*Article*

# Synthesis of Tetravalent Thio- and Selenogalactoside-Presenting Galactoclusters and Their Interactions with Bacterial Lectin PA-IL from *Pseudomonas aeruginosa*

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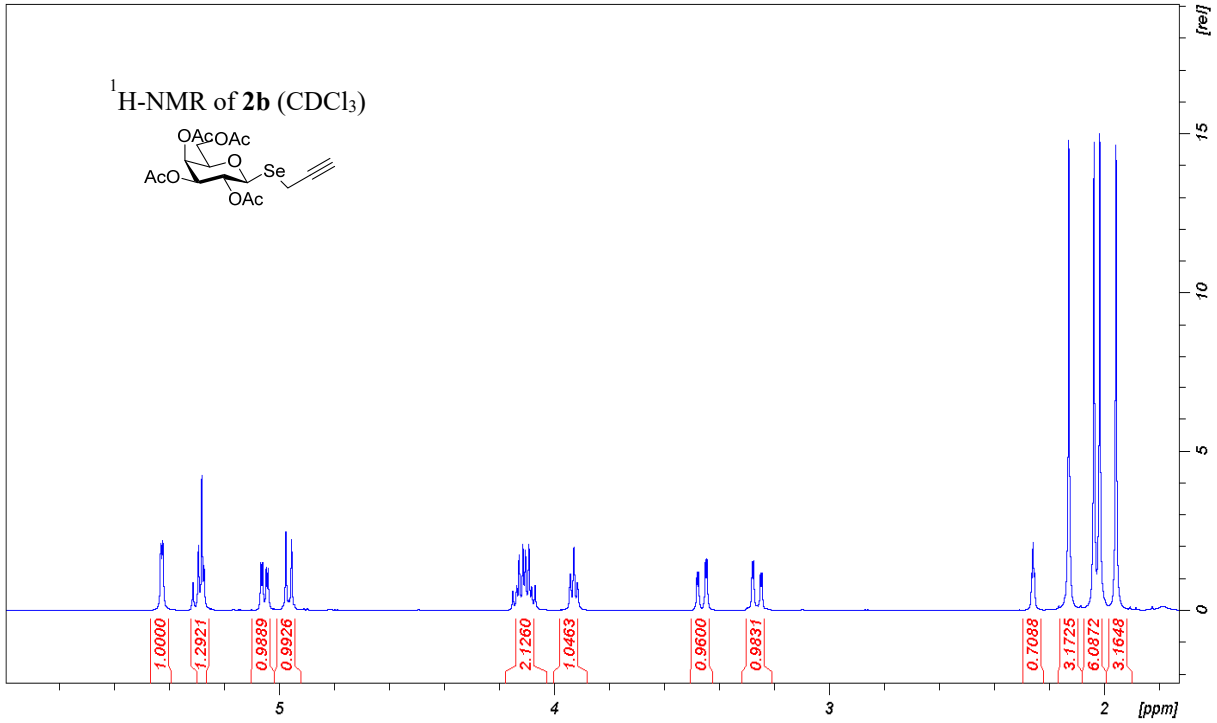
**Abstract:** Synthesis of tetravalent thio- and selenogalactopyranoside-containing glycoclusters using azide-alkyne click strategy is presented. Prepared compounds are potential ligands of *Pseudomonas aeruginosa* lectin PA-IL. *P. aeruginosa* is an opportunistic human pathogen associated with cystic fibrosis, and PA-IL is one of its virulence factors. The interactions of PA-IL and tetravalent glycoconjugates were investigated using hemagglutination inhibition assay and compared with mono- and divalent galactosides (propargyl 1-thio- and 1-seleno-β-D-galactopyranoside, digalactosyl diselenide and digalactosyl disulfide). The lectin-carbohydrate interactions were also studied by STD-NMR technique. Both thio- and seleno-tetravalent glycoconjugates were able to inhibit PA-IL significantly better than simple D-galactose or their intermediate compounds from the synthesis.

**Keywords:** selenoglycosides; galactoclusters; *Pseudomonas auruginosa*; PA-IL lectin; multivalency

Figure S1. NMR spectra of compounds: **2b, 3b, 6a, 7a, 6b, 7b**



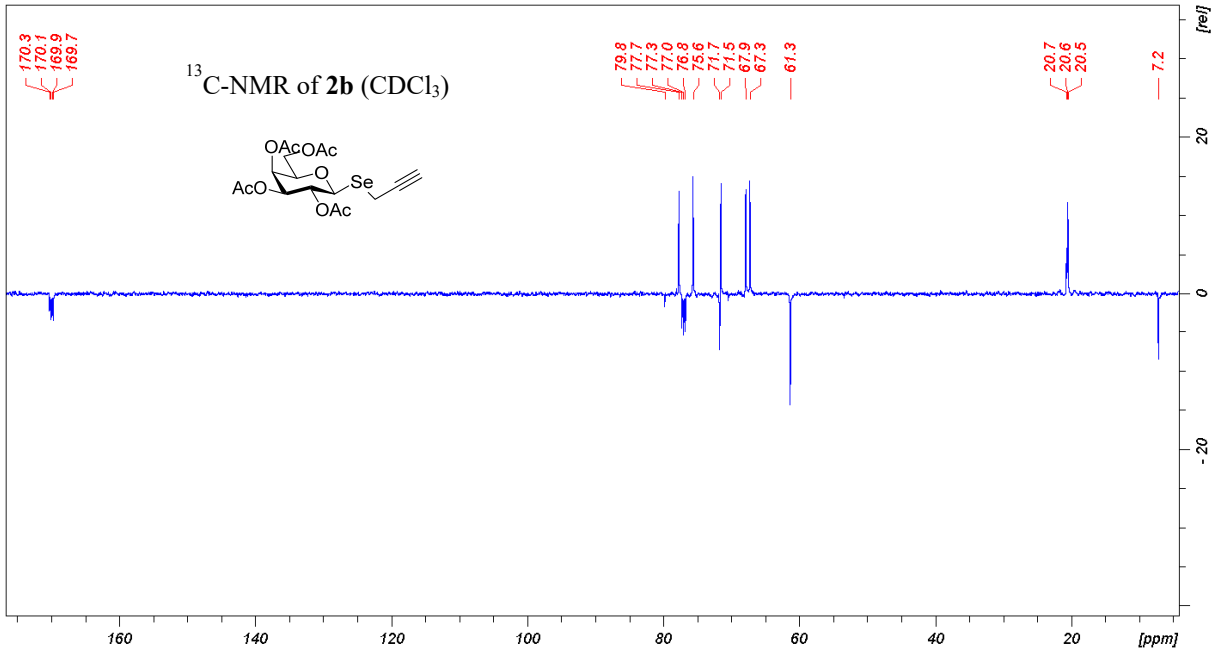
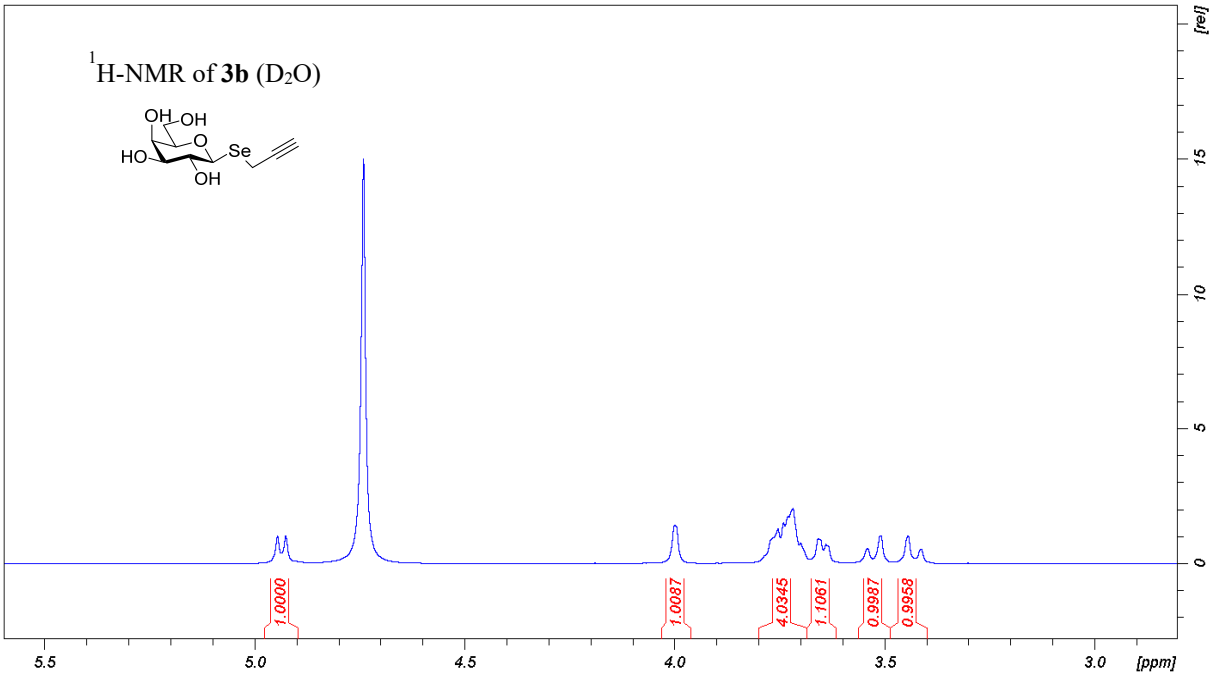



