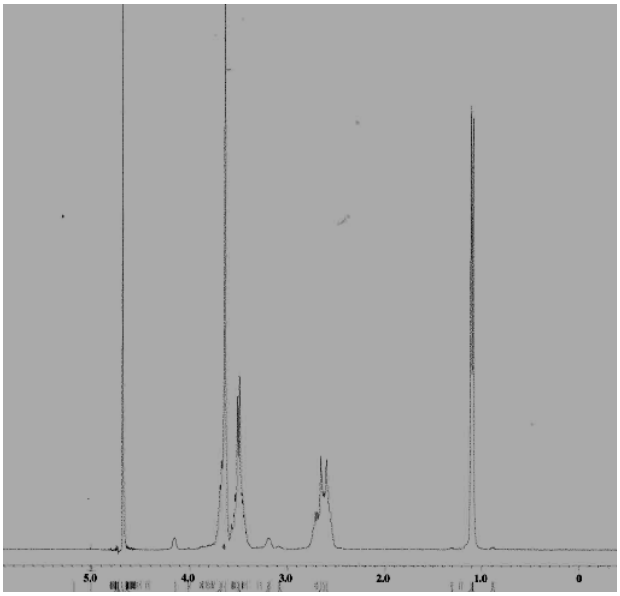

Fig. S1. Representative ^{1}H-NMR Spectra of Pluronic-PEI in D_2O (JEOL 500).

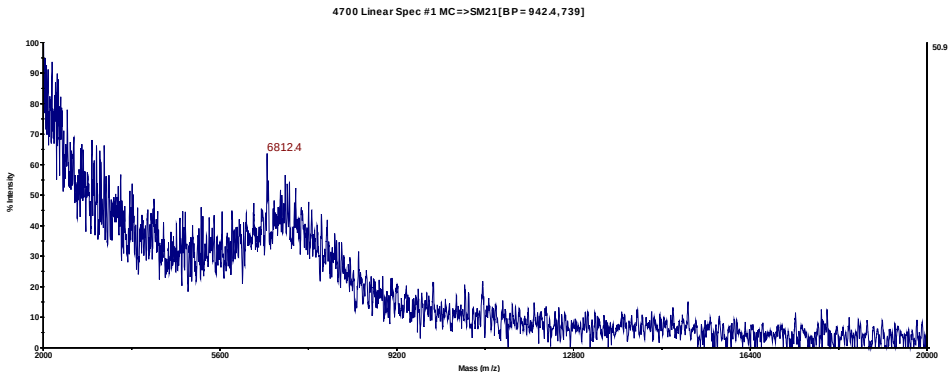

Fig. S2. MALDI-TOF-MASS of PCM -05 (Sinapinic acid with 0.1% TFA)

MALDI-TOF Mass values of polymer was determined using a Voyager-DE Pro STR MALDI-TOF mass spectrometer. Samples were prepared by (1) plate coating with 0.5 μL saturated sinapinic acid in 50% acetonitrile with 0.1% TFA; (2) depositing 0.5 μL solution of polymer in water (10^{-5} M); and, finally, (3) coating with 0.5 μL saturated sinapinic acid in 20% acetonitrile with 0.1% TFA.

2. DNA binding comparison for Pluronic only and Pluronic-PEI conjugate: The Pluronic-PEI conjugates (PCMs) showed strong bind with negatively charged DNA, but the with pluronic (such as P85) showed same as DNA only(Fig. S3).

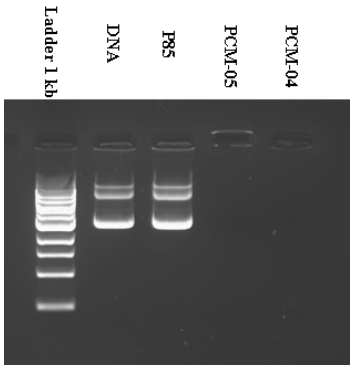

Fig. S3. Electrophoretic mobility of DNA mixed with polymers (The complexes were prepared immediately before use by gently vortexing a mixture of DNA and polymer solution at weight ratio of polymer/DNA =5. The complexes were incubated at room temperature for 30 minutes in 24 µL volume, then loaded onto 1% agarose gel with ethidium bromide (0.1μg/mL) in tris-acetate (TAE) buffer (100V, 40min). The gel was analyzed on UV illuminator).