

Supporting Information

Covalent functionalization of graphene oxide with D-mannose: evaluating the hemolytic effect and protein corona formation

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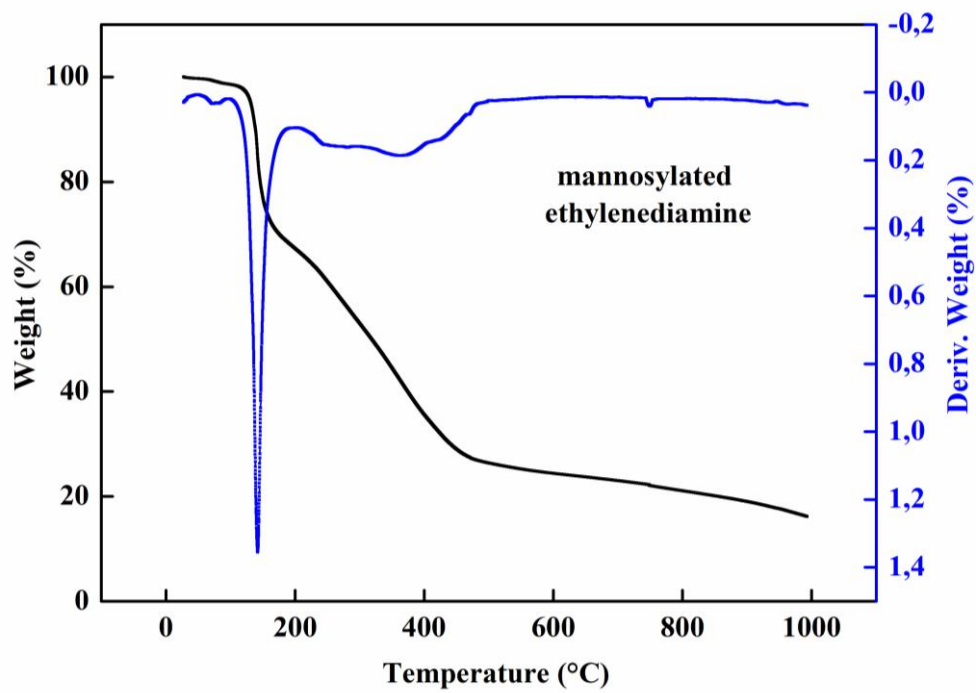
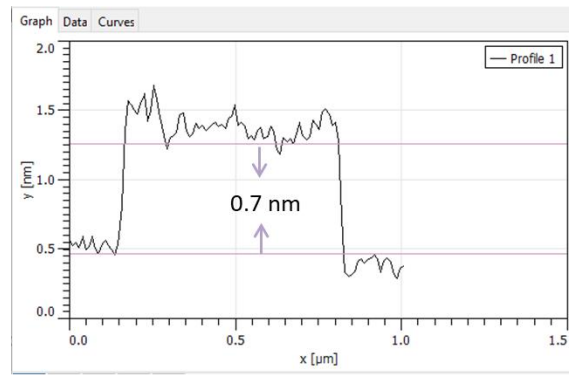
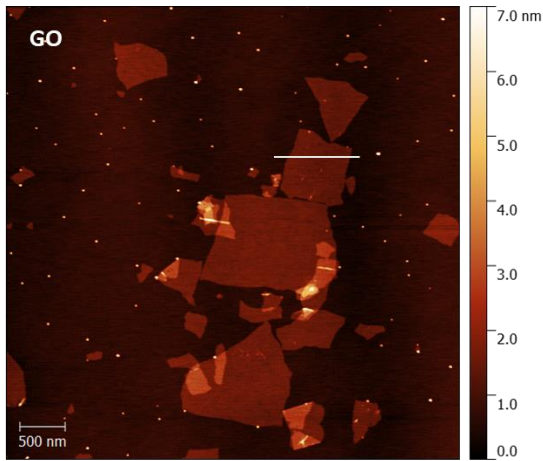
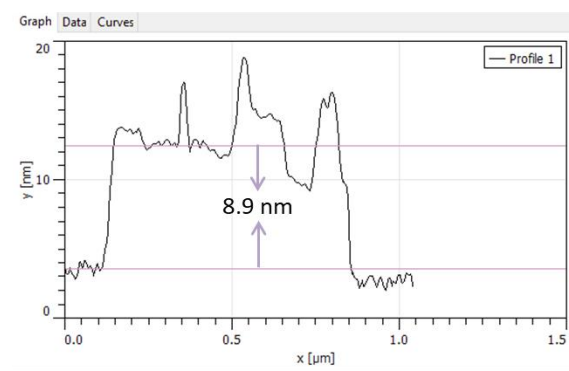
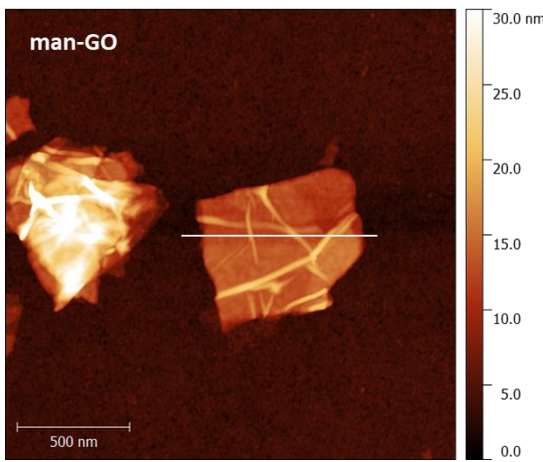


