Supplementary Information

Detection of Pathogenic *Streptococcus suis* Bacteria Using Magnetic Glycoparticles

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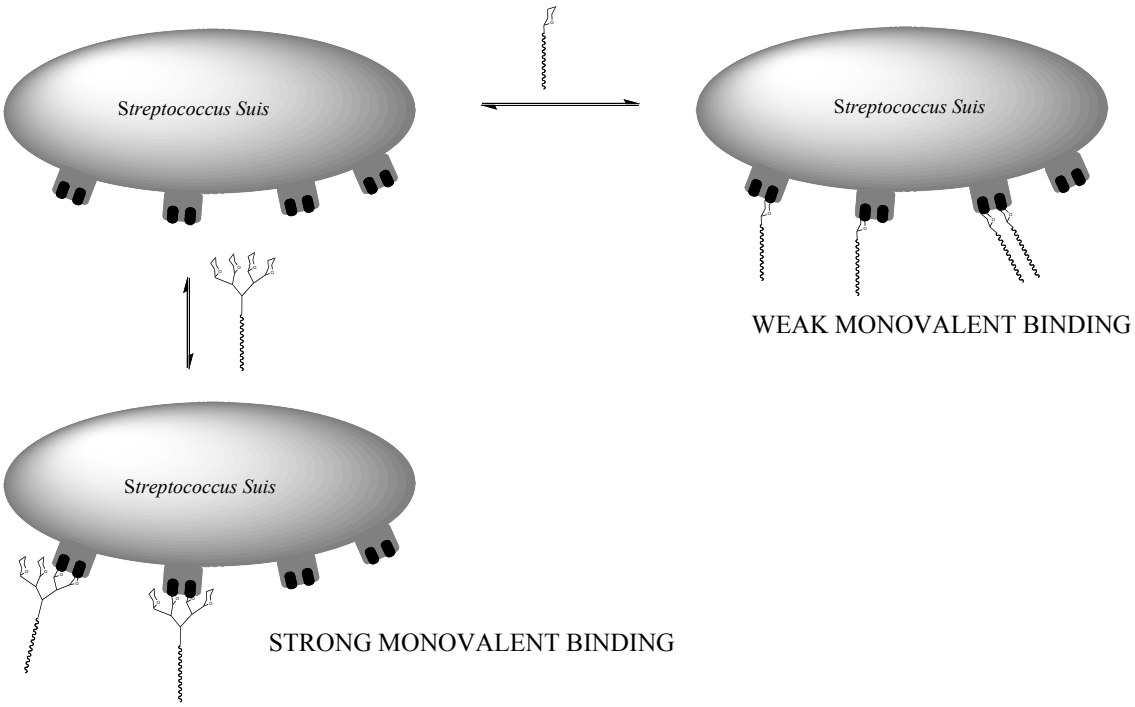
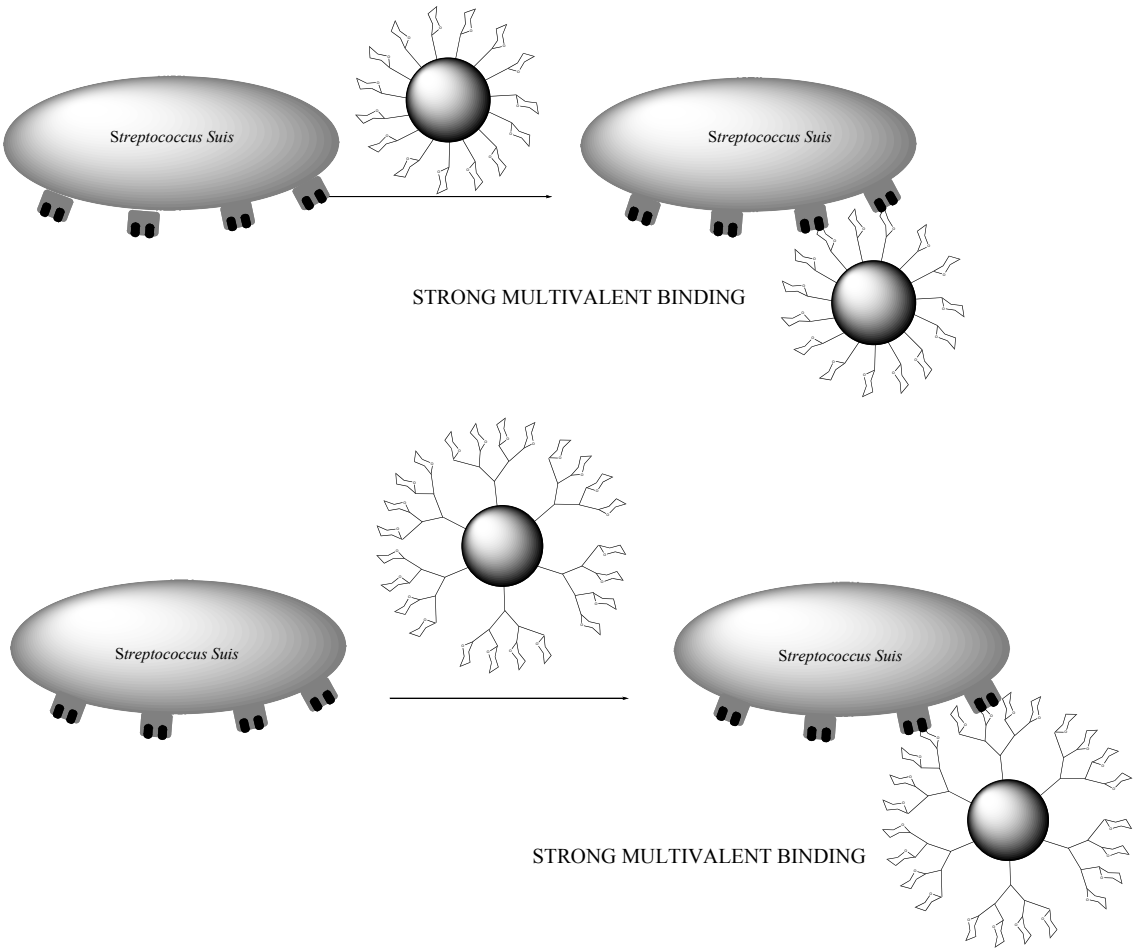
Multivalency effects

