Supporting Information

PGMA-based supramolecular hyperbranched polycations for gene delivery

Miao Qi,[a,#] Shun Duan,[b,c,#] BingranYu,[c] HaoYao,[a] Wei Tian,[a,*] and Fu-Jian Xu[b,c,*]

[a]The Key Laboratory of Space Applied Physics and Chemistry, Ministry of Education and Shaanxi Key Laboratory of Macromolecular Science and Technology, School of Science, Northwestern Polytechnical University, Xi'an, 710072, P. R. China
[b]Key Laboratory of Carbon Fiber and Functional Polymers (Beijing University of Chemical Technology), Ministry of Education, Beijing 100029 China
[c]Beijing Laboratory of Biomedical Materials, Beijing University of Chemical Technology, Beijing 100029 China

[#] The authors contributed equally to this work.

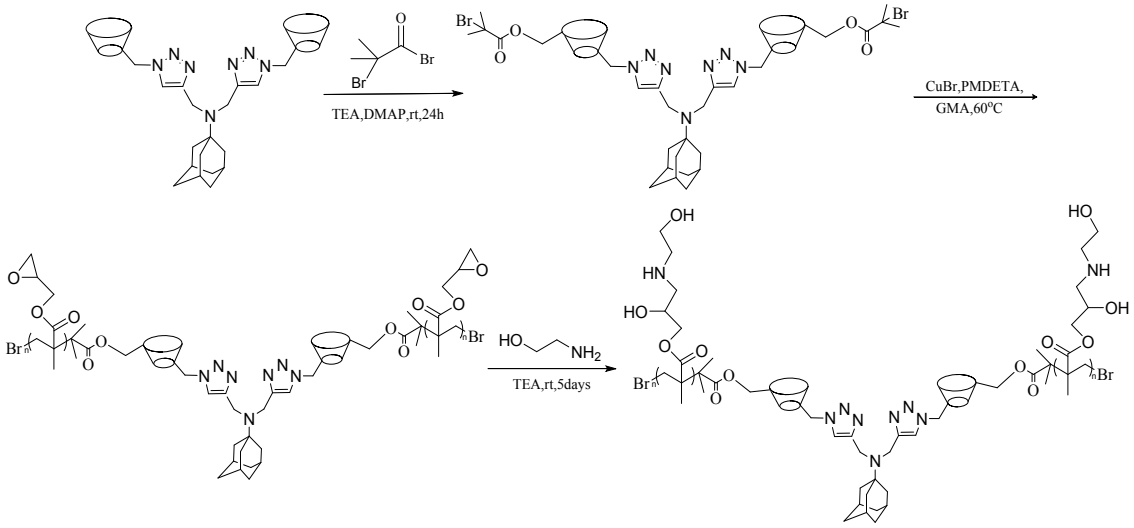
[*]To whom all correspondence should be addressed:
Email: happytw_3000@163.com (W T)
xufj@mail.buct.edu.cn (F J X)

Materials characterization

The Fourier Transform Infrared (FTIR) spectra were obtained on a Nicolet iS10 spectrometer (Nicolet), casting samples into thin films on KBr. ^{1}H NMR and ^{13}C NMR spectra were conducted on a Bruker Avance 300 spectrometer (Bruker BioSpin, Switzerland) operating at 300 MHz (1H) in DMSO-d_6 or D_2O. MALDI-TOF-MS measurements were performed on a Bruker-Autoflex III & MALDI-TOF-MS with deionized water as the solvent.

Synthesis of Ad-(CD-PGEA)$_2$

The structure and synthetic routes of Ad-(CD-PGEA)$_2$ are shown in Scheme S1.



Scheme S1 Synthetic routes of Ad-(CD-PGEA)$_2$.

