

Supporting information for

Seed-less amino-sugar mediated synthesis of gold nanostars

Waël Moukarzel, Juliette Fitremann, Jean-Daniel Marty*

- 1. Preparation of free glucosamine**
- 2. Formation of nanostars with glucosamine**
- 3. Formation of nanostars with glucamine**

1. Preparation of free glucosamine.

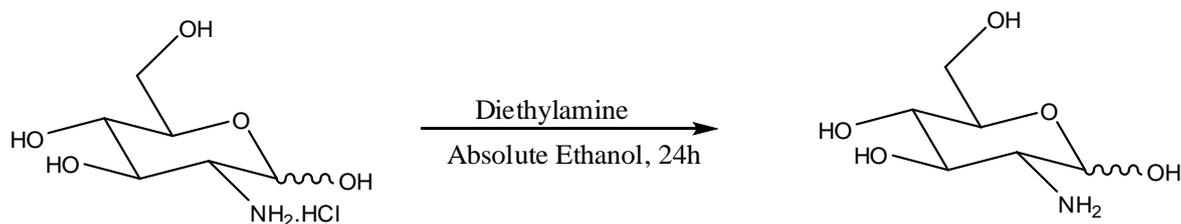


Figure S1. Preparation of free glucosamine.

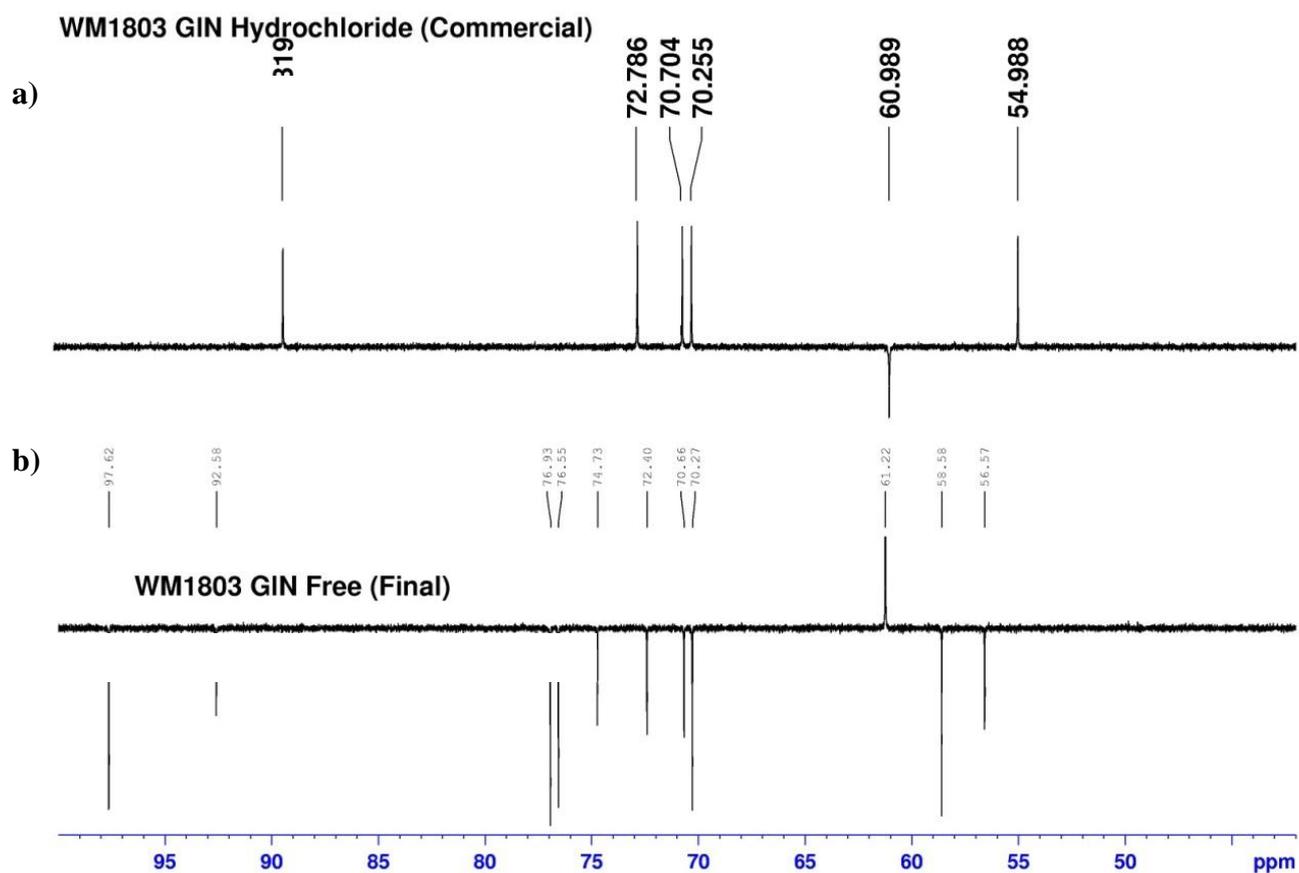


Figure S2. ^{13}C NMR spectra (DMSO, 100 MHz) of a) commercially available glucosamine.HCl and b) free glucosamine

Chemical shifts δ (ppm)			
^{13}C	Glucosamine.HCl	Glucosamine free base*	
1	89.3	97.6	92.6
5	72.8	76.9	74.7
3	70.7	76.6	72.4
4	70.3	70.3	70.7
6	61	61.2	61.2
2	55	58.6	56.6

