Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Glycodendrimer coated gold nanoparticles for proteins detection based on surface energy transfer process

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Contents:

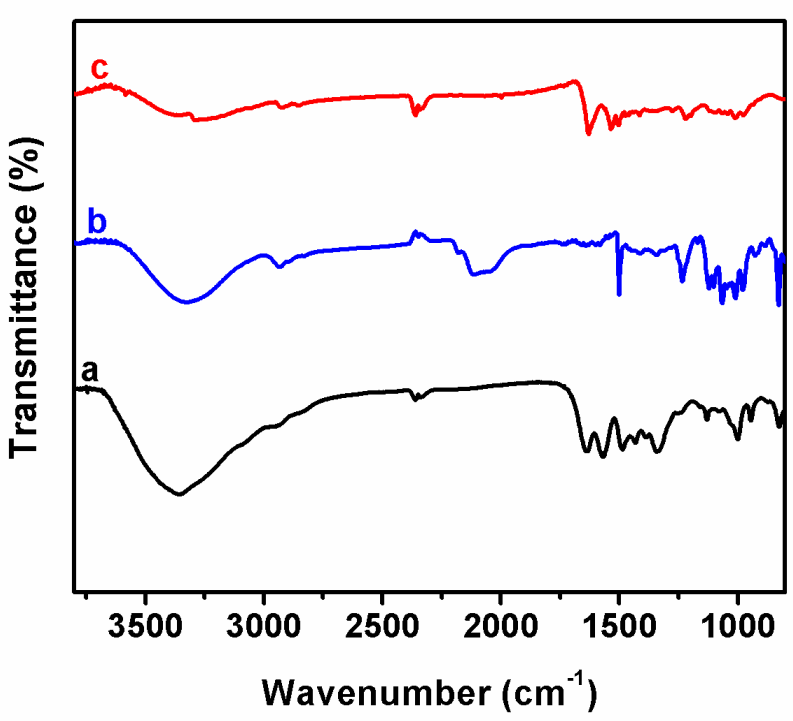

Figure S1: FTIR spectra of: (a) amine-terminated PAMAM G0 generation cystamine core dendrimer adsorbed on gold nanoparticles (Au-G0); (b) *p*-isothiocyanatophenyl α-D-mannopyranoside and; (c) glycodendrimer (mannose-functionalized poly(amidoamine) PAMAM generation G0 cystamine core dendrimer) coated gold nanoparticles (Au-man).

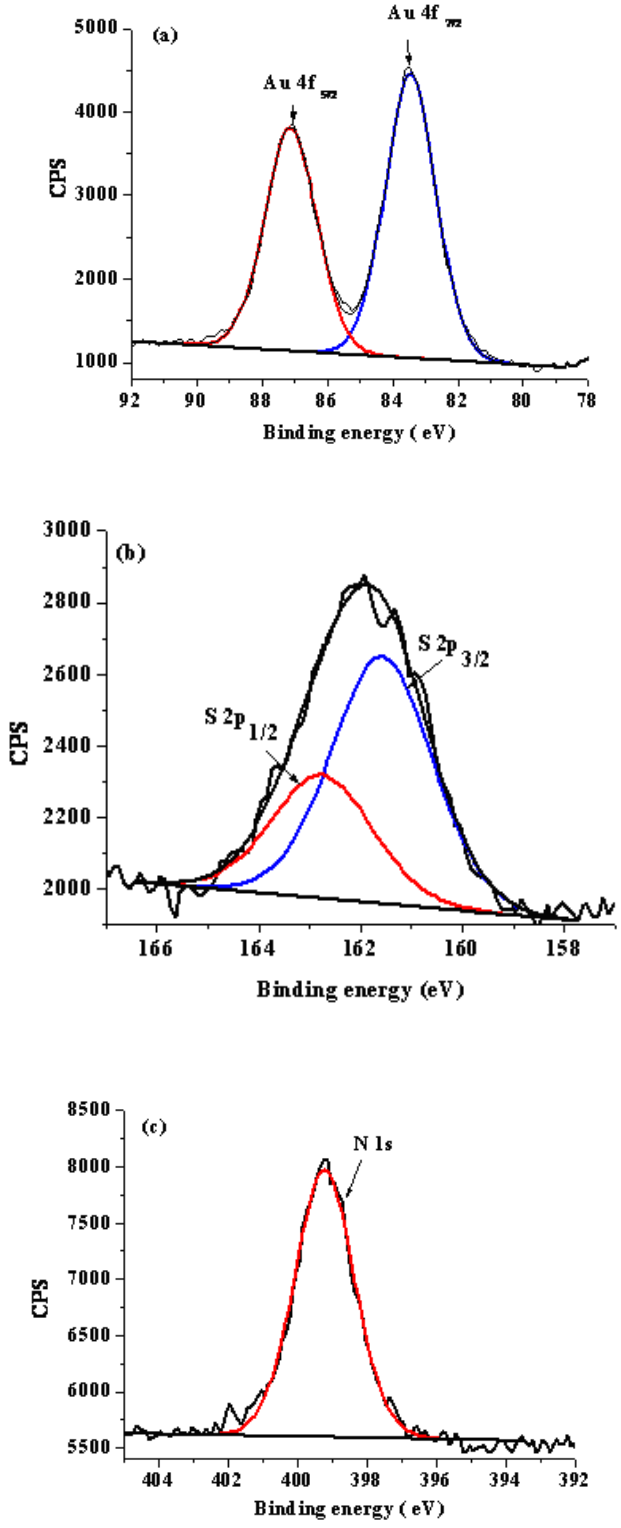

Figure S2: XPS spectra of Au-man: (a) gold, (b) sulphur and (c) nitrogen.