Characterization of Ad-(CD-Br)$_2$

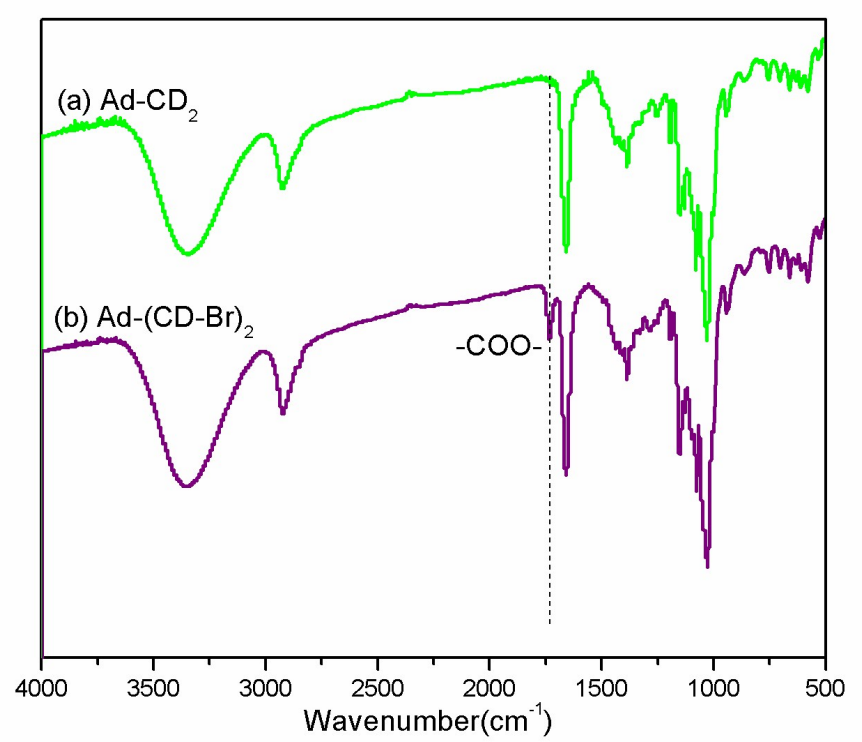


Figure S1 FTIR spectra of Ad-CD$_2$ (a) and Ad-(CD-Br)$_2$ (b).

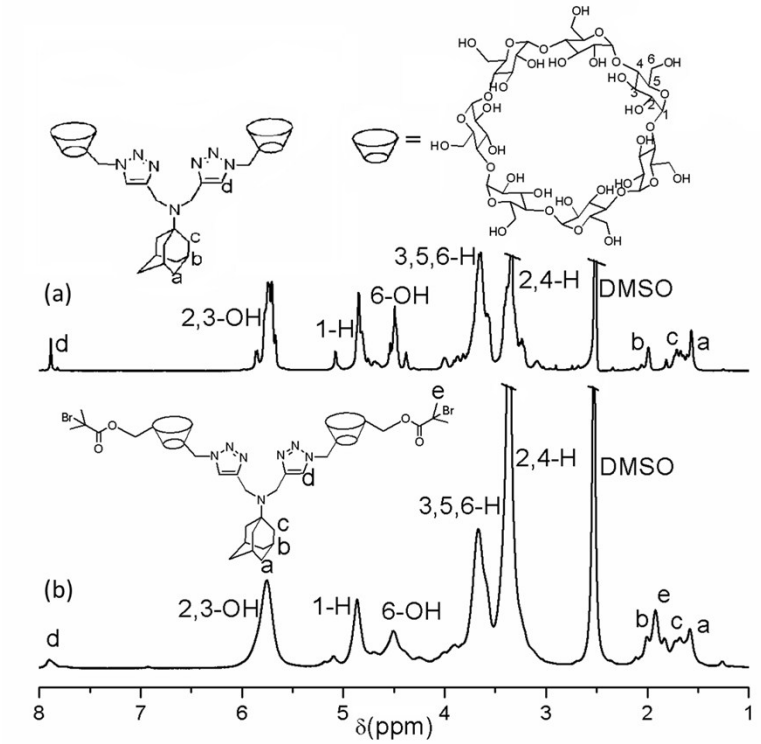


Figure S2 ^{1}H NMR spectra of Ad-CD$_2$ (a) and Ad-(CD-Br)$_2$ (b).