Observed multivalency effects are explained by using schematic drawings. In the first part (a) previously observed multivalency effects with glycodendrimers in solution versus monovalent compounds are shown (refs. 17 and 18). In the second scenario (b) the effects (or lack thereof) of the use of a tetravalent versus a monovalent ligand displayed on a magnetic particle is shown.

a)



a) Large multivalency effects are observed in the inhibition of *S. suis* adhesion. The tetravalent ligands is much more potent than the monovalent. Even though the adhesion protein is not known, it is likely that it contains several closely spaced binding sites that allow chelation as shown.

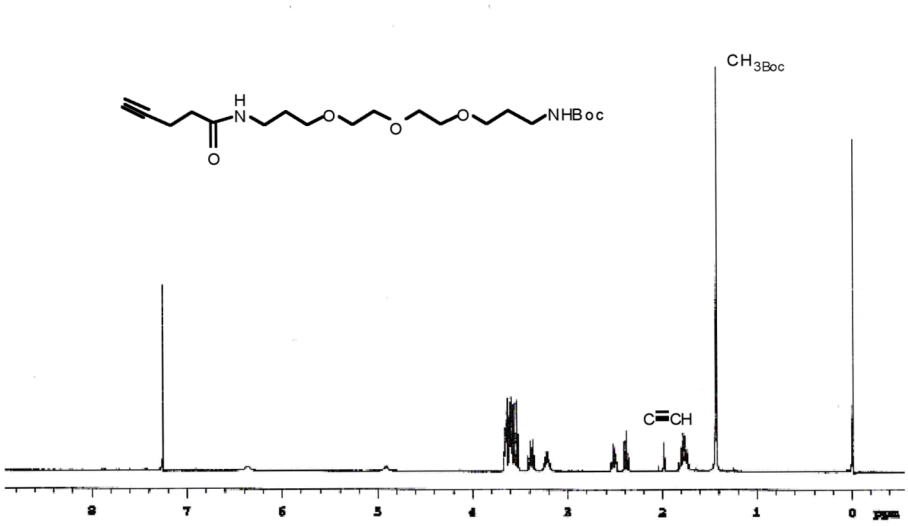


b) The use of a monovalent or a tetravalent ligand displayed on a magnetic particle does not lead to any major differences in the detection of *S. suis* as shown in this work. Considering the relatively large size of the particle (250 nm) the attached ligands are likely able to bind to several adhesion proteins scattered on the bacterial surface. This type of chelation seems to be the major effect and additional chelation that the tetravalent ligand would be capable of yields no extra effect.

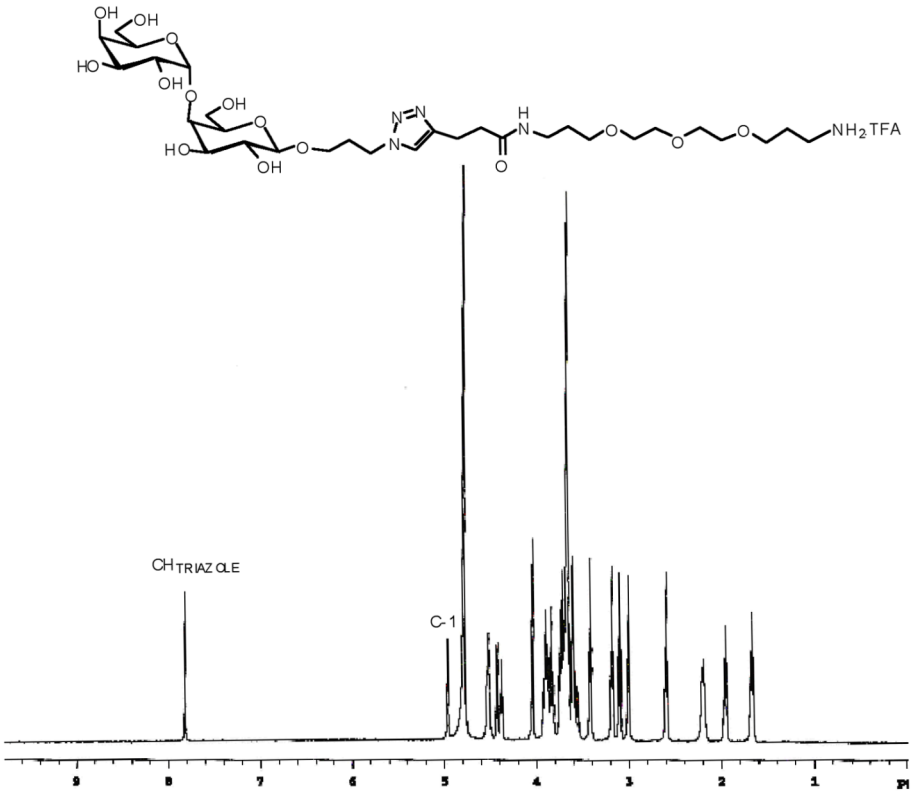
Spectra

Monovalent alkyne (**3**):