Figure 1S. TGA and DTGA of the mannosylated ethylenediamine.



Roughness: 102.8 pm



Roughness: 913.2 pm

Figure 2S. AFM topography images of GO and man-GO.

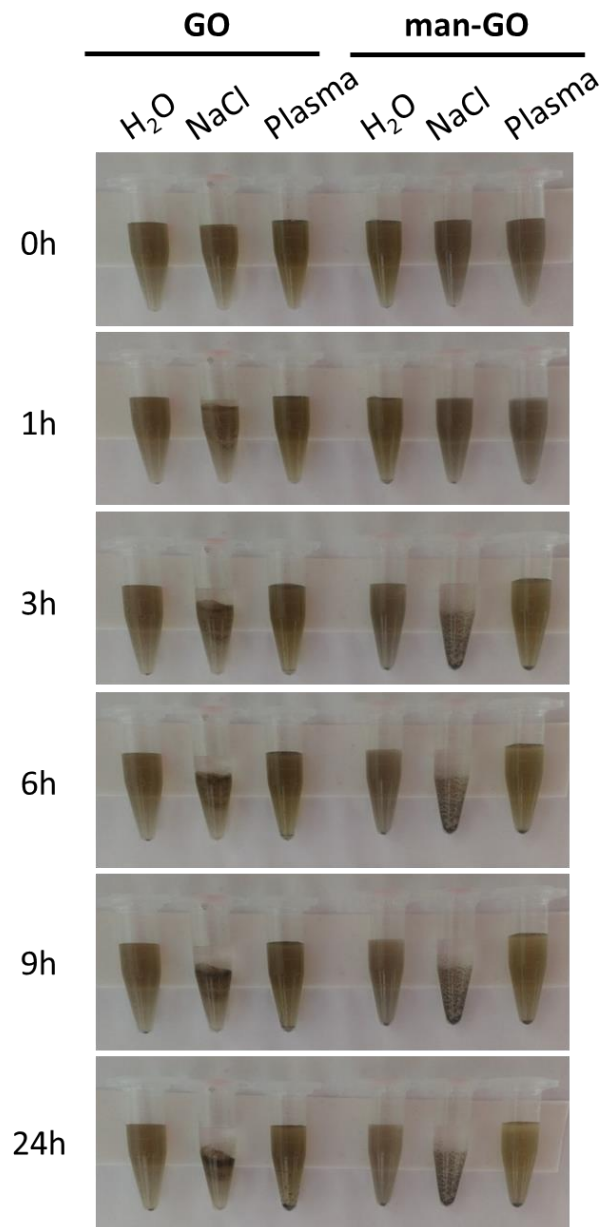


Figure 3S. Pictures for visual section of the dispersion stability study of GO and man-GO ($100 \mu\text{g mL}^{-1}$) materials in deionized water (H_2O), $\text{NaCl } 0.15 \text{ mol L}^{-1}$ solution and 55% human plasma in $\text{NaCl } 0.15 \text{ mol L}^{-1}$, over a period of 24h.