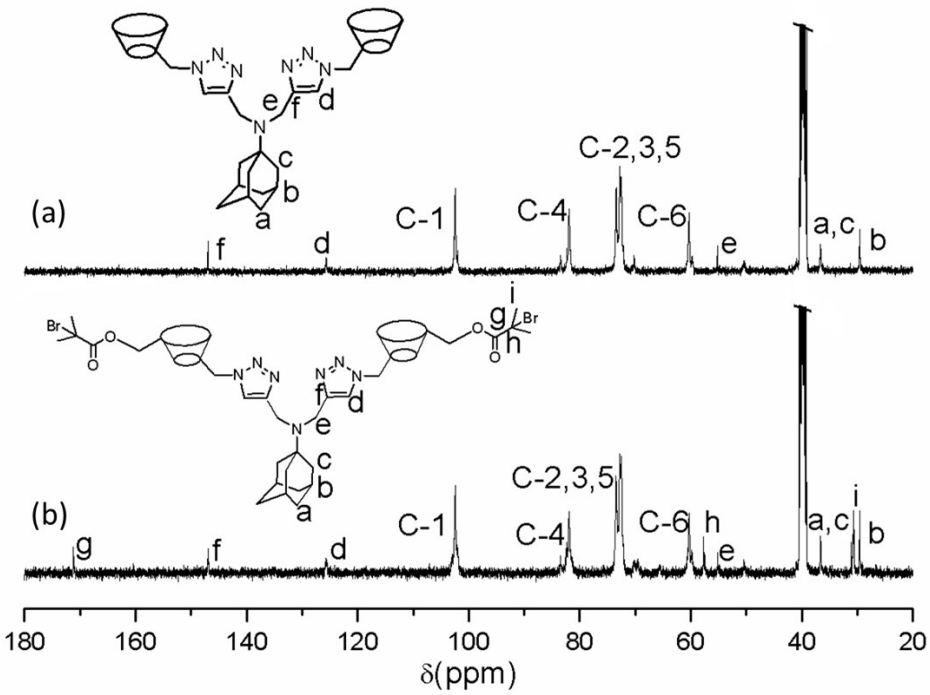


Figure S3 ^{13}C NMR spectra of Ad-CD_2 (a) and Ad-(CD-Br)$_2$ (b).

Characterization of Ad-(CD-PGMA)$_2$

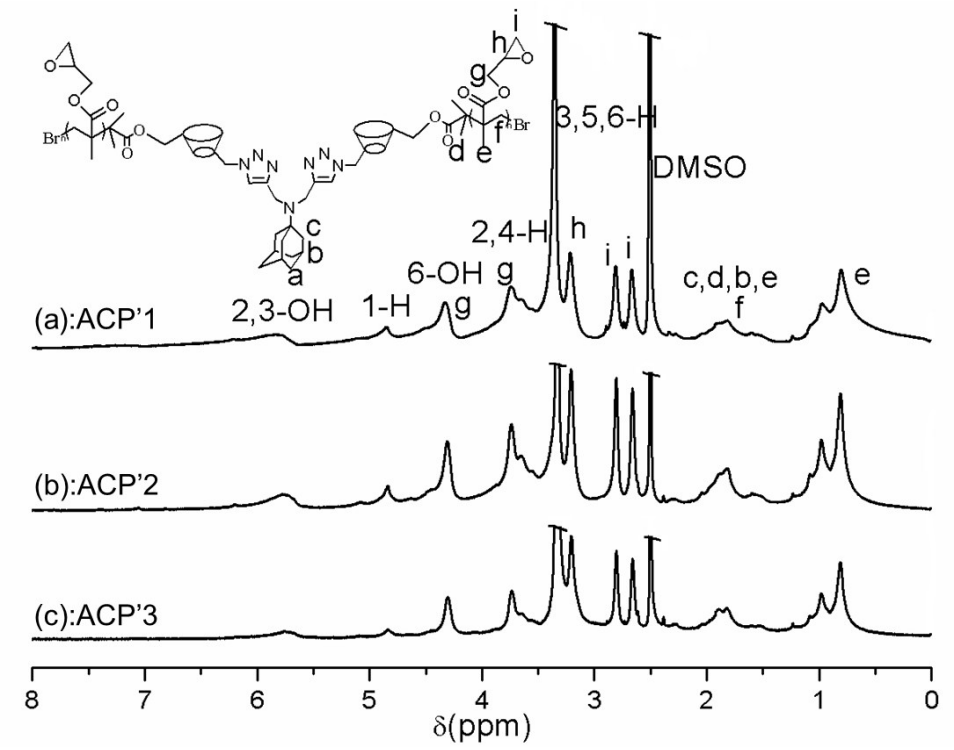


Figure S4 ^{1}H NMR spectra of different Ad-(CD-PGMA)$_2$ samples.