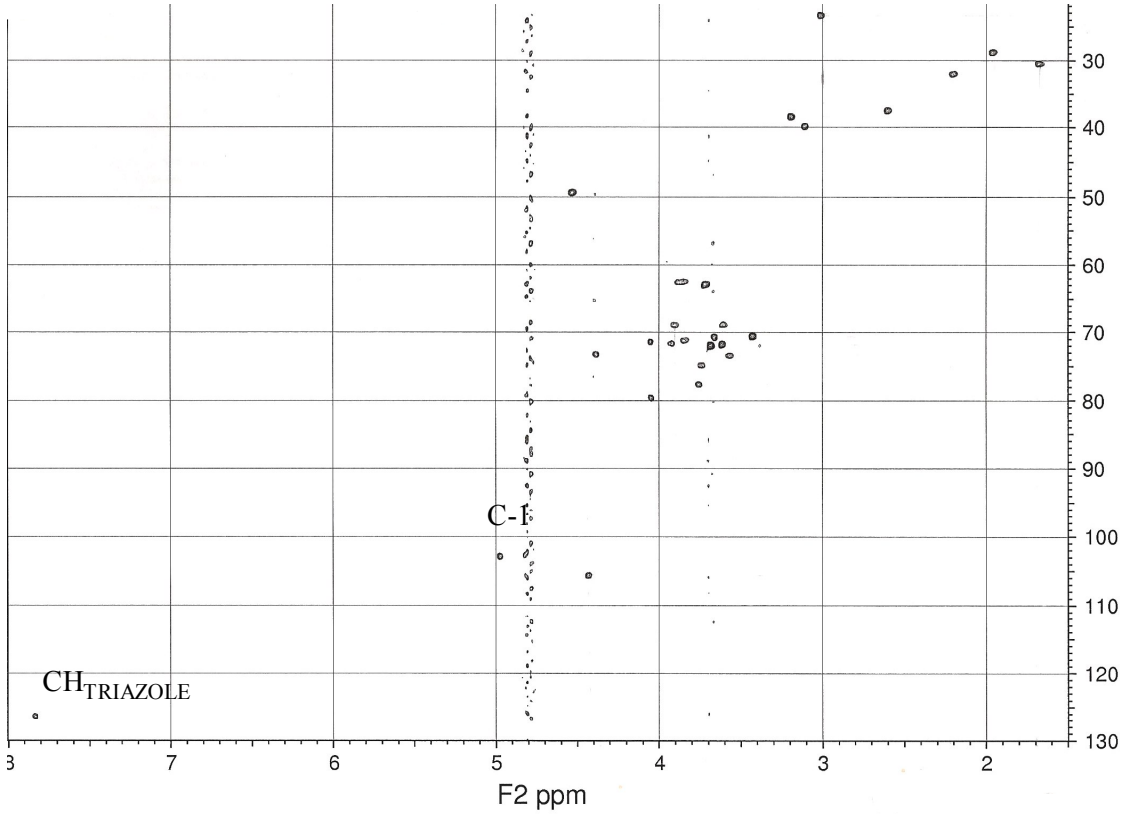
^{1}H NMR (300 MHz, $CDCl_3$)



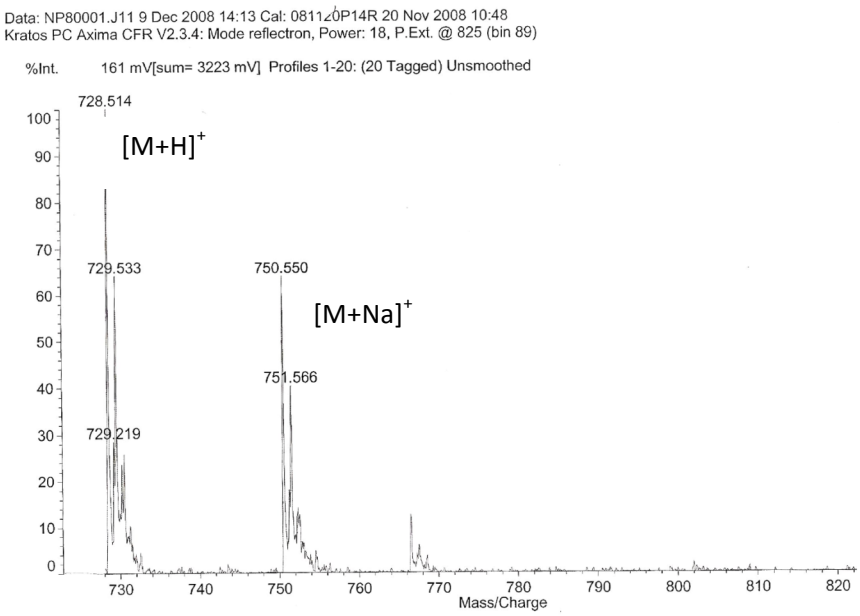
^{1}HNMR (300 MHz, D_2O) of the deprotected monovalent galabiose intermediate:



HSQC NMR (500MHz, D_2O) of the deprotected monovalent galabiose intermediate:

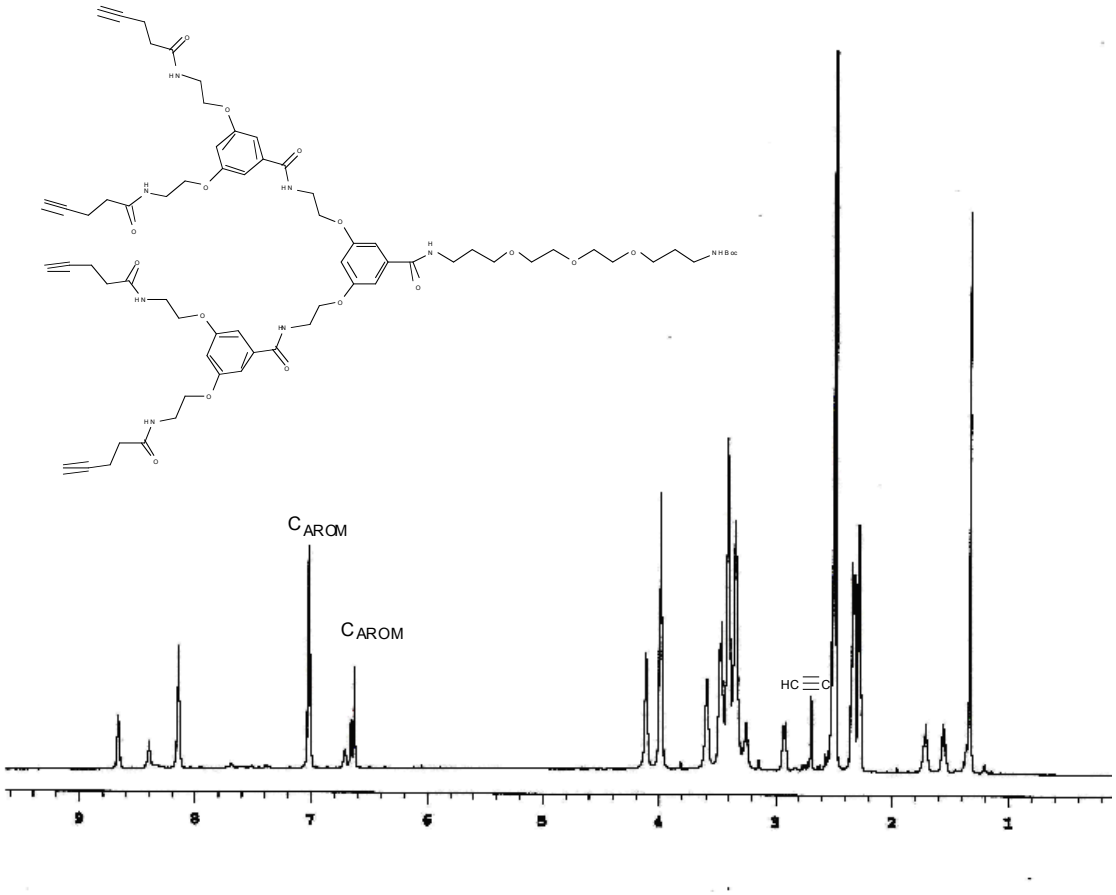


ESI MS of the deprotected monovalent galabiose intermediate

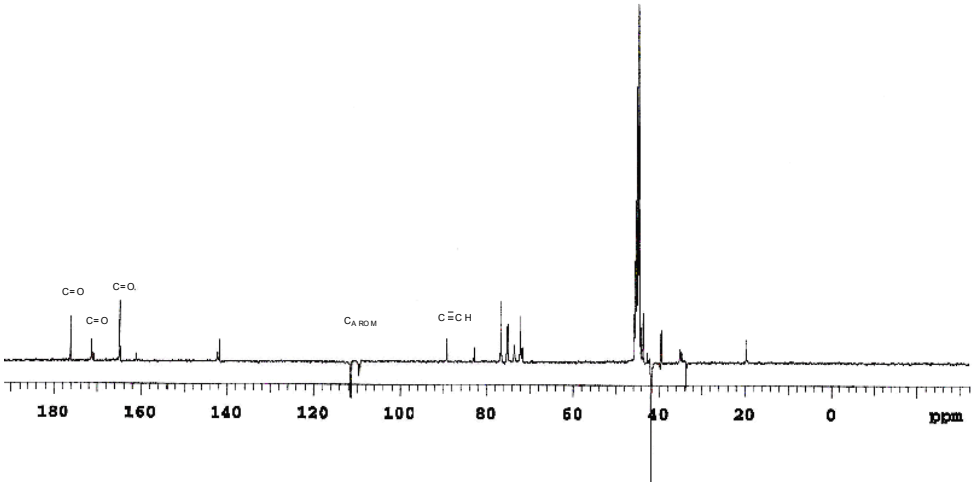


Tetravalent alkyne dendrimer (**9**):

^{1}H NMR (300 MHz, DMSO)