Figure S1. cont.



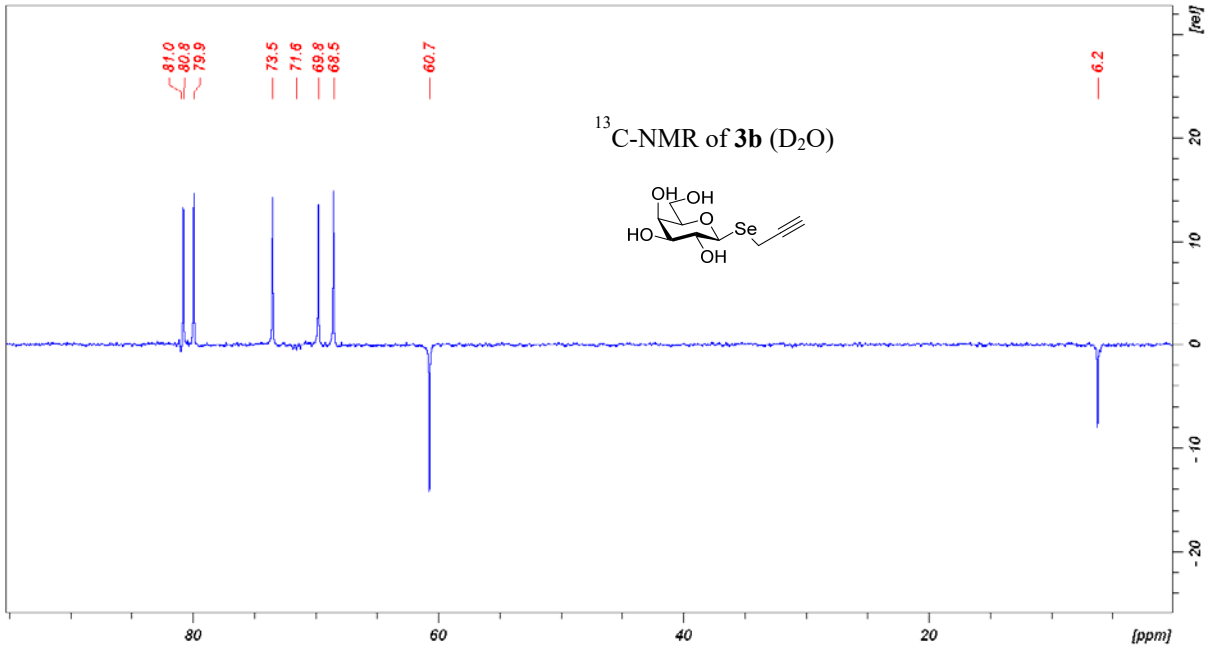
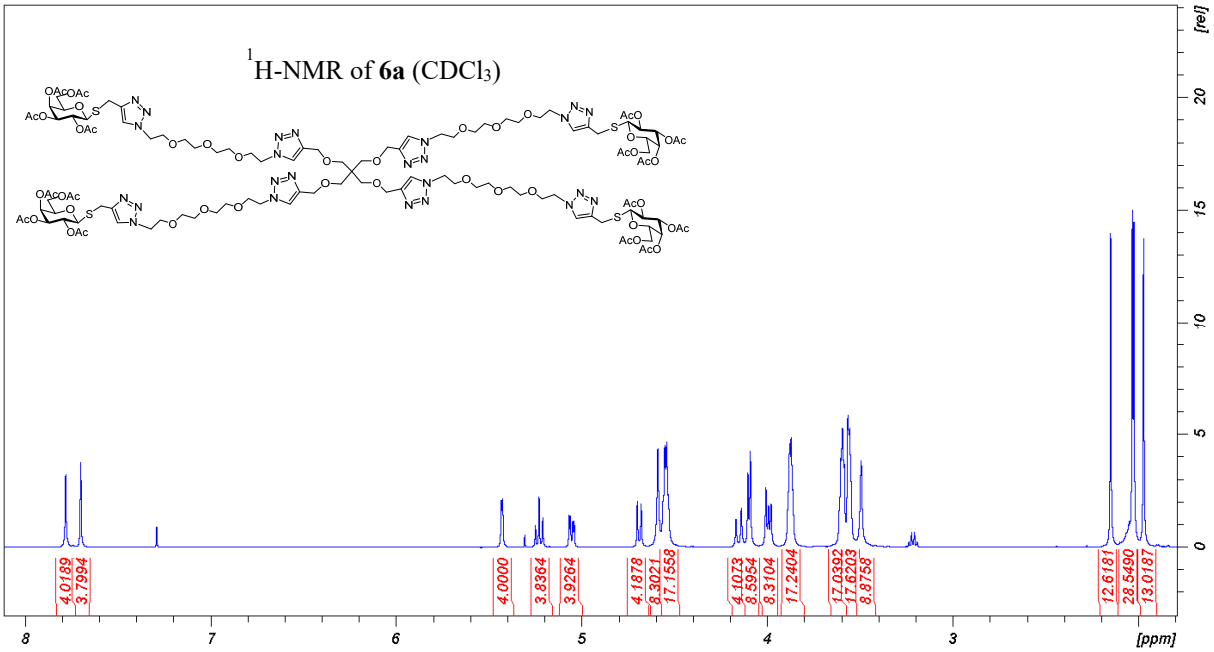



Figure S1. cont.