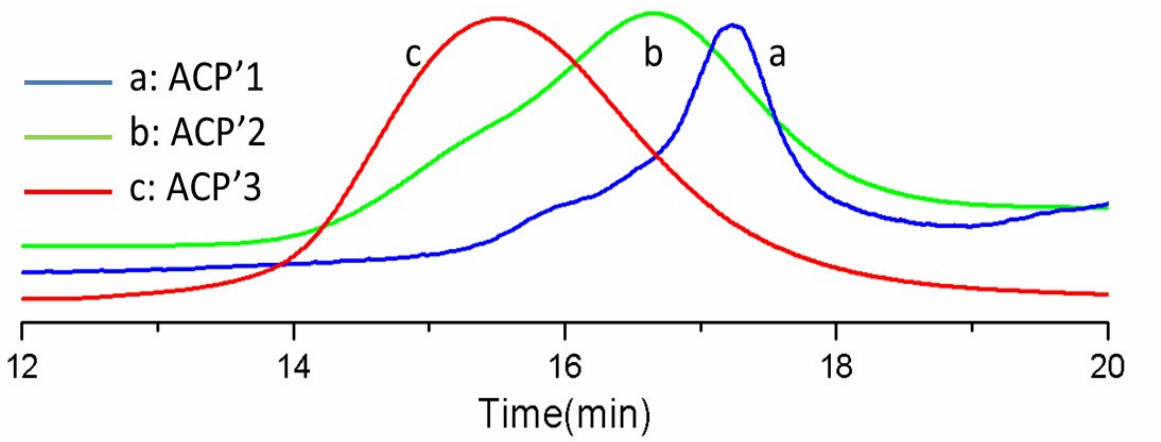


Figure S5 SEC/MALLS curves of different Ad-(CD-PGMA)$_2$ samples.

Characterization of Ad-(CD-PGEA)$_2$

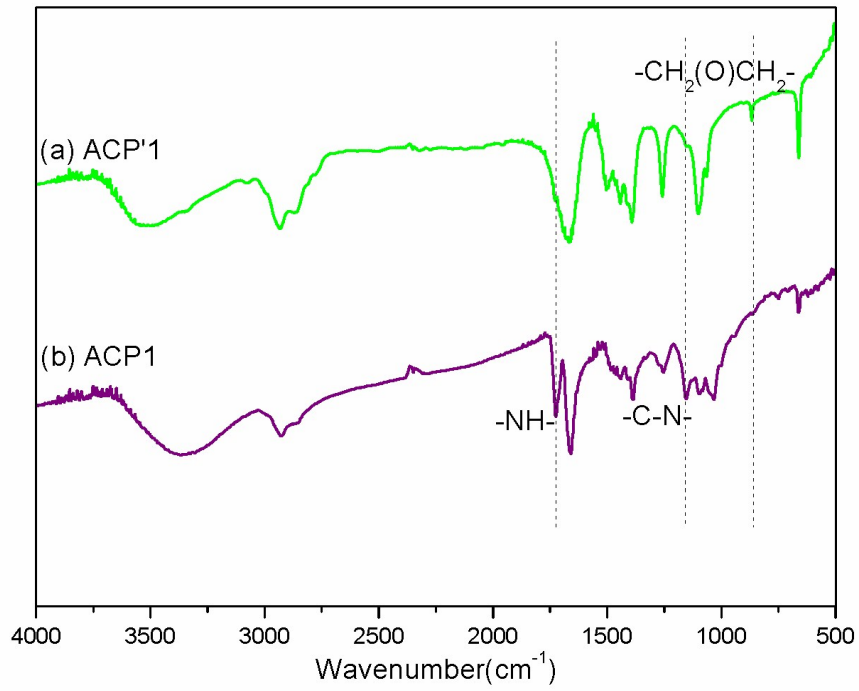


Figure S6 FTIR spectra of ACP'1 (a) and ACP1 (b).