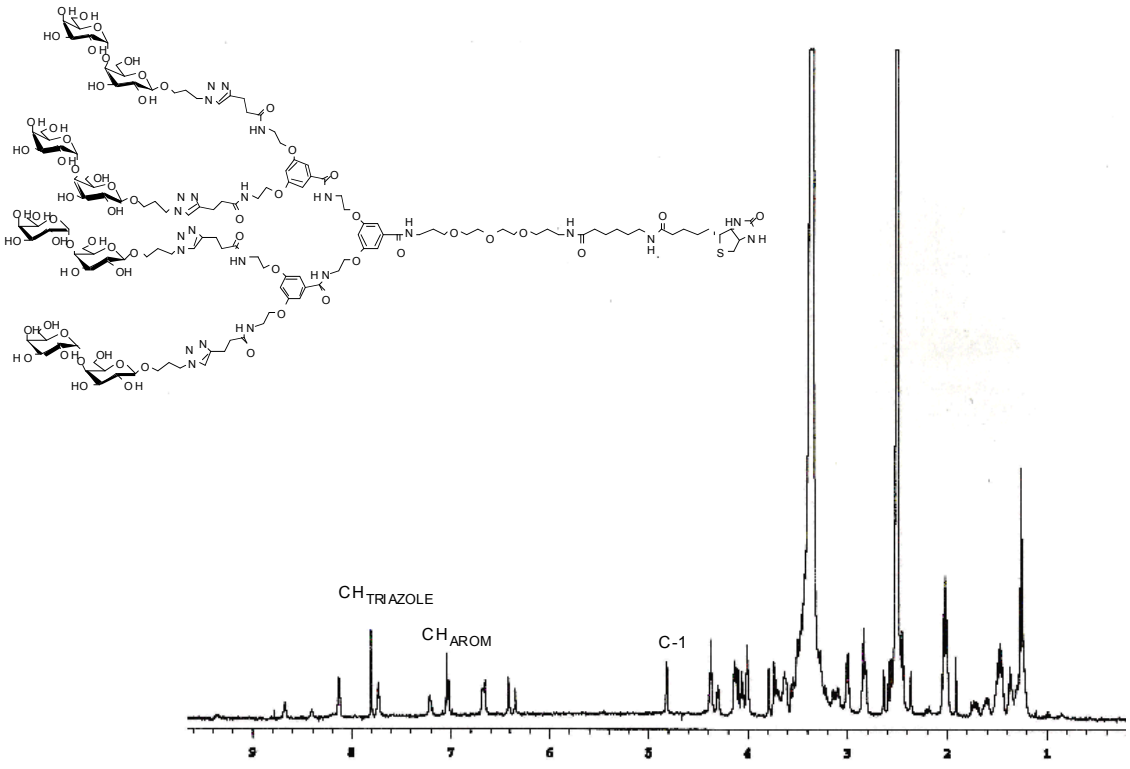


^{13}C NMR APT of **9** (75.5 MHz, DMSO)

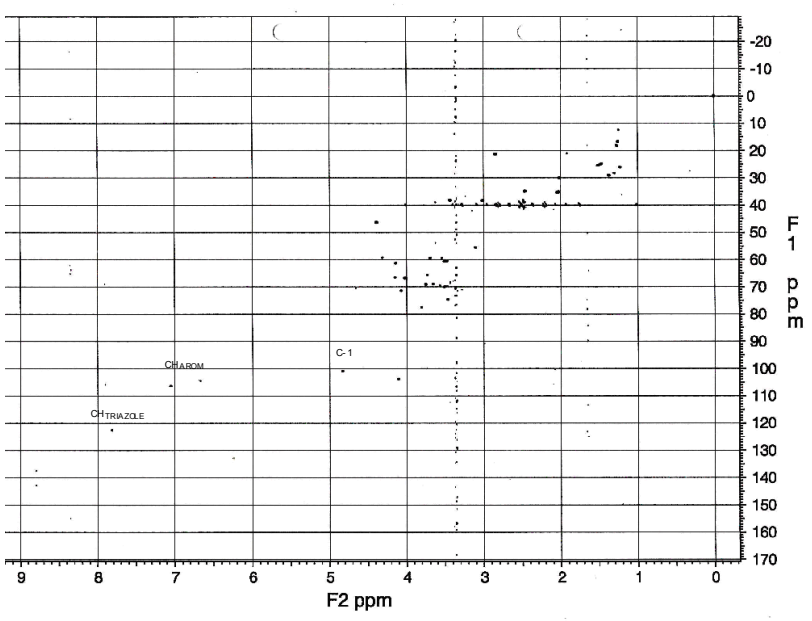


Biotinylated tetravalent galabiose dendrimer (**10**):

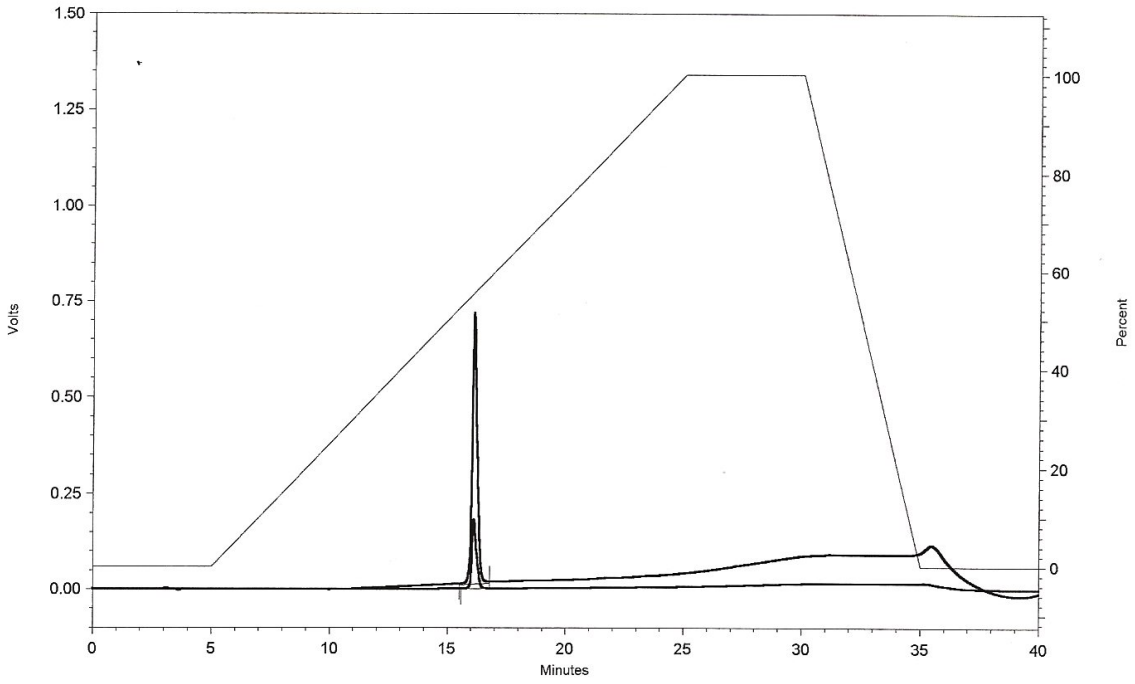
^{1}H NMR (500 MHz, DMSO):