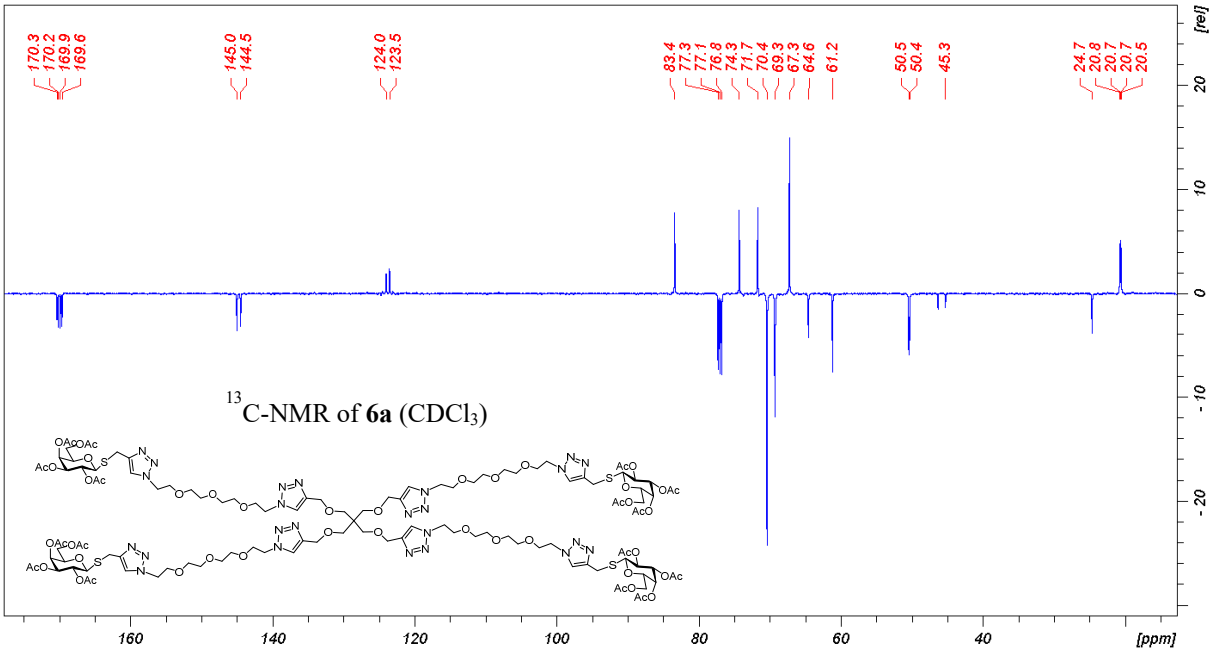
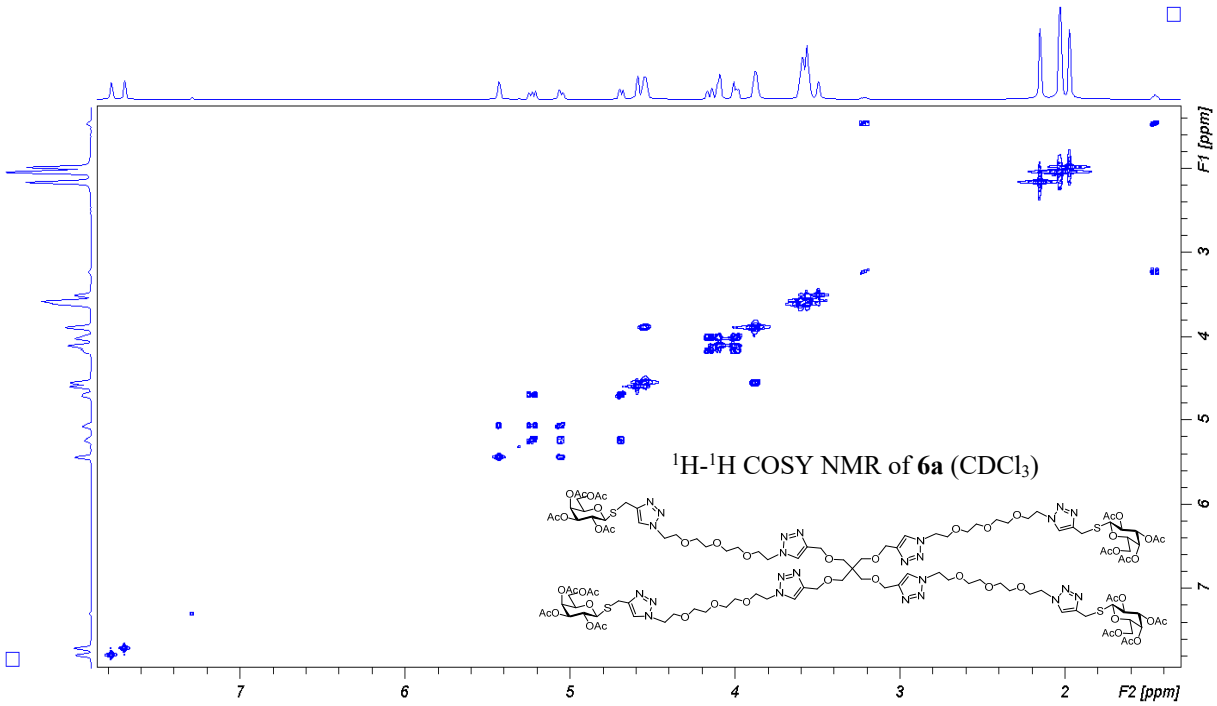
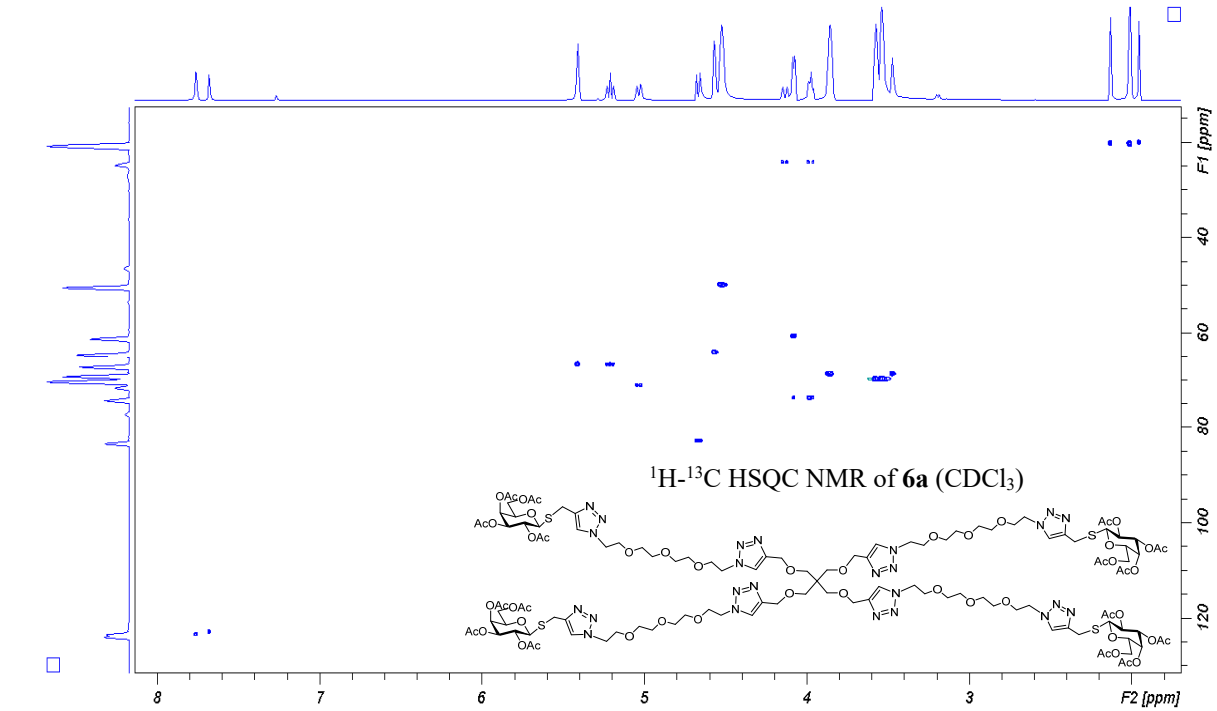



Figure S1. cont.