Table S1. ^{13}C chemical shift of commercially available glucosamine.HCl and glucosamine free base (The chemical shifts of both α and β anomers are reported).

2. Formation of nanostars with glucosamine. Different volumes of 10 mM glucosamine free base solution were added to a 0.1 mL solution of 10 mM HAuCl₄ (with a [sugar]/[HAuCl₄] ratio varying from 5 to 60) and completed to 2.5 mL with ultrapure water.

It has to be noted, that the way the solution was stirred does not influence the morphology of the final Au nanostars. Same results were obtained without stirring.

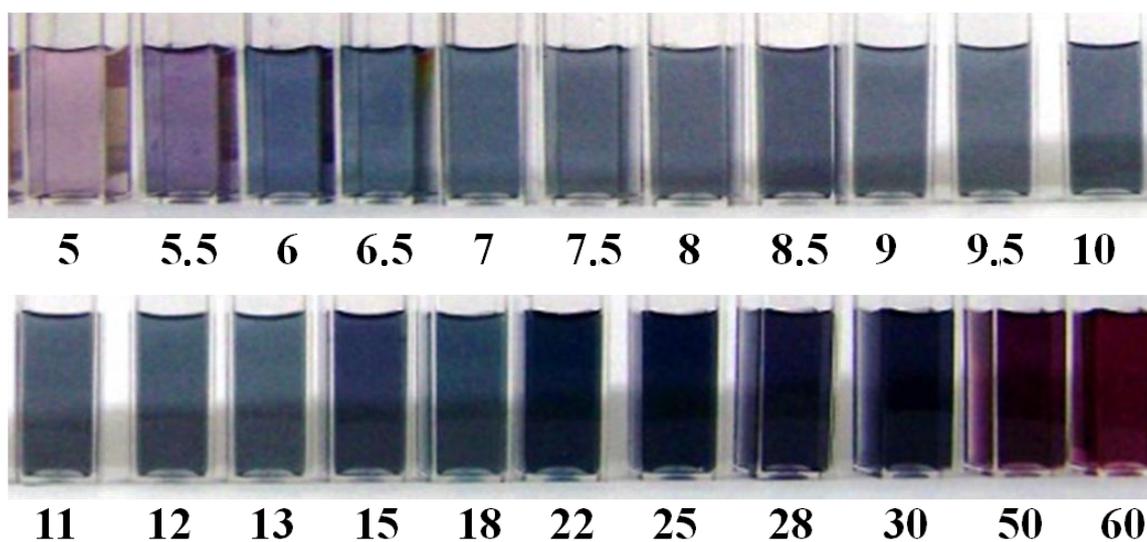


Figure S3. Photograph of nanostars obtained with different [glucosamine]/[HAuCl₄] ratios (from 5 to 60).