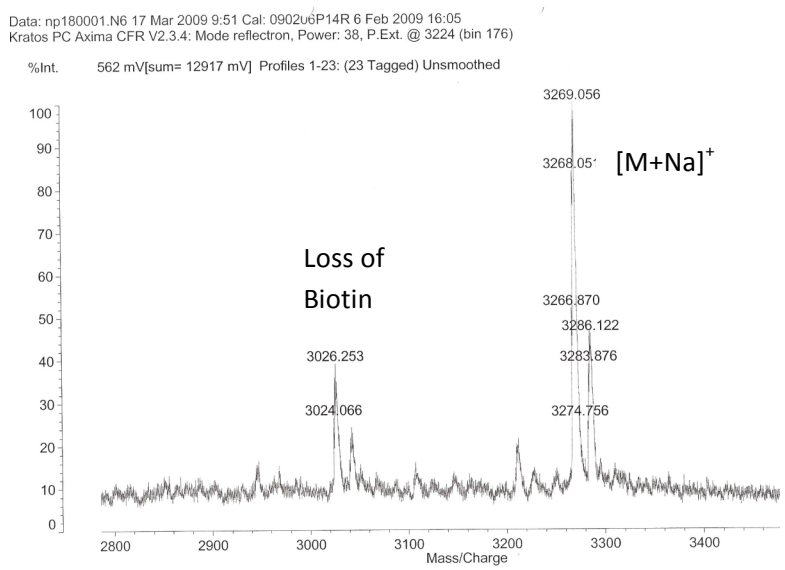
HSQC NMR of **10** (500MHz, DMSO):



HPLC of **10** with UV (top line) & ELSD (bottom line) detection (Acetonitrile:H_2O)

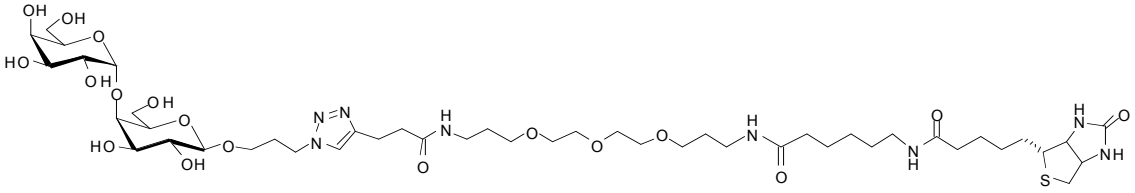


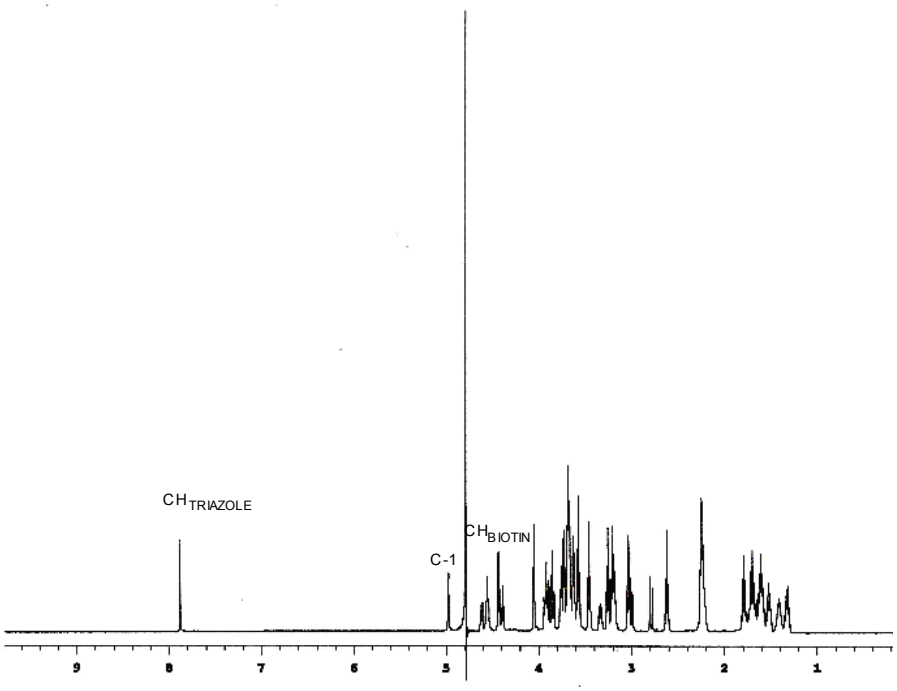
MALDI-TOF of **10** (Matrix: α-Cyano-4-hydroxycinnamic acid)



