SUPPLEMENTARY INFORMATION

Carbohydrate Recognition and Photodegradation by an Anthracene-Kemp's Acid Hybrid

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Contents **Page**

^{1}H-NMR binding assay.

All ^{1}H-NMR measurements were performed on a JEOL ECA-500. The sample temperature was regulated at 298 K. For ^{1}H-NMR binding assay, a 2 mM solution of anthracene-Kemp's acid hybrid **1** in $CDCl_3$ (solution A) and 100 mM solution of each substrate in $CDCl_3$ (solution B) were prepared. And then, solution B was titrated into a solution A in order to make mixtures with a constant concentration of the hybrid and a range of concentration of each substrate (0.3 - 30 eq.). In general, ten different concentrations were made. $\Delta\delta_{obs}$ was plotted against the concentration of a substrate, where $\Delta\delta_{obs}$ is the difference between the observed ^{1}H-NMR chemical shift of the imide NH proton of **1** and the ^{1}H-NMR chemical shift of the free imide NH proton of **1**. The titration data were analyzed by nonlinear least-square method using Microsoft Excel 2010 software.[1,2]

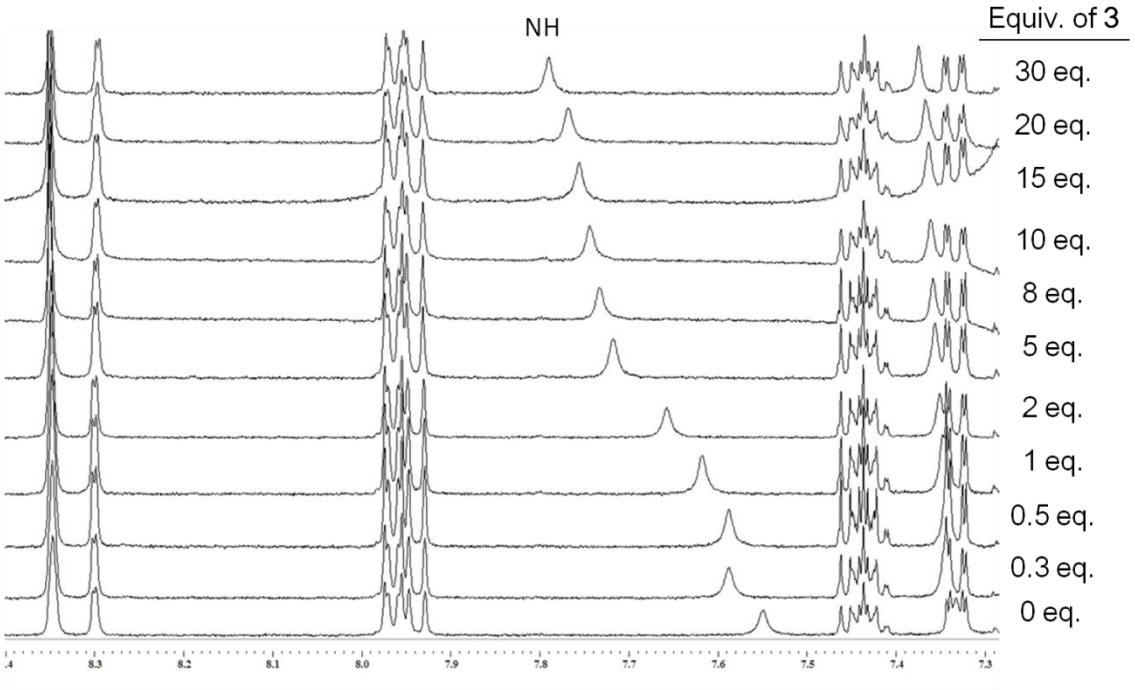


Figure S1 Partial ^{1}H-NMR spectra (500 MHz, $CDCl_3$, 298 K) of receptor **1** (1.0 mM) after addition of (from bottom to top) 0.0-30.0 equiv. of **3**.

