A Butterfly-like model for non-covalent functionalization of MWCNTs as a biocompatible nanoglycoarrays.

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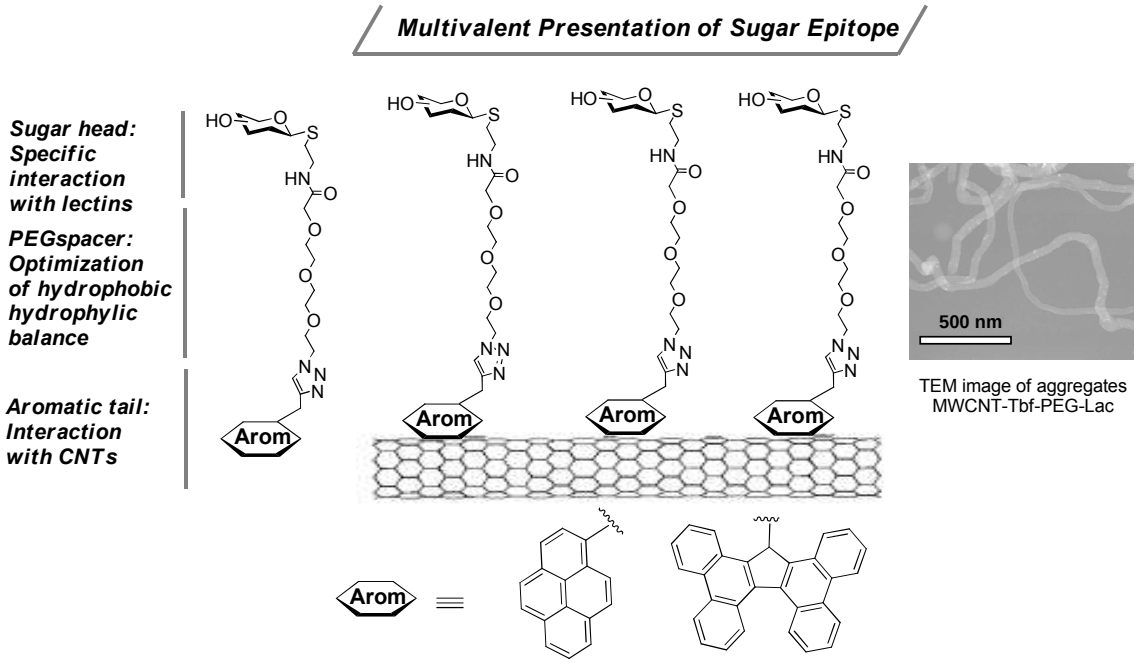
Carbon nanotubes (CNTs) have received an unrivalled interest as consequence of their unique structural, mechanical, electrical, and optical properties.[1] To date, CNTs are being actively investigated in a wide range of scientific areas,[2] These applications have been hampered by the insolubility of CNTs in most organic solvent, and in water. To overcome the drawbacks of insolubility, the surface functionalization of the CNT sidewalls has emerged as a powerful strategy to exfoliate CNTs resulting in the preparation of stable aqueous/organic suspensions. So far many strategies have been developed to exfoliate CNTs into solution including covalent and no-covalent functionalization.[3,4,5] Herein we disclose the use of sugar based tetrabenzo[a,c,g,i] fluorene (Tbf) amphiphiles with large flat aromatic group, as a new molecular scaffold for the non-covalent functionalization of CNTs, comparing with sugar based pyrene amphiphiles giving rise to robust water soluble nanoglycoarrays with a biomimetic presentation of cabohydrates on their surface (scheme 1).



Scheme 1

In the present communication, the following points will be discussed: (i) the modular synthetic strategies developed for the synthesis of the neoglycoconjugates, (ii) the determination of the neoglycolipid structural requirements for an efficient interaction and solubilization of MWCNTs, (iii) The characterization of the MWCNT nanoglycoarrays were carried out by Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Raman, UV-Vis, IR, and Fluorescence Spectroscopies, and (iv) the preliminary studies of the selective binding of MWCNT nanoglycoarrays with specific biological receptors.

References

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