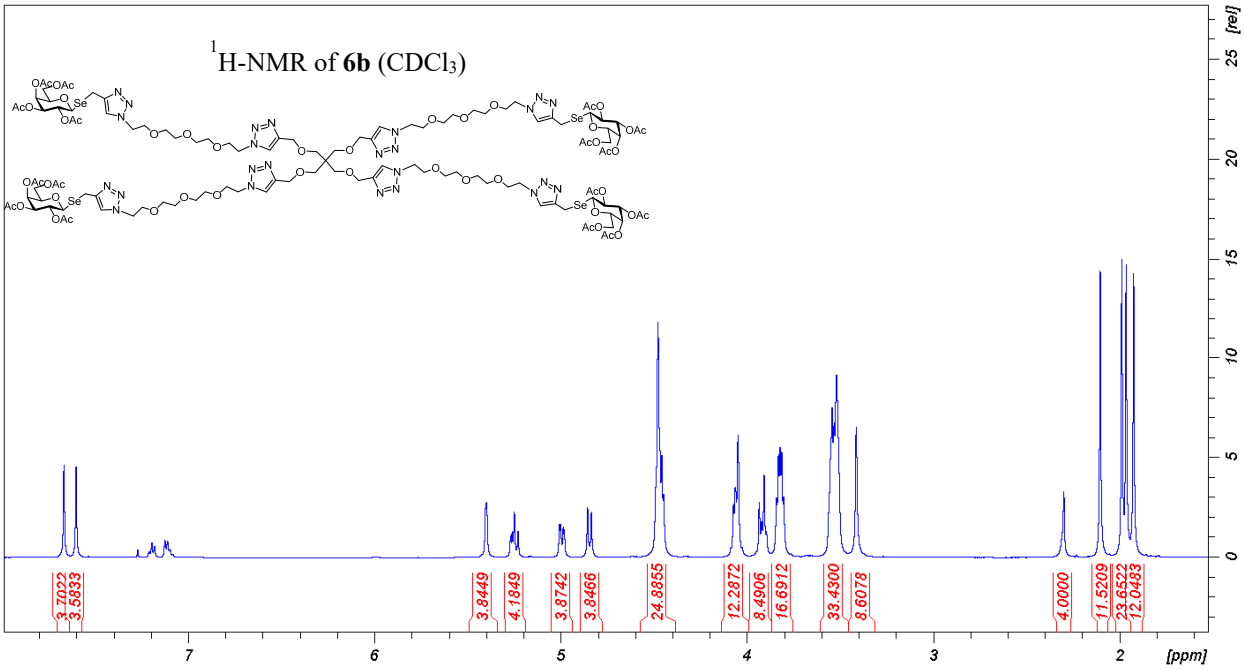



$^{1}$H-$^{1}$H COSY NMR of **6a** ($CDCl_3$)




$^{1}$H-$^{13}$C HSQC NMR of **6a** ($CDCl_3$)

Figure S1. cont.



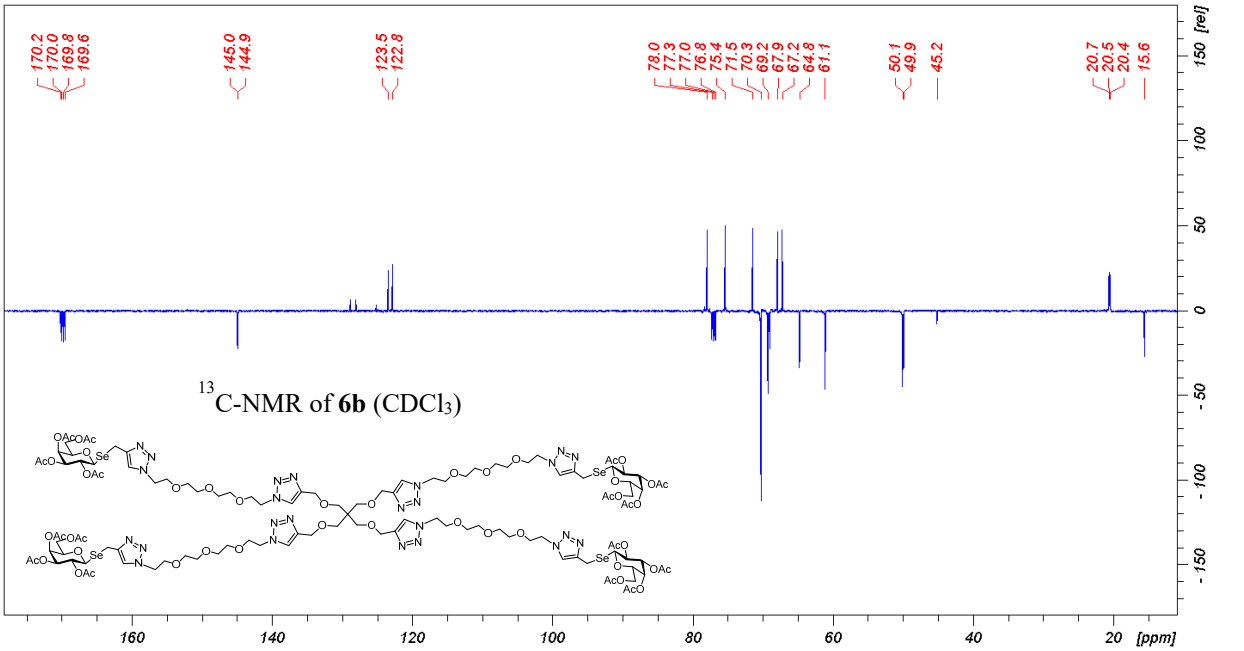
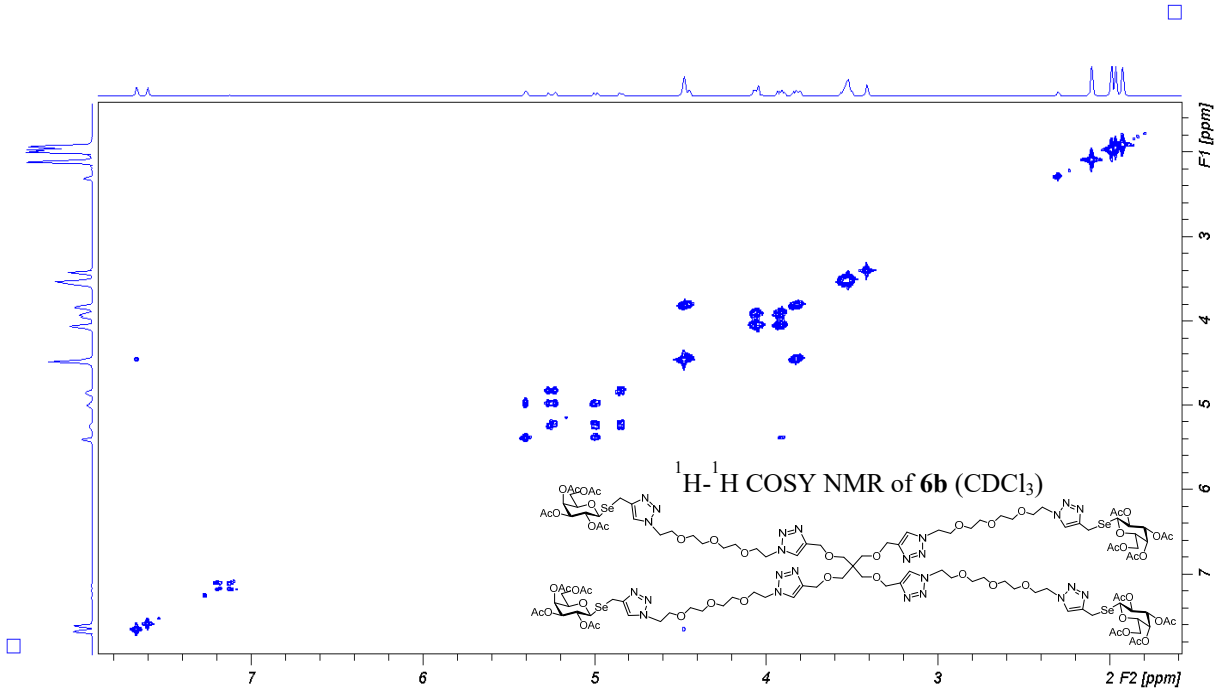
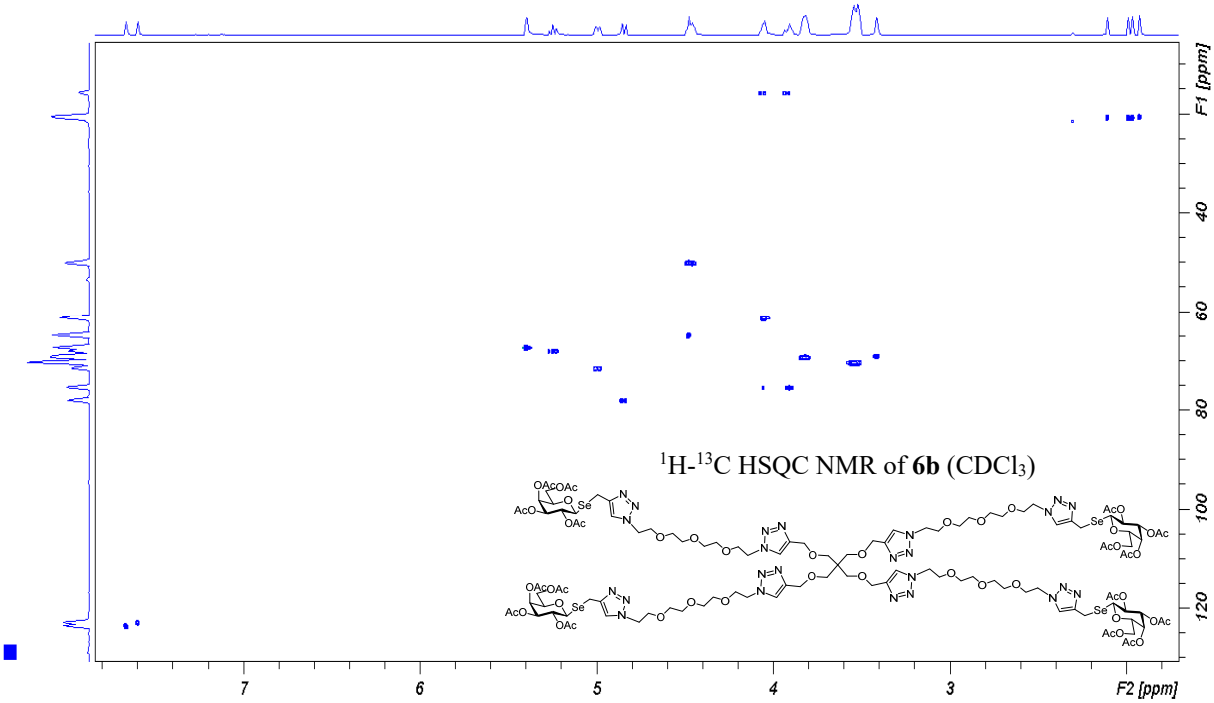