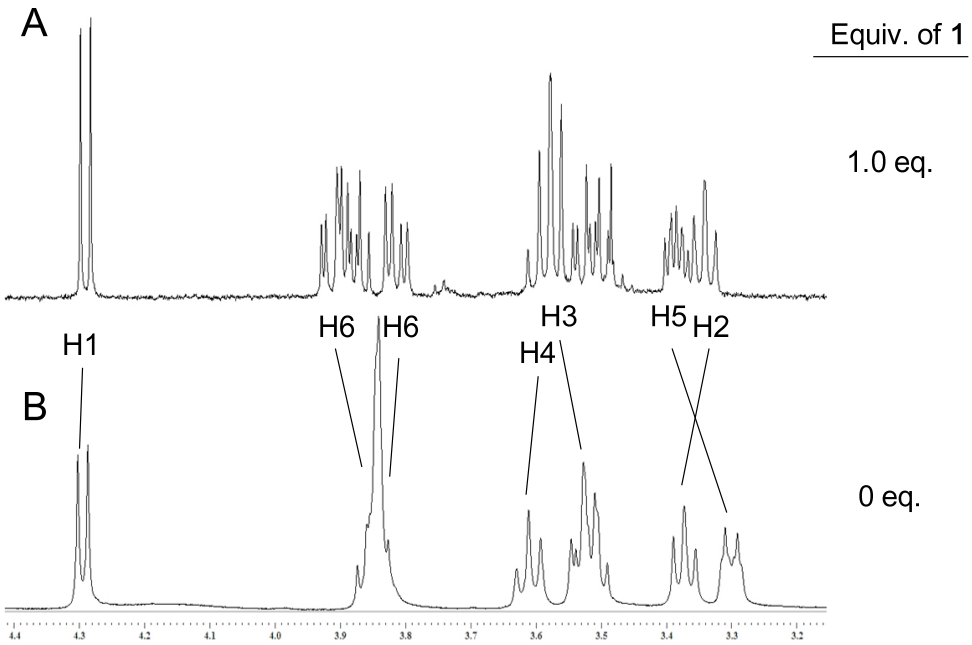
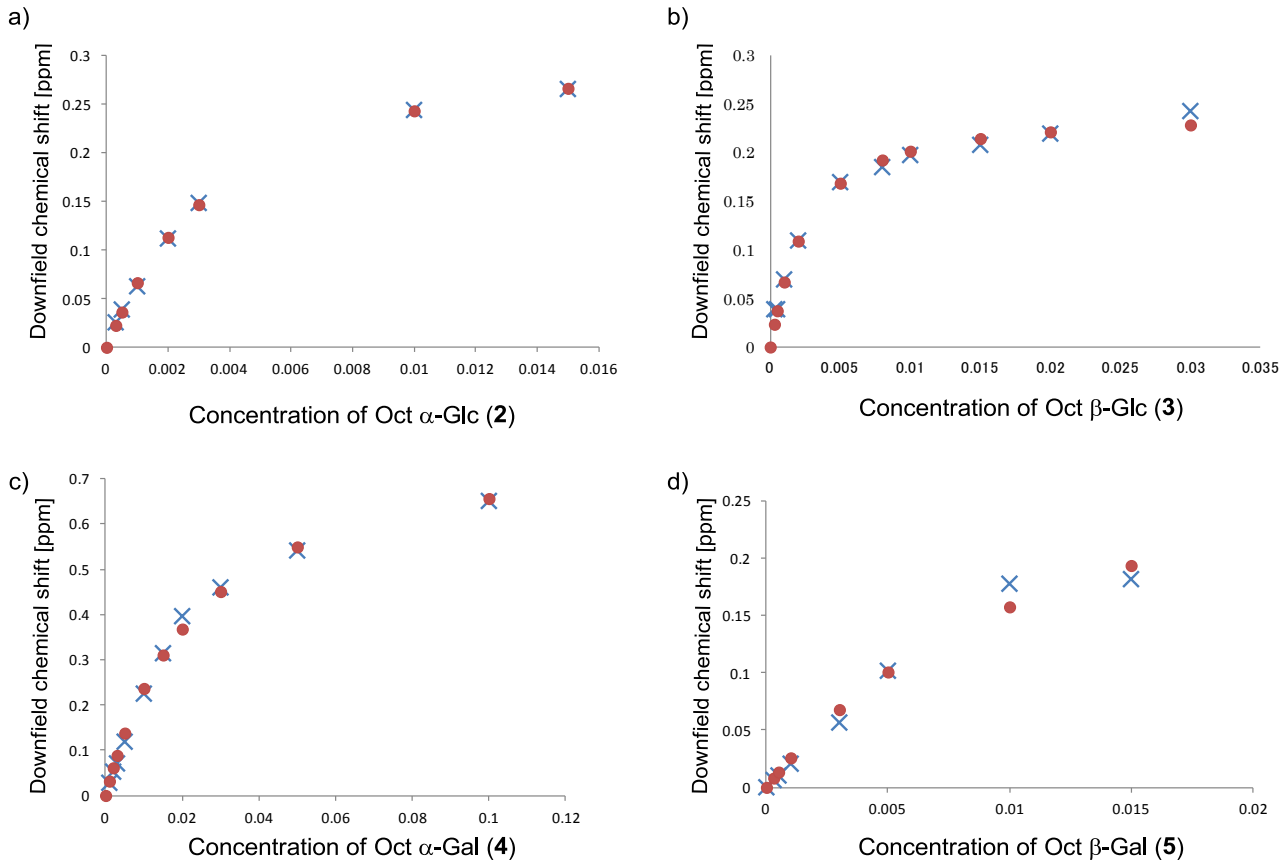