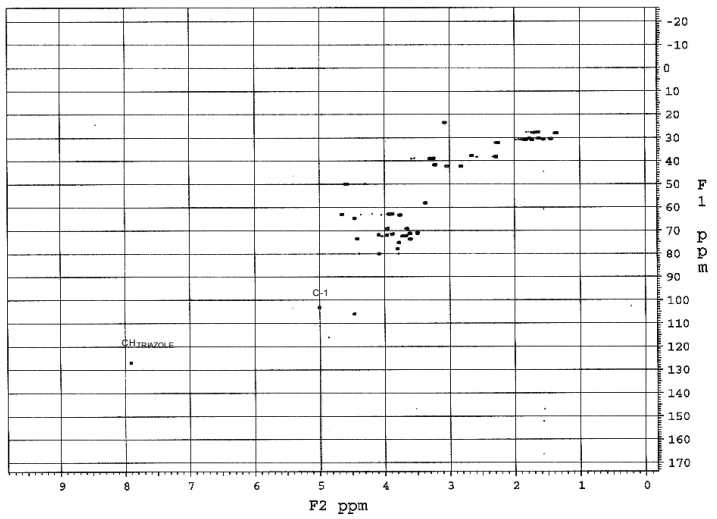
Biotinylated monovalent galabiose (**4**)

^{1}H NMR (500 MHz, D_2O)

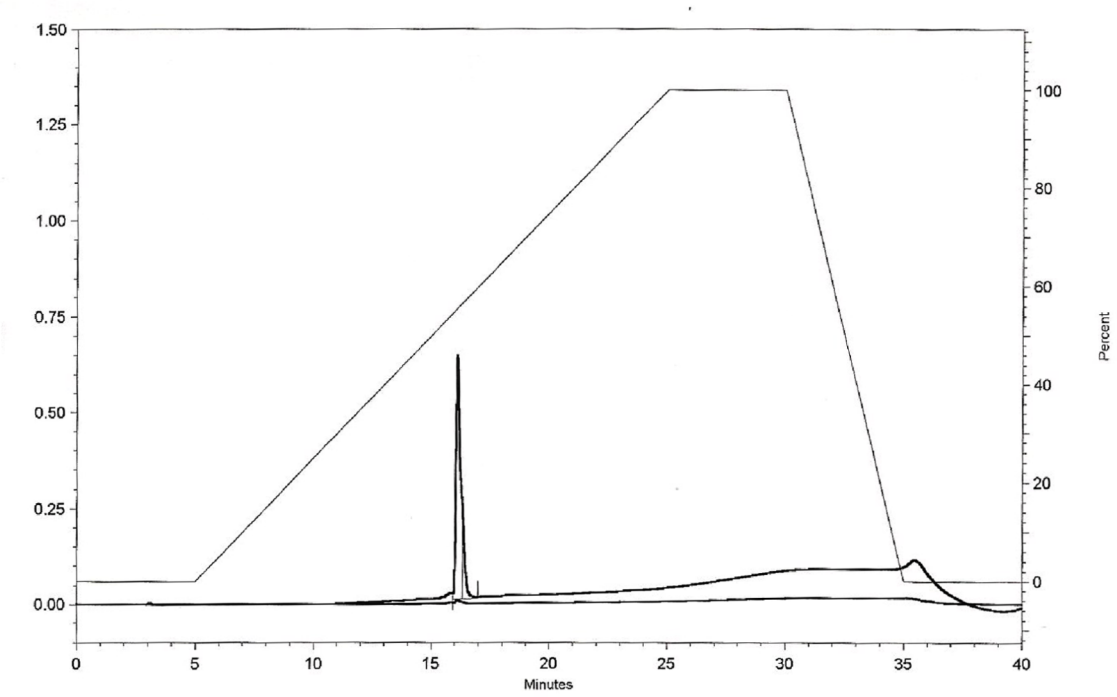




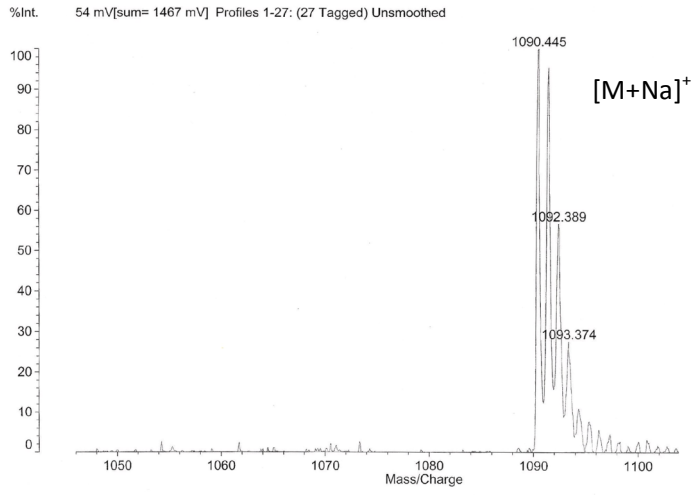
HSQC NMR of **4** (500MHz, D_2O):



HPLC of **4** with UV (top line) & ELSD (bottom line) detection (Acetonitrile:H_2O)