Figure S1. cont.

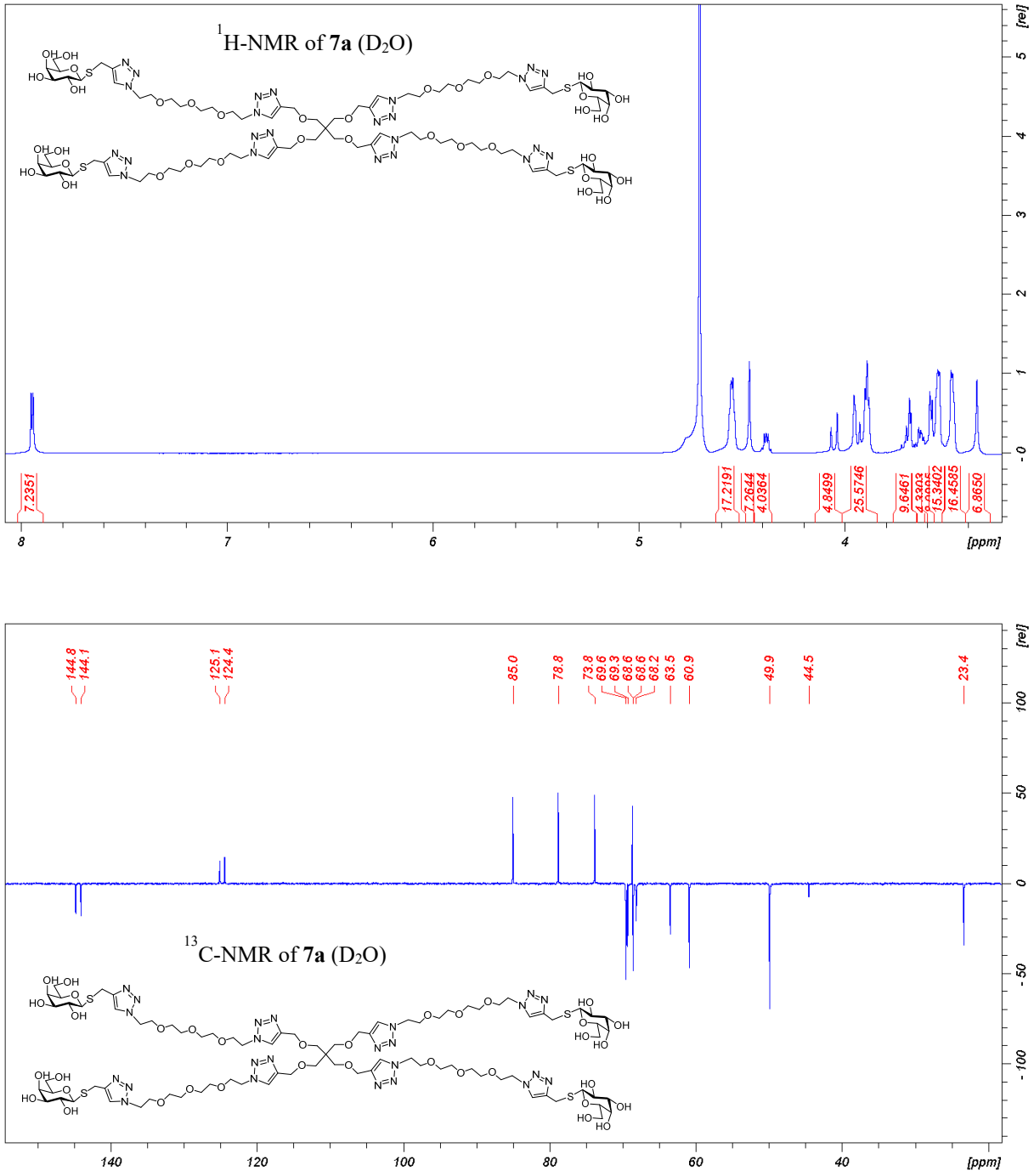



$^{1}$H-$^{1}$H COSY NMR of **6b** ($CDCl_3$)




$^{1}$H-$^{13}$C HSQC NMR of **6b** ($CDCl_3$)

Figure S1. cont.