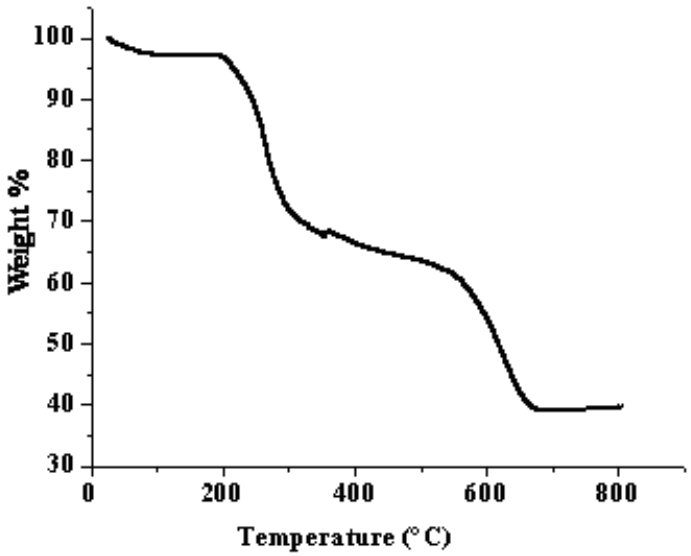

Figure S3: TGA measurements for Au-man. The heating rate is 10 °C min^{-1}.

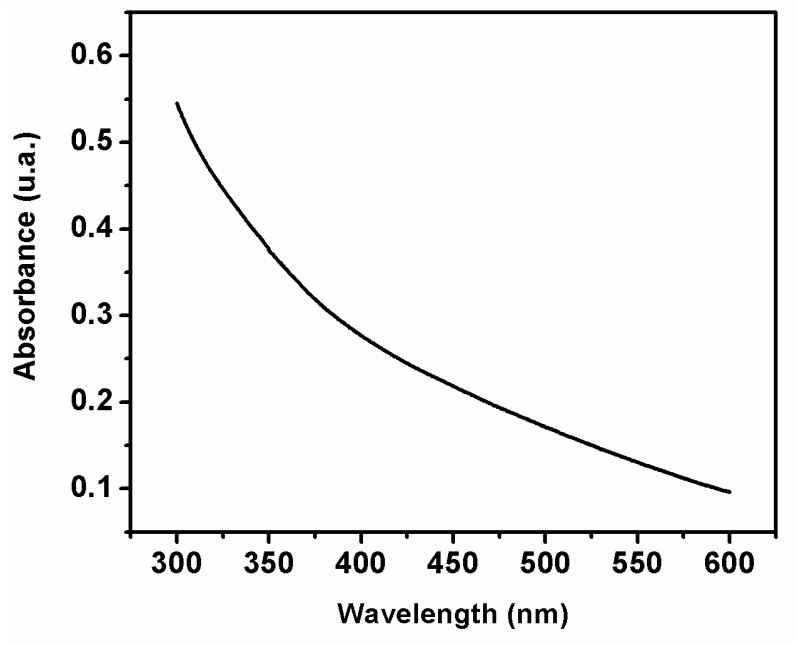

Figure S4: UV-visible spectra of Au-man.

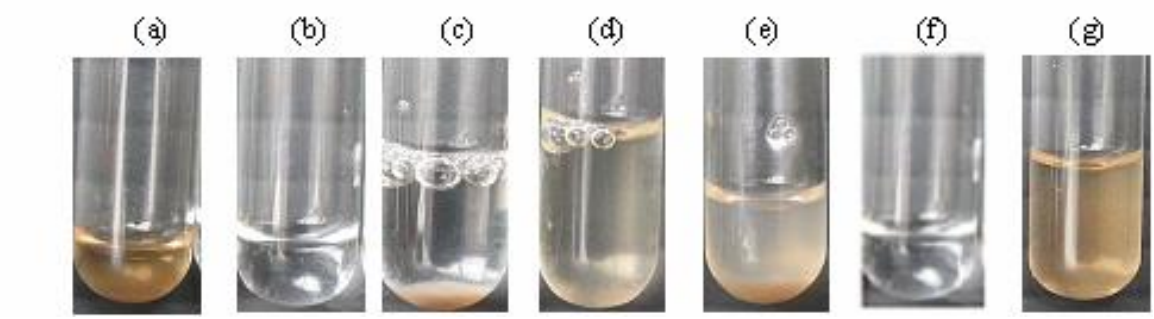

Figure S5: Immunoprecipitation tests:

(a) Au-man (1mg/1mL in PBS)

(b) Con A (1mg/mL in PBS)

(c) solution (a) mixed with solution (b) after 30 min

(d) solution (c) after adding 1 mL of D-mannose (200 mg/mL in PBS)

(e) solution (c) after adding 1 mL of D-galacose (200 mg/mL in PBS)

(f) WGA from *Triticum vulgaris* (1mg/mL in PBS)

(g) solution (f) mixed with solution (a) after 30 min

Stoechiometry of the complex between Con A-FITC and Au-man

Fluorescence measurements were used to determine the stoechiometry of the complex (RL) Au-man (L)-Con A-FITC (R). In this model each receptor can accommodate n ligands. The saturation of level of the receptors sites is :

$Y=n[L_f][R_T]$,

where $[R_T]$ is the receptor (Con A-FITC) concentration, $[L_f]$ is the concentration of the complex (Au-man-Con A-FITC). In our case there is only one receptor per Con A-FITC and the Scatchard[1] equation is:

$$Y = \frac{[RL]}{[R_T]} = \frac{[RL]}{[R+RL]} = \frac{1}{\left[1+\frac{R}{RL}\right]} \quad (1)$$

$$Y = \frac{1}{1+K_d/[L]} = \frac{[L]}{[L]+K_d} \quad (2)$$

Rearranging equation (2) yields:

$$Y + \frac{Y}{[L]}K_d = 1 \text{ and : } \frac{Y}{[L]} = \frac{(1-Y)}{K_d} \quad (3)$$

where $K_d = 1/K_a$ and K_a is the binding constant

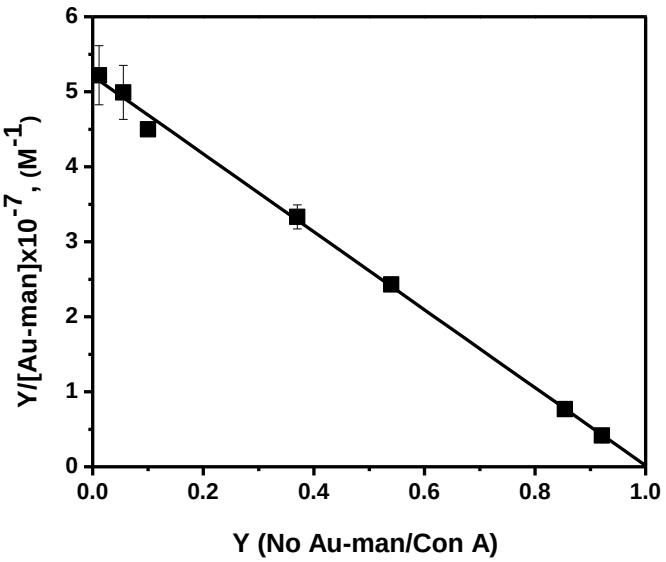

Figure S6: Scatchard plot for the binding of Con A-FITC to Au-man, determined by fluorescence. The fluorescence of the FITC-Con A after binding to Au-man was compared with the fluorescence of equal concentration of the FITC-Con A (320 nM) in absence of Au-man. The slope equals to K_a =5.2 x 10^6 M^{-1} with the intercept on *x* axis (n) equal to 1 Au-man per Con A binding site. The straight line is the fit of the data with eq. y=5.2-5.2x where y=Y/[Au-man]) and x=Y and it has a R^2 = 0.9943.

1. Scatchard, G., The attractions of proteins for small molecules and ions. *Ann. New York Acad. Sci*. *51*, 660, **1949**.

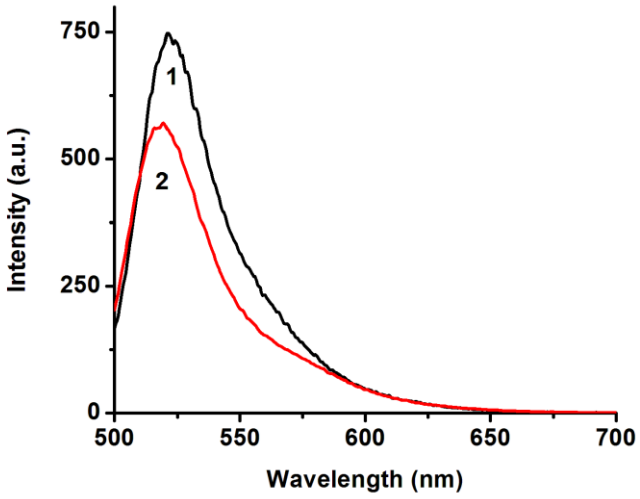

Figure S7: Fluorescence spectra of donor lectin FITC-Con A in absence (1) and presence of Au-man (2); λ_{ex}=490 nm.