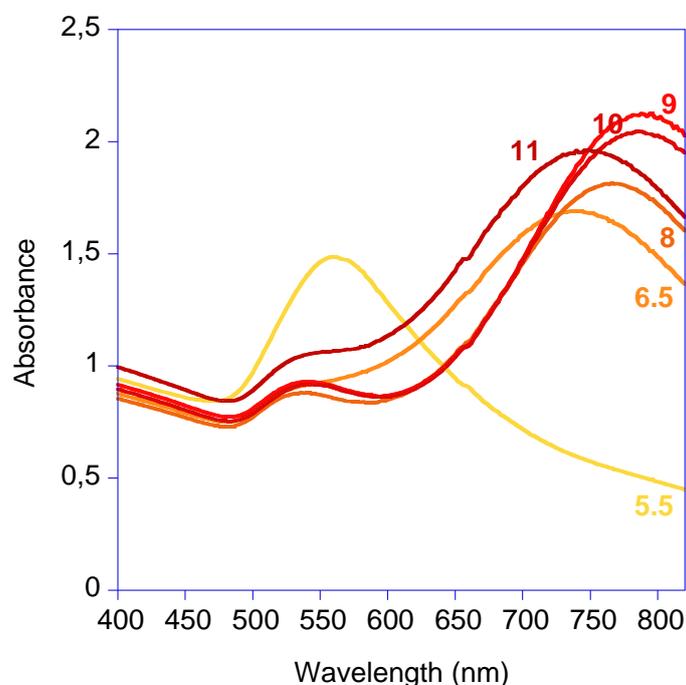


Figure S4. Absorbance spectra obtained with [glucosamine]/[HAuCl₄] ratios of 5.5, 6.5, 8, 9, 10 and 11.

Formation of glucosaminic acid. Formation of glucosaminic acid was detected by ^1H , ^{13}C and HMBC (Figure S3) NMR spectroscopy and mass spectroscopy (Figure S4). The reaction is achieved in D_2O and NMR spectra are recorded at the end of the reaction.