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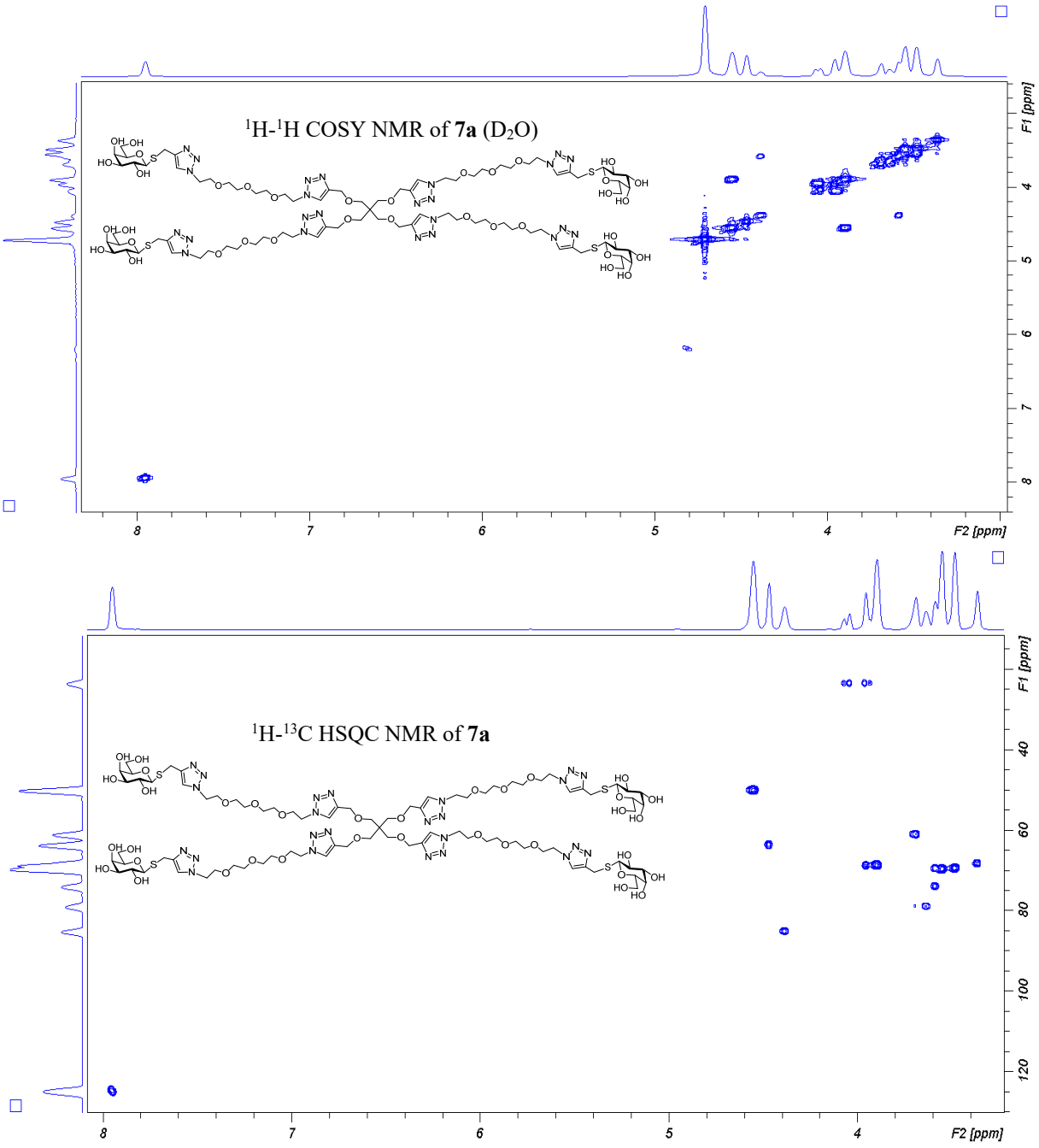

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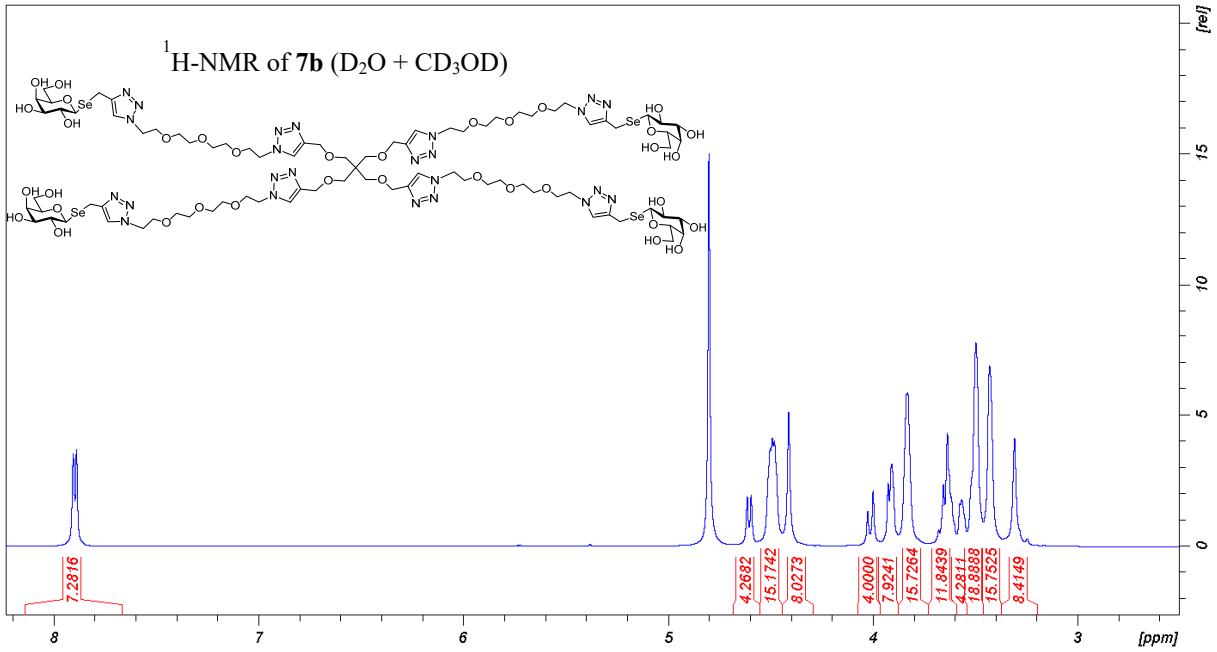