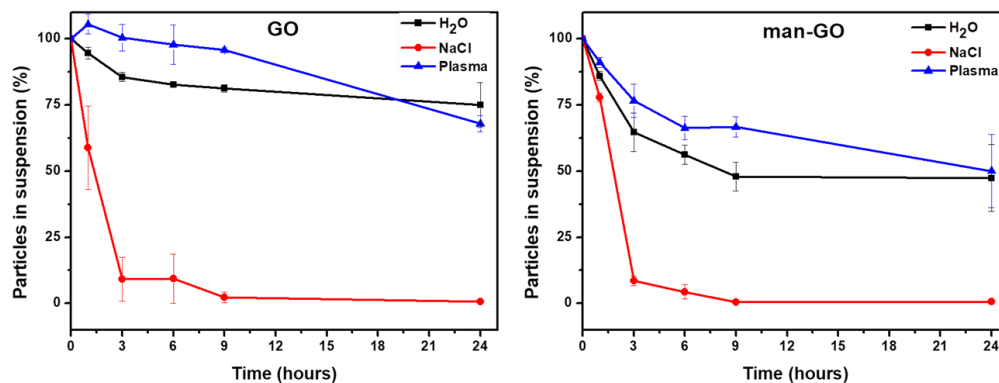


Figure 4S. Assessment of the sedimentation patterns of GO and man-GO materials dispersions at $100 \mu\text{g mL}^{-1}$ in deionized water, $\text{NaCl } 0.15 \text{ mol L}^{-1}$ solution and 55% human plasma in $\text{NaCl } 0.15 \text{ mol L}^{-1}$, over 24h incubation by UV-vis analysis (absorbance at 400 nm).

The colloidal stability of GO and man-GO in deionized water, $\text{NaCl } 0.15 \text{ mol L}^{-1}$ solution and human plasma 55% in PBS was evaluated by monitoring the absorbance of the supernatant at 400 nm using an UV-vis spectrophotometer. Briefly, 1.0 mL of each suspension at $100 \mu\text{g mL}^{-1}$ was prepared, and absorbance readings were taken at 0, 1, 3, 6, 9 and 24h. The results showed that man-GO was slightly less stable than GO in all media. The NaCl solution has drastically accelerated the GO and man-GO sedimentation, while the human plasma preserved almost all particles in suspension over time, highlighting that the PC plays an important role on their stabilization. In addition, we can observe that both materials presented a smaller portion that was unstable and precipitated in few hours. On the other hand, there was a very stable portion that remained stable over 24h. These results indicate that the materials were somewhat heterogeneous for biomedical applications and further improvements of the man-GO quality (*e.g.* fractionation) must be performed in order to enable its future application.

Table S1. A list of the whole array of the analyzed hard corona plasma proteins on man-GO.

Identified Proteins (109)	Accession Number	Score
Fibrinogen alpha chain	P02671 (+1)	77
Serumalbumin	P02768	71
Apolipoprotein B-100	P04114	46
Apolipoprotein E	P02649	50
Fibrinogen beta chain	P02675	56
Vitronectin	P04004	54
Complement C3	P01024	39
Isoform of P02679, Fibrinogen gamma chain	C9JC84 (+3)	33
Kininogen-1	P01042	29
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	26
Hornerin	Q86YZ3	19
Hemoglobinsubunit beta	P68871	11
Coagulation factor XI	P03951	21
Apolipoprotein C-IV	P55056	13
Protein SAA2-SAA4	A0A096LPE2	22
Apolipoprotein A-I	P02647	12
Isoform of P03952, Plasma kallikrein (Fragment)	H0YAC1 (+1)	13
Complement C4-B	POCOL5	11
Plasminogen	P00747	10
Isoform of P01834, Ig kappa chain C region	A0A087WZW8 (+1)	13
Histidine-rich glycoprotein	P04196	11
Isoform of P0CG05, Ig lambda-2 chain C regions (Fragment)	A0A075B6K9 (+2)	4
Histone H1.3	P16402	2
Actin, cytoplasmic 1	P60709 (+1)	9
Alpha-1-antitrypsin	P01009	12
Ig alpha-1 chain C region	P01876	7
Myosin-7	P12883	8
Dermcidin	P81605	10
Glyceraldehyde-3-phosphate dehydrogenase	P04406	4
Isoform of P01857, Ig gamma-1 chain C region	A0A087WV47 (+1)	9
Apolipoprotein A-II	P02652 (+2)	7
Coagulation factor XII	P00748	7
Gelsolin	P06396	4
Isoform of Q92954, Proteoglycan 4	A0A0U1RR20 (+5)	3
Filaggrin	P20930	3
Lysozyme C	P61626	6
Isoform of P02656, Apolipoprotein C-III	B0YIW2 (+1)	8
Isoform of P68104, Elongation factor 1-alpha 1	A0A087WVQ9 (+3)	7