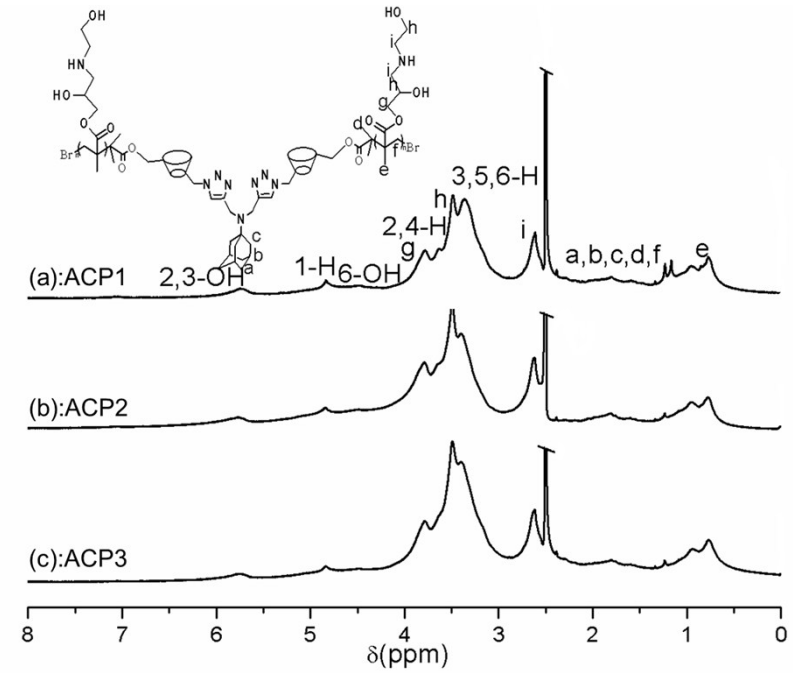


Figure S7 ^{1}H NMR spectra of different Ad-(CD-PGEA)$_2$ samples.

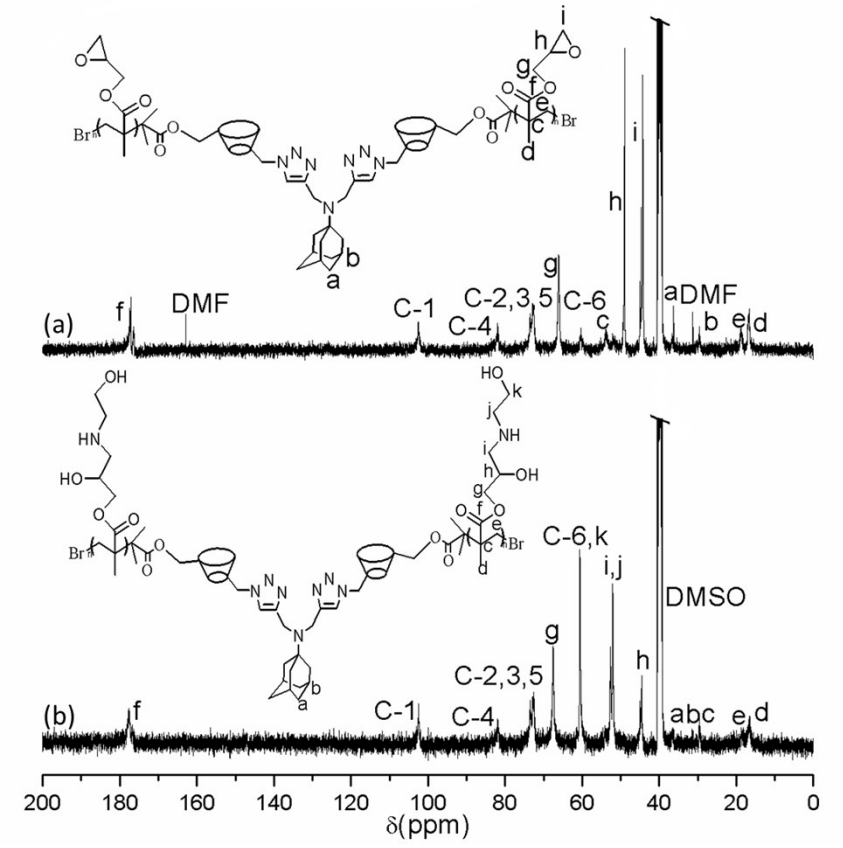


Figure S8 ^{13}C NMR spectra of ACP'1 (a) and ACP1 (b).