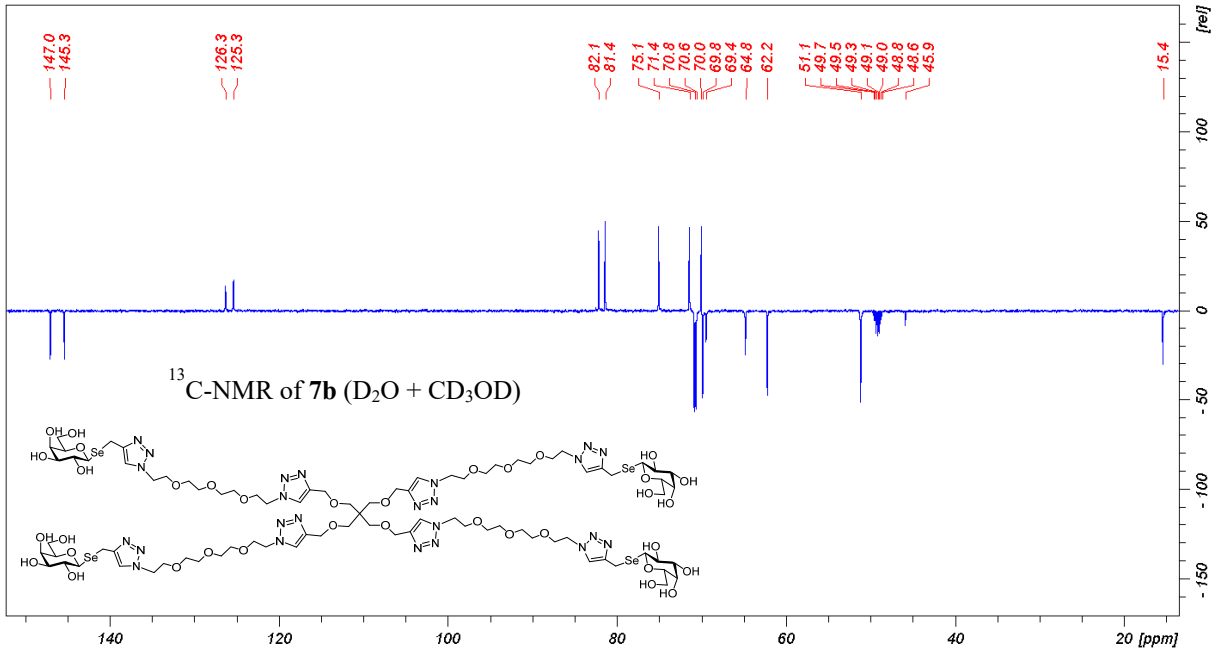

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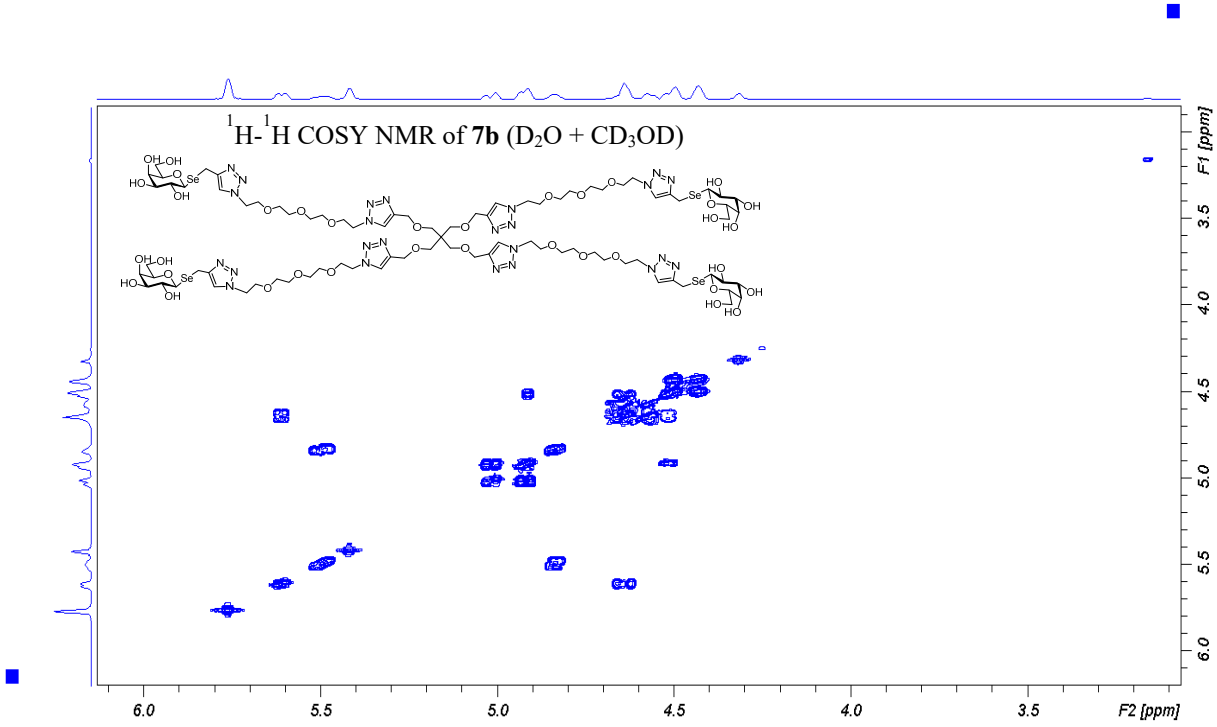


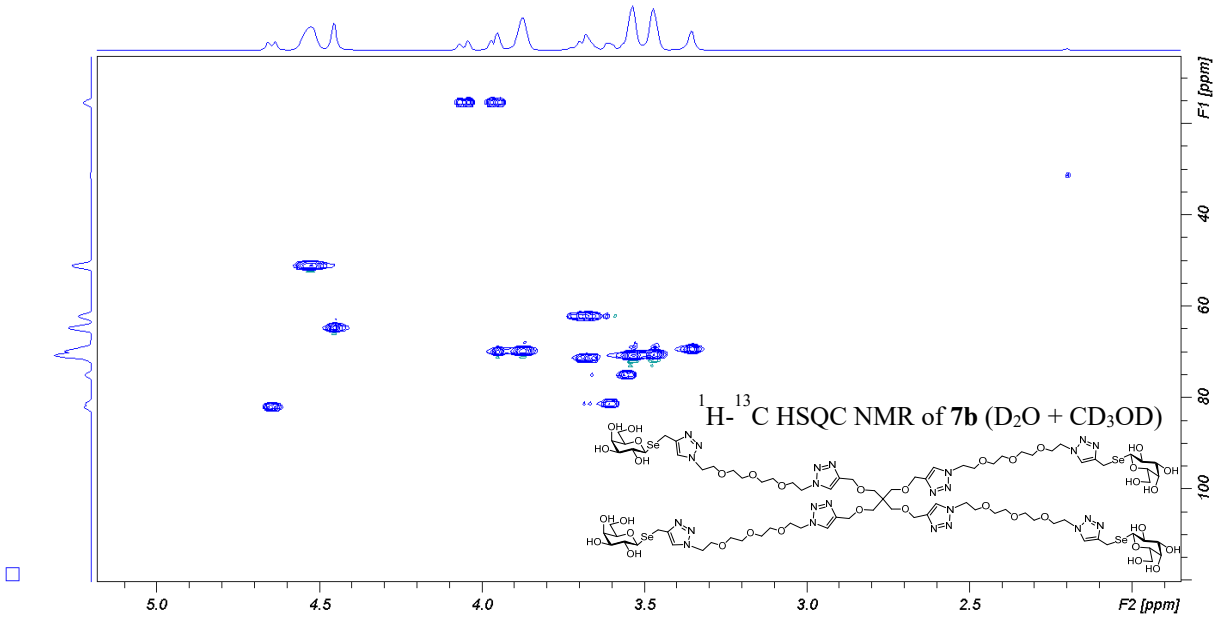

Figure S2. STD NMR spectra of **1** and **3a, 3b** in the presence of PA-IL tetramer.

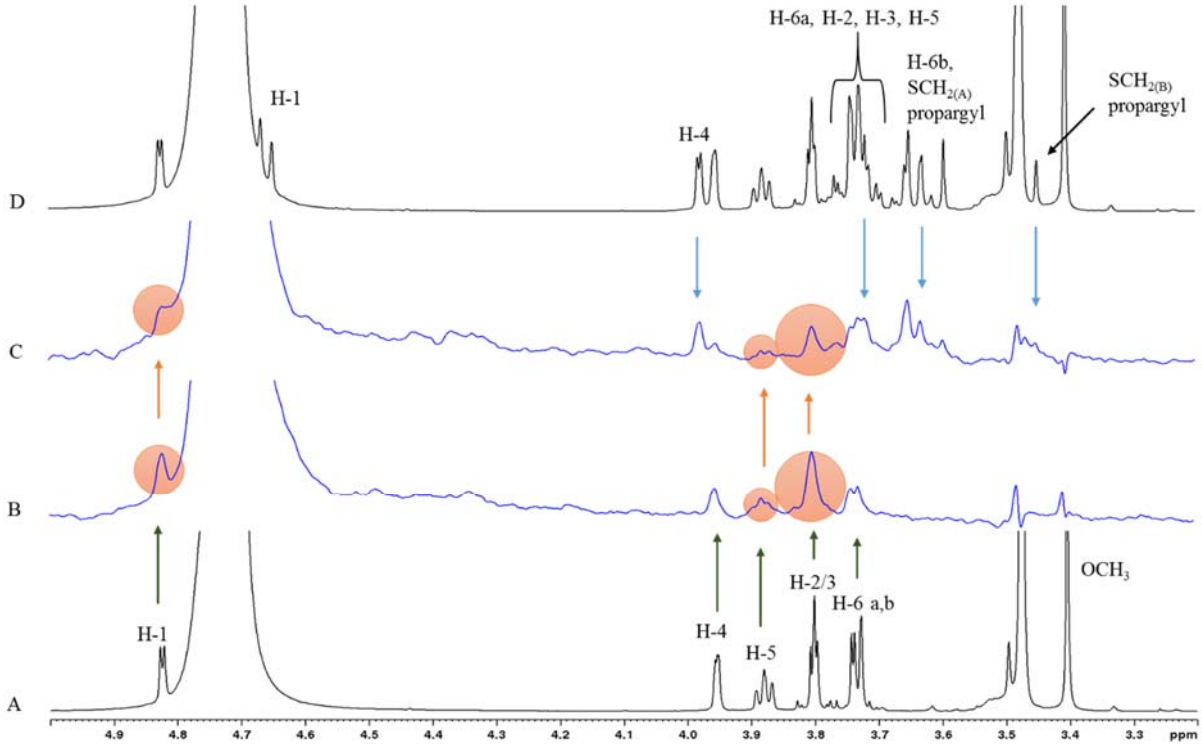


**Figure S2.** 500 MHz $^{1}$H and STD NMR spectra of **1** and **3a** in the presence of 10 μM PA-IL tetramer. (A) and (B) $^{1}$H and STD NMR spectra of **1**. (C) and (D) STD and 1H NMR spectra of the 1:1 mixture of **1** and **3a**, respectively.