Figure S2 Partial ^{1}H-NMR spectra (500 MHz, $CDCl_3$, 298 K) of **3** (B) and upon addition of 1 mM of **1** (A).



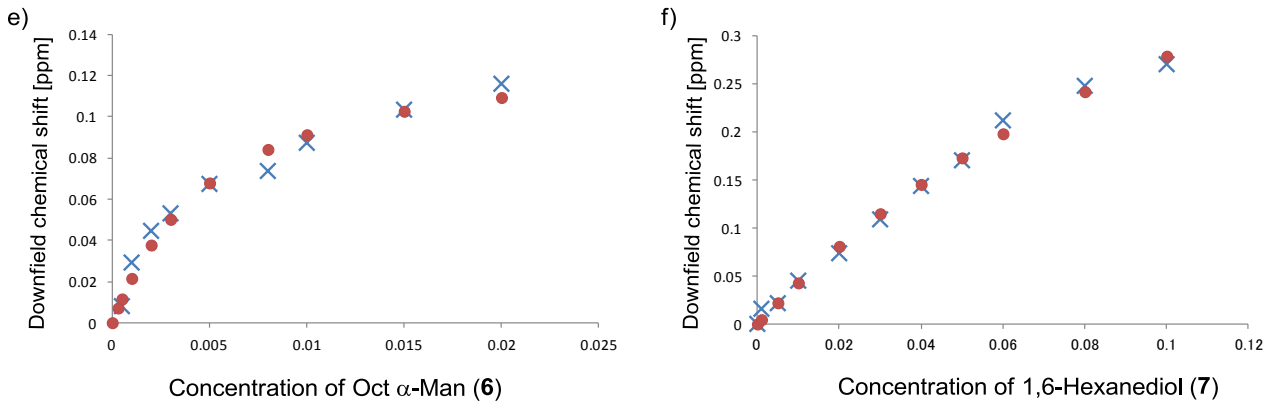


Figure S3 Plot of the observed (×) and calculated (●) downfield chemical shifts of the imide NH signal of **1** as a function of added each monosaccharide in $CDCl_3$ at 500 MHz and T=298 K. (a) Oct α-Glc (**2**), (b) Oct β-Glc (**3**), (c) Oct α-Gal (**4**), (d) Oct β-Gal (**5**), (e) Oct α-Man (**6**), and (f) 1,6-Hexanediol (**7**).

Photodegradation of β-CD by anthracene derivative 8.

β-CD (30 μM) was incubated with an anthracene derivative **8** (0, 90 or 300 μM) in 1% DMSO/MeCN-H_2O (9:1) at 25 ^oC for 2 h under irradiation with a UV lamp (365 nm, 100 W, Black-ray (B-100A), UVP Inc.,) placed 10 cm from the vessels, and analyzed by HPLC (TSK-GEL, Amide-80, 4.6×150 mm; 40 ^oC; detection by RI).

Photodegradation of monosaccharides 3 and 4 by anthracene-Kemp's acid hybrid 1.