Dissociation of S-ACPs

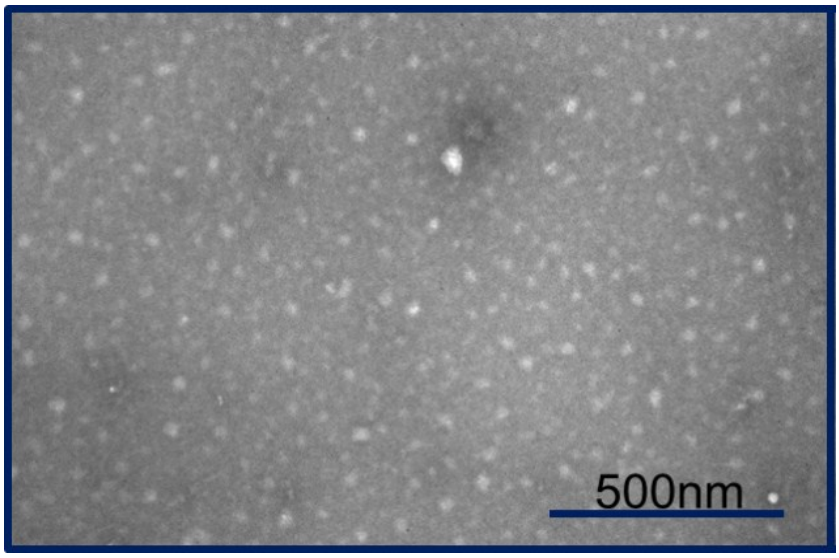


Figure S9 Typical TEM image of D-ACP2 in aqueous solution in the presence of Ad-Na.

Cytotoxicity of Ad-Na

The cytotoxicity of Ad-Na was evaluated in C6 cell line by CCK-8 assay. C6 cells were seeded into 96-well plates at the density of 10^4 cells/well with 100 μL culture media. After 24-hour culture, the culture media were replaced with 100 μL culture media containing 10 μL Ad-Na solution at the concentration of 1.88 mg/mL, and the normal culture media were taken as negative control while culture media containing phenol (0.64%, w/v) as positive control. After 24-hour culture, the cell viability was measured and calculated as described in the article. The result was shown in Figure S9.

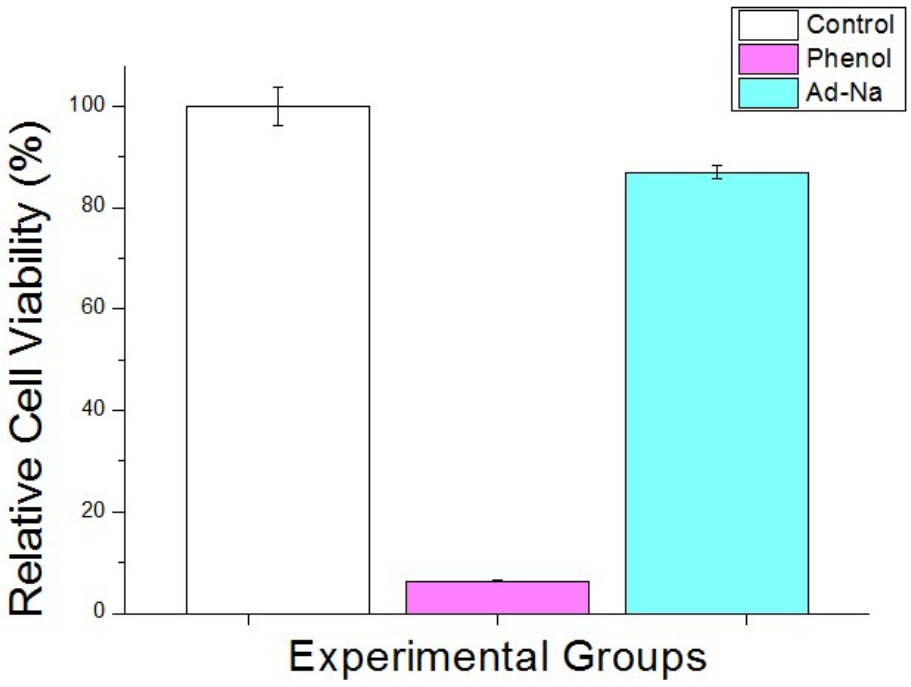


Figure S10 Cytotoxicity of Ad-Na.

Notes and reference

1. N. P. Truong, M. V. Dussert, M. R. Whittaker, J. F. Quinn, T. P. Davis. Polym. Chem., 2015, 6, 3865–3874.