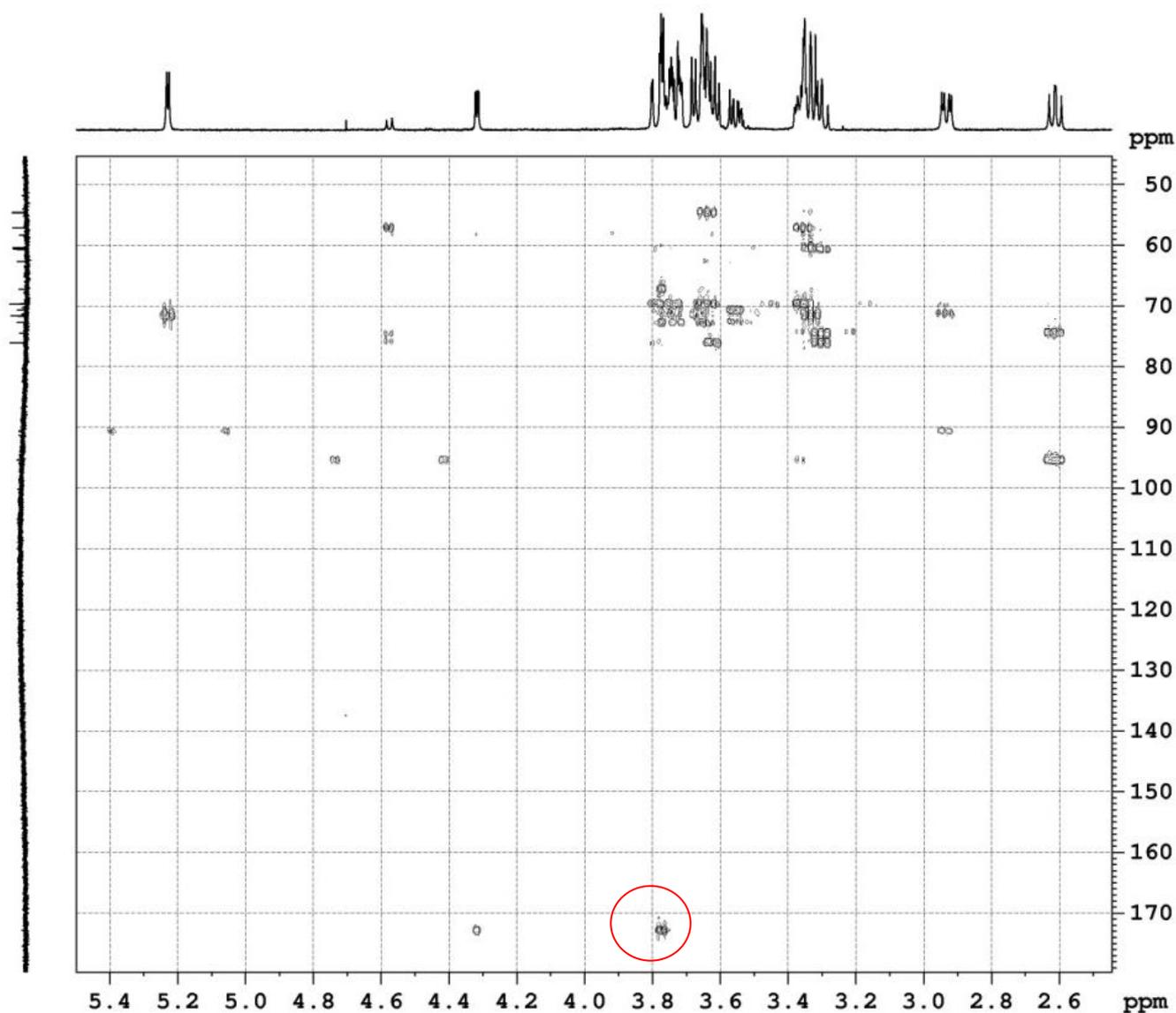


Figure S5. HMBC spectrum of the crude product 24 hours after gold nanostars formation in D_2O showing typical peaks of glucosaminic acid ($[\text{HAuCl}_4]_0 = 0.4 \text{ mM}$ and $[\text{glucosamine}]_0 = 2.8 \text{ mM}$).