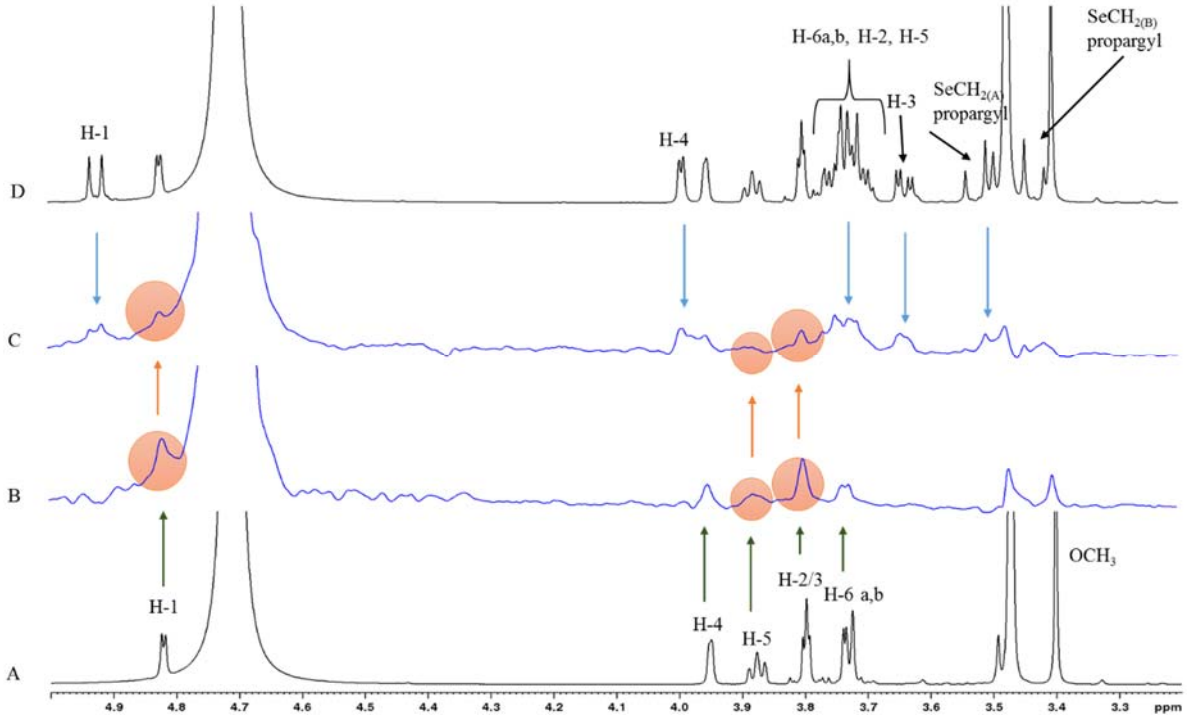


**Figure S2.** 500 MHz $^{1}$H and STD NMR spectra of **1** and **3b** in the presence of 10 μM PA-IL tetramer. (A) and (B) $^{1}$H and STD NMR spectra of **1**. (C) and (D) STD and $^{1}$H NMR spectra of the 1:1 mixture of **1** and **3b**, respectively.

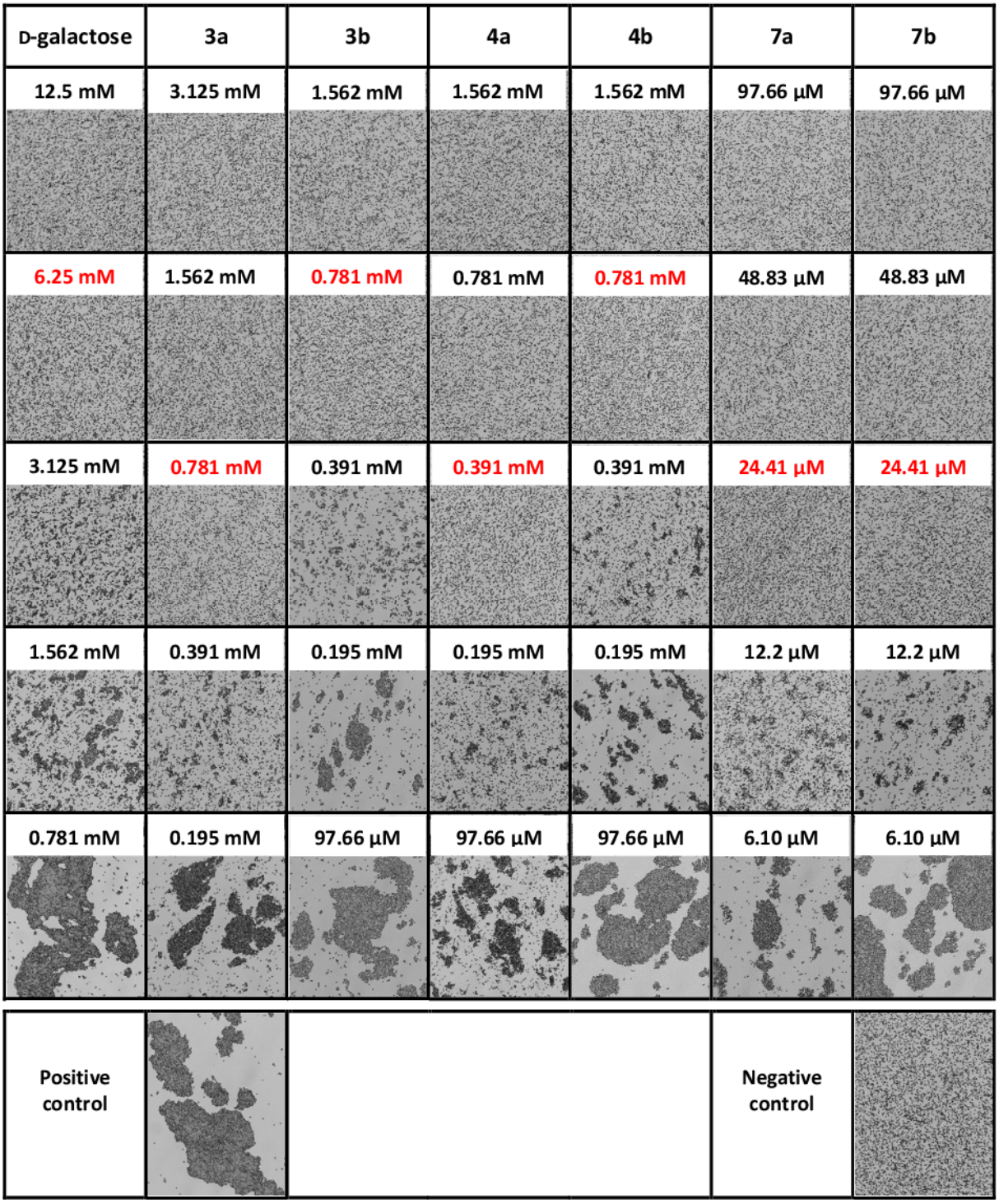


**Figure S3.** Influence of D-galactose, compounds **3a, 3b, 4a, 4b, 7a** and **7b** on hemagglutination caused by lectin PA-IL. Positive control: experiment without inhibitor. Negative control: experiment without lectin PA-IL. The minimal inhibitory concentration of each compound is highlighted in red.