CYCLODEXTRINS IN NANOMEDICINE: RATIONAL DESIGN OF DRUG DELIVERY SYSTEMS, GENE VECTORS AND ANTITOXINS

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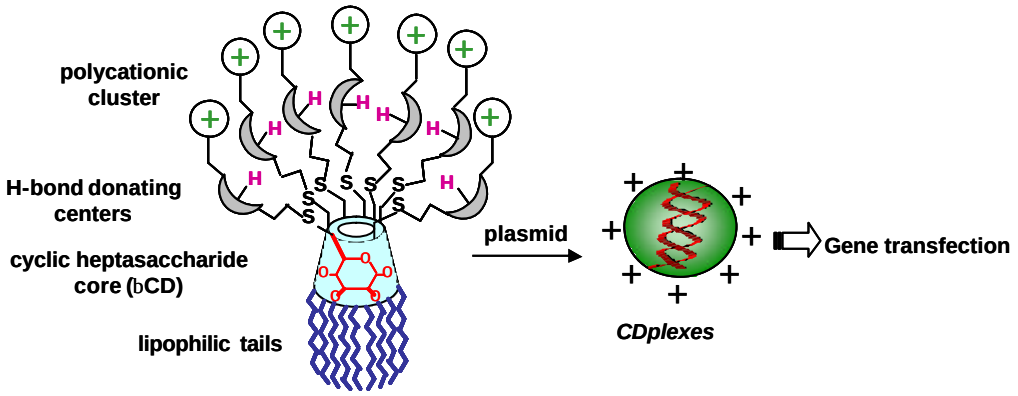
Cyclomaltooligosaccharides (cyclodextrins, CDs) are a class of industrially available supramolecular nanobiomaterials now readily adaptable to further manipulation in order to modulate their topology and recognition features.[1] Regioselective functionalization of their hydroxyl groups has already been exploited in the design of glycodendritic site-specific drug delivery systems[2] and glycocalix mimics (*third-generation CDs*).[3] *Fourth-generation CDs*, involving the capability to self-assemble and interact with larger structures, are now developed. By taking advantage of the tubular structure and topical anisotropy of the molecule, different functional elements with a dedicated spatial orientation can be installed to favour aggregation, encapsulation or binding phenomena. Three examples that illustrate this concept will be presented, namely the design of a tailor-made carrier for the anticancer drug Taxotère®,[2] CD-based artificial viruses for gene delivery (see Figure)[4,5] and nanometric blockers against the pore-forming protein associated to anthrax toxin.



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