

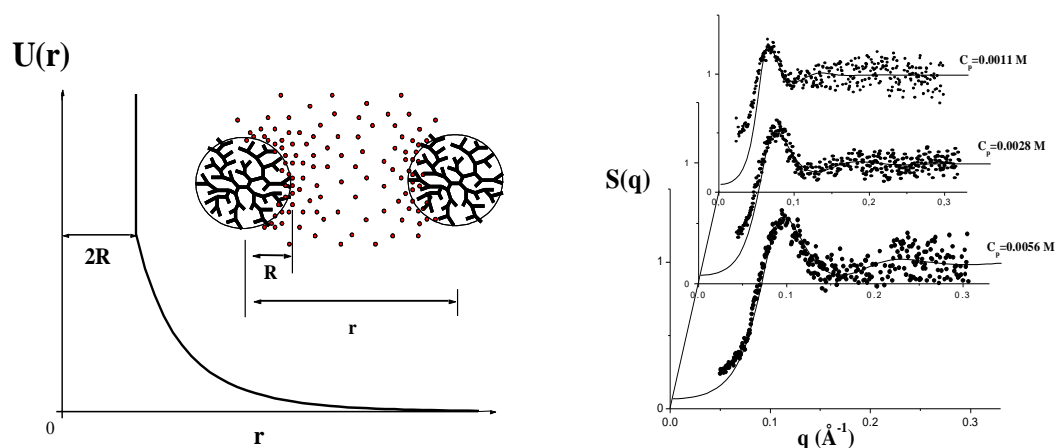
Charge interaction in branched polymer nanosystems and application in drug delivery

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Abstract

A promising class of multi-functional macromolecules suitable for biological applications consists of the highly ramified (dendritic) polymers known as dendrimers. Because of their compact, tree-like molecular structure, dendrimers provide a source of surface functionality and interior void space, which makes well-suited for use as carrier molecules in drug delivery¹. Their multivalent surface functionalities, in fact, can be linked to drug molecules or ligands in a well-defined manner thus increasing the binding efficiency or affinity of therapeutic molecules. These systems combine then the inclusion and transport properties of guest-host (drug carrier) systems, together with the increased stability of colloidal aggregates, and may be of interest as a promising class of nanomaterials suitable for advanced applications in the field of biotechnology and medicine.



We present some recent results which show how the effective intra- and inter-dendrimer charge interactions, as well as the dendrimer solution environment conditions, are crucial parameters for the modulation of the degree of structural organization in solution, suitable for a number of potential applications in the field of biotechnology². Results for the interaction of dendrimers with model membranes and relevant examples of charge interaction in bioinspired membranes will also be presented³.

¹ Tomalia, D. A.; Naylor, A. M.; Goddard, W. A. *Angew. Chem., Int. Ed. Engl.* 1990, 29, 138–175

² D. Lombardo, A. Longo, R. Darcy, A. Mazzaglia, *Langmuir* 20 (2004) 1057.

³ D. Lombardo, *Langmuir* 25 (2009), 3271–3275.