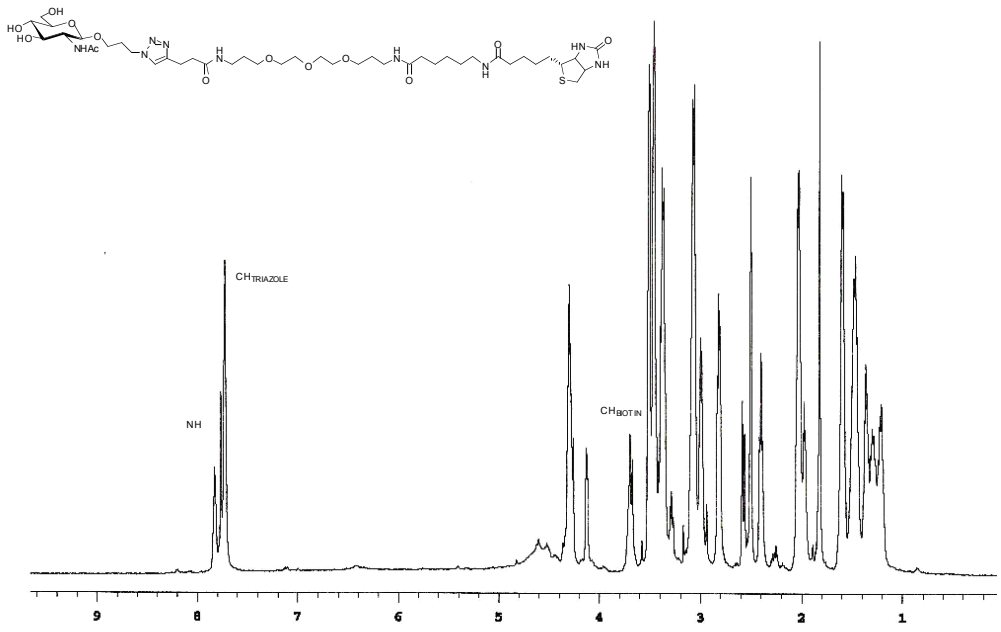


MALDI-TOF of **4** (matrix:α-Cyano-4-hydroxycinnamic acid)

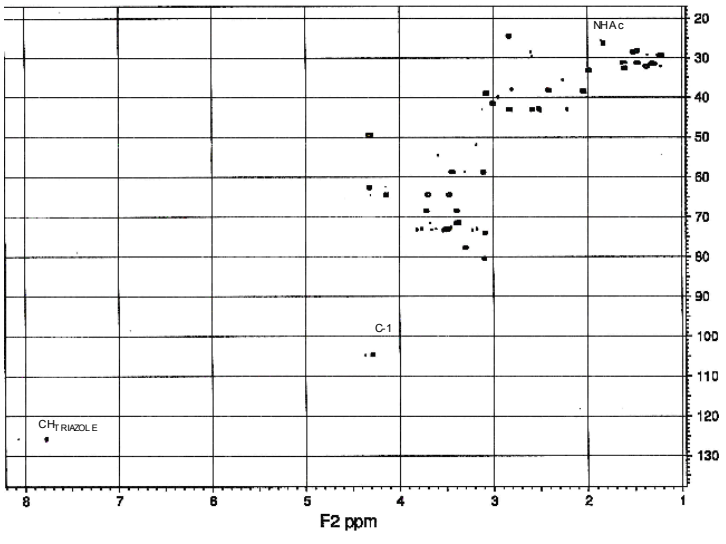


Biotinylated GlcNAc conjugate (**5**):

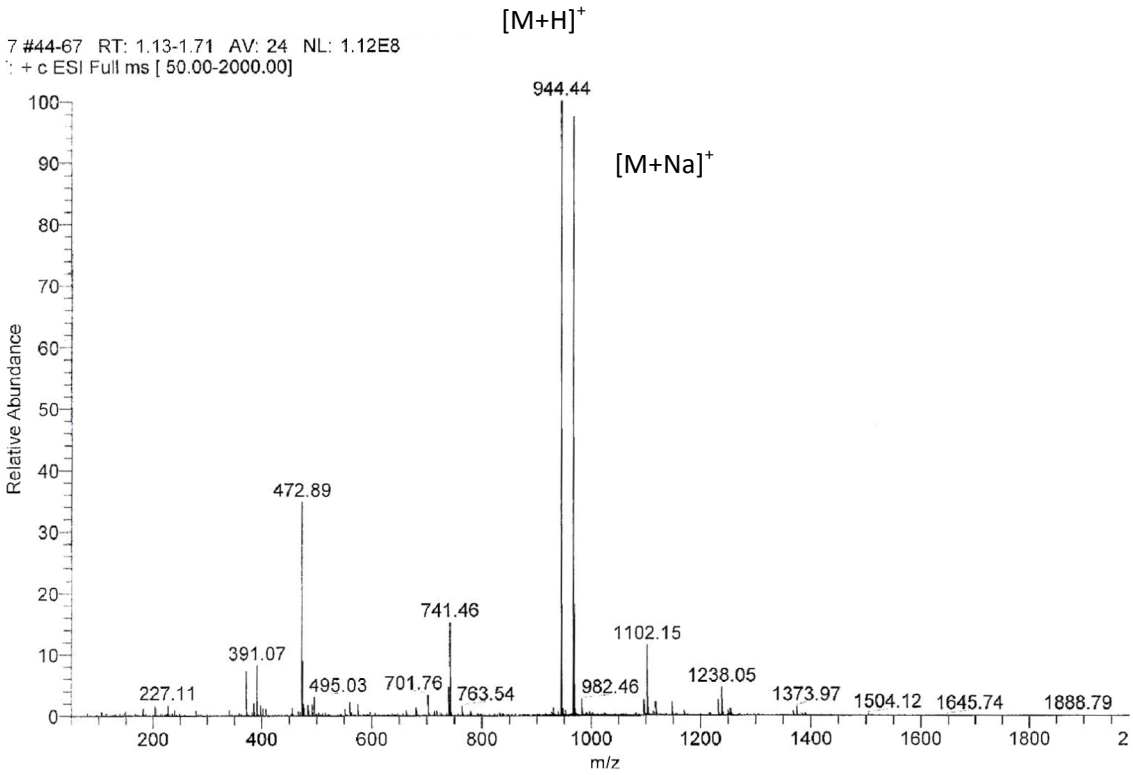
^{1}H NMR (500 MHz, DMSO):



HSQC NMR of **5** (500MHz, DMSO):



ES MS of **5**


[M+H]+
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[M+Na]+
Relative Abundance
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1102.15
391.07
1238.05
227.11
495.03
701.76
763.54
982.46
1373.97
1504.12
1645.74
1888.79
m/z