Each monosacchaide (1.0 mM) was incubated with anthracene-Kemp's acid hybrid **1** (1.0 mM) in 1% DMSO/MeCN at 25 ^oC for 2 h under photo-irradiation (365 nm, 100 W) placed 10 cm from the mixture) and the mixture was dried *in vacuo*. The residue was acetylated using Ac_2O in pyridine at 40 ^oC for 13 h, and then concentrated. The resulting residue was subjected to silica gel column chromatography and analyzed by HPLC (Mightysil RP-18 GP 5 mM, 4.6×150 mm; 40 ^oC; detection by UV (215 nm); 35:65 MeCN/H_2O; flow rate 1.0 mL min^{-1}).

EPR spectrometry.

EPR experiments were carried out with a E-500 CW/EPR (Bruker) and recorded under the following conditions: microwave frequency 9.39 GHz, microwave power 16 mW, field modulation 0.1 mT at 100 kHz. DMPO was used as a spin-trapping agent. Anthracene derivative **8** (100 μM) and DMPO (500 mM) were incubated in 20% MeCN/H_2O under irradiation with a UV lamp (365 nm, 100 W) placed 40 cm from a flat cell for 40 min.

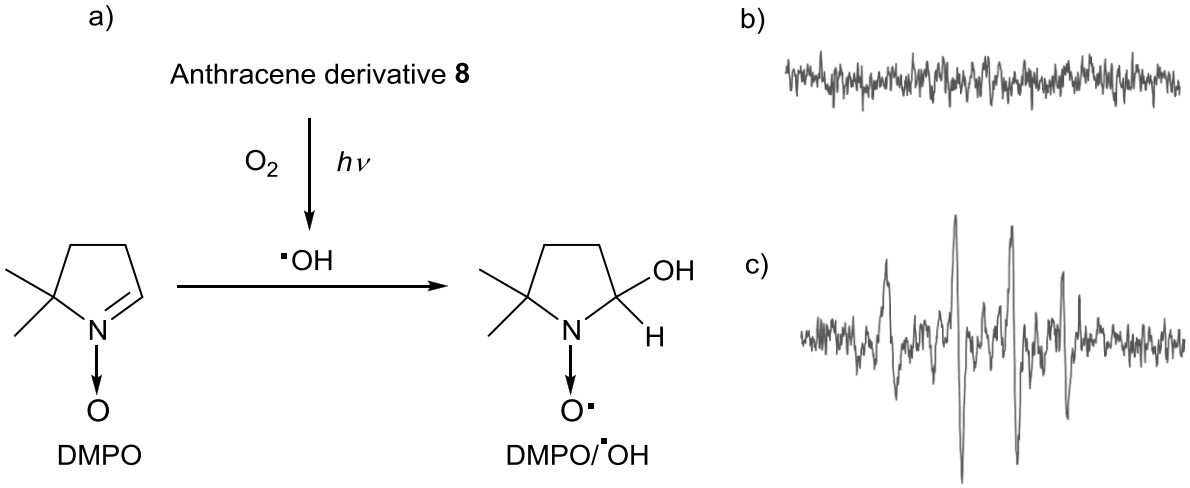


Figure S4 EPR spectra obtained during photo-irradiation of **8** in the presence of DMPO. **8** (100 μM) was incubated with DMPO (500 mM) in 20% MeCN/H_2O under irradiation with a UV lamp (365 nm, 100 W) placed 40 cm from a flat cell for 40 min. a) Formation of DMPO/•OH from DMPO by reaction of photo-excited **8** and O_2. b) Before irradiation; c) after 40 min irradiation.

References.

1 B. Askew, P. Ballester, C. Buhr, K. S. Jeong, S. Jones, K. Parris, K. Williams and J. Rebek Jr., *J. Am. Chem. Soc.*, 1989, **111**, 1082; K. Williams, B. Askew, P. Ballester, C. Buhr, K. D. Jeong, S. Jones and J. Rebek Jr., *J. Am. Chem. Soc.*, 1989, **111**, 1090.

2 N. Hayashi, T. Ujihara and K. Kohata, *Biosci. Biotechnol. Biochem.*, 2004, **68**, 2512; K. Hirose, *J. Incl. Phenom. Macro.*, 2001, **39**, 193.