Isoform of P00738, Haptoglobin	A0A0C4DGL8 (+4)	5
Hemoglobinsubunit alpha	P69905	4
Platelet basic protein	P02775	8
Isoform of Q14722, Isoform KvB1.1 of Voltage-gated potassium channel subunit beta-1	Q14722-2	1
Complementfactor H	P08603	6
Clusterin	P10909 (+3)	7
Disintegrin and metalloproteinase domain-containing protein 17	P78536	4
Apolipoprotein A-IV	P06727	5
Alpha-2-macroglobulin	P01023	4
Fibronectin	P02751 (+12)	5
Isoform of P08670, Vimentin	B0YJC4 (+1)	7
Protein S100-A7	P31151	4
Filaggrin-2	Q5D862	3
Isoform of Q6ZU80, Centrosomalprotein of 128 kDa (Fragment)	H0YJH2	2
Antithrombin-III	P01008	3
Desmoplakin	P15924	1
Desmoglein-1	Q02413	4
Plasma serine protease inhibitor	P05154	4
Isoform of P17936, Insulin-like growth factor-binding protein 3 (Fragment)	H0Y485 (+6)	1
Isoform of P02766, Transthyretin	A0A087WT59 (+1)	3
Isoform of P63104, Isoform 2 of 14-3-3 protein zeta/delta	P63104-2 (+4)	5
Tropomyosin beta chain	P07951 (+4)	1
Ig kappa chain V-III region WOL	P01623	2
Fermitin family homolog 3	Q86UX7 (+1)	3
Isoform of P08493, Isoform 2 of Matrix Gla protein	P08493-2 (+1)	2
Selenoprotein P	P49908	3
Retinoicacid receptor responder protein 2	Q99969	1
Thioredoxin	P10599	1
Apolipoprotein L1	O14791 (+2)	3
Serotransferrin	P02787	1
Beta-2-glycoprotein 1	P02749	1
Pigment epithelium-derived factor	P36955	3
Isoform of P04075, Fructose-bisphosphate aldolase	H3BQN4 (+3)	1
Complement C1q subcomponent subunit C	P02747	3
Alpha-2-HS-glycoprotein	P02765	1
Isoform of P05155, Plasma protease C1 inhibitor	E9PGN7 (+3)	3
Insulin-like growth factor-binding protein 4	P22692 (+1)	2
Ribonuclease 4	P34096	1
Complement factor H-related protein 1	Q03591	4

Pancreatic alpha-amylase	P04746 (+3)	2
Isoform of P08865, 40S ribosomal protein SA	A0A0C4DG17 (+2)	2
Serum paraoxonase/arylesterase 1	P27169	2
Isoform of P19823, Inter-alpha-trypsin inhibitor heavy chain H2	A0A087WTE1 (+2)	2
Isoform of P05452, Tetranectin	E9PHK0 (+1)	3
C4b-binding protein alpha chain	P04003	3
Isoform of P01871, Ig mu chain C region	A0A087X2C0	3
Profilin-1	P07737	2
Isoform of P02788, Lactotransferrin (Fragment)	E7EQB2 (+3)	1
Apolipoprotein(a)	P08519	2
Isoform of P06576, ATP synthase subunit beta, mitochondrial (Fragment)	F8W0P7	3
Isoform of Q14103, Heterogeneous nuclear ribonucleoprotein D0 (Fragment)	H0YA96 (+6)	1
Alpha-enolase	P06733 (+1)	1
Isoform of P00734, Prothrombin	E9PIT3 (+1)	1
Serum amyloid A-1 protein	P0DJI8	7
Actin, alpha skeletal muscle	P68133 (+3)	3
Procollagen C-endopeptidase enhancer 1	Q15113	2
Tubulin alpha-1A chain	Q71U36 (+8)	2
Isoform of P67809, Nuclease-sensitive element-binding protein 1 (Fragment)	H0Y449 (+2)	1
Isoform of P49913, Cathelicidin antimicrobial peptide	J3KNB4 (+1)	1
Isoform of Q86W56, Isoform 4 of Poly(ADP-ribose) glycohydrolase	Q86W56-4	1
Isoform of P09471, Isoform Alpha-2 of Guanine nucleotide-binding protein G(o) subunit alpha	P09471-2 (+2)	1
Isoform of P02654, Apolipoprotein C-I (Fragment)	K7ERI9 (+1)	1
Isoform of Q6ZMR3, L-lactate dehydrogenase	A0A087WUM2 (+1)	1
Isoform of P02655, Protein APOC4-APOC2	K7ER74	7
DnaJ homolog subfamily B member 11	Q9UBS4	1
Uncharacterized protein C10orf12	Q8N655	1
Leukocyte cell-derived chemotaxin-2	O14960	1
Isoform of P07910, Heterogeneous nuclear ribonucleoproteins C1/C2	B2R5W2 (+10)	1
Engulfment and cell motility protein 1	Q92556	1
Cystatin-C	P01034	1
Ig kappa chain V-IV region Len	P01625 (+3)	1