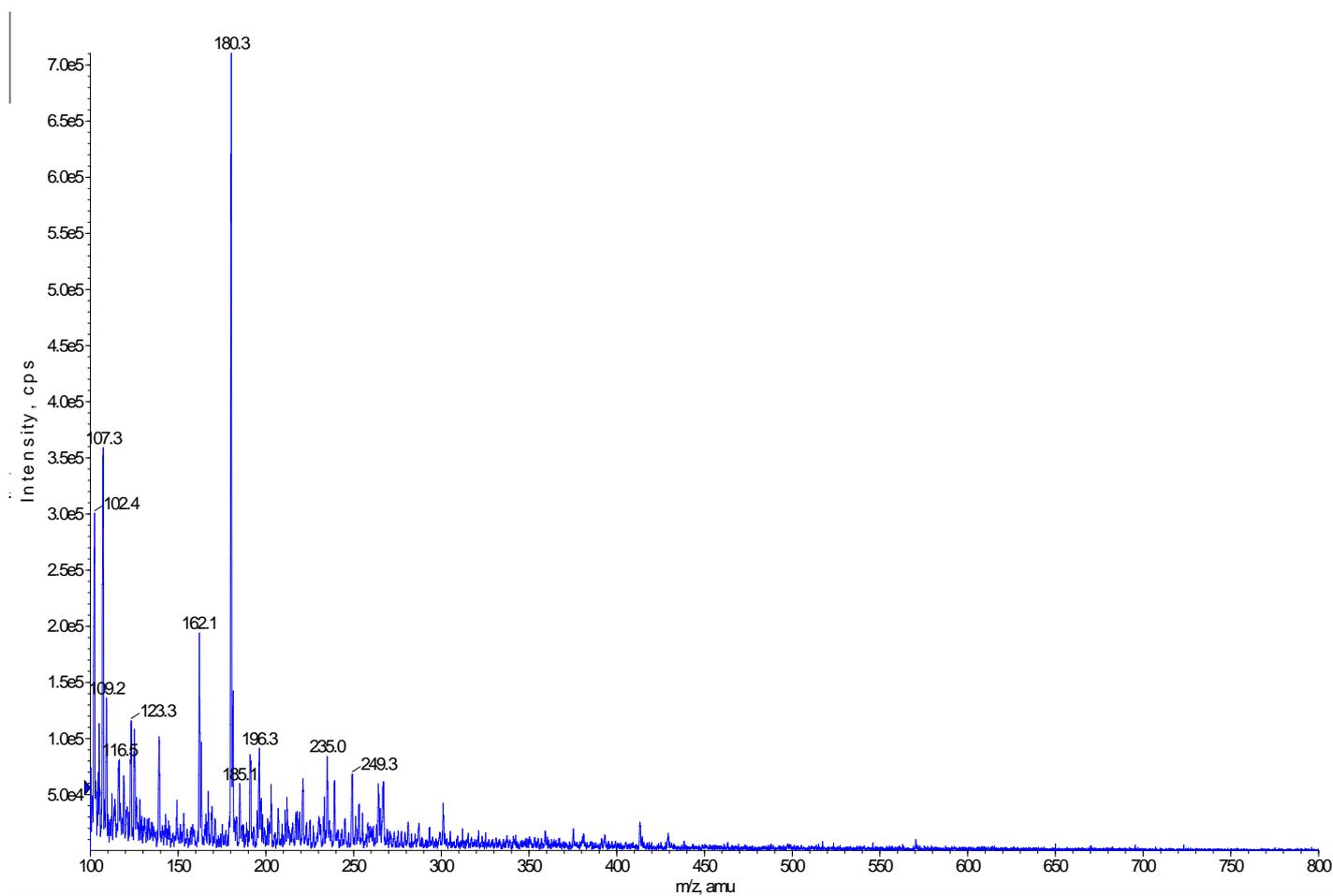


Figure S6. Mass spectrum (electro spray ionization) of the crude product after Au nanostar formation in D₂O showing peaks corresponding to glucosaminic acid formation. (glucosamine $[M+H]^+ = 180$, glucosaminic acid $[M+H]^+ = 196$)

3. Formation of nanostars with glucamine.

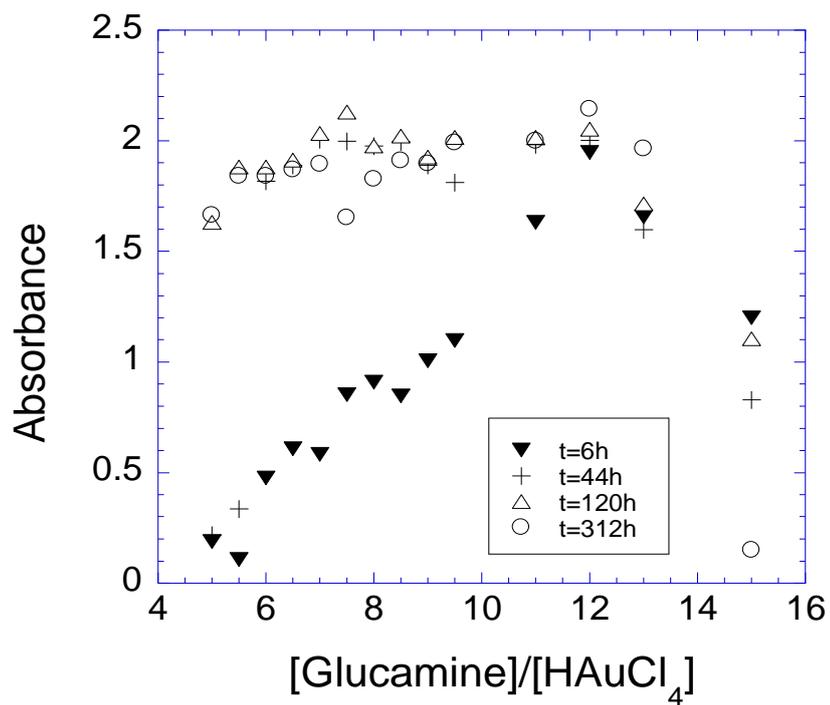


Figure S7. Evolution through time of the absorbance at maximum wavelength for the highest SPR as a function of [glucamine]/[HAuCl₄] ratio (t= 6h, 44h, 120h, 312h).