Characterization data of water-soluble hydrophilic and amphiphilic dendrimers prodrugs for delivering bioactive chemical entities otherwise non soluble

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ABSTRACT

More than 40% of bioactive chemical entities (BCEs) developed in pharmaceutical industry are almost water-insoluble, poorly orally bioavailable and/or not via parenteral administrable, and this strongly limits their clinical applications. Drug Delivery (DD) is an engineered technology dealing with the development of delivery systems (DDSs) able to solubilize, transport, target release and maintain therapeutic drugs concentration where needed for long periods. DD frequently makes use of nanosized carriers, often positive charged, including dendrimer such as commercially available and strongly cationic PAMAM and PEI. Nowadays, uncharged dendrimer scaffolds modified with amino acids-modified in their cationic form, are preferred because a more controlled number of nitrogen atoms causes less damage to cells. Then, two hydrophilic (**1**, **2**) [1] (Fig. 1) and three amphiphilic (**3**-**5**) [2] (Fig. 2) water-soluble dendrimers were prepared and completely characterized.

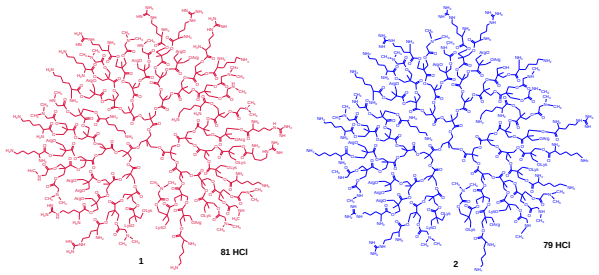

Fig. 1: *Hydrophilic dendrimers **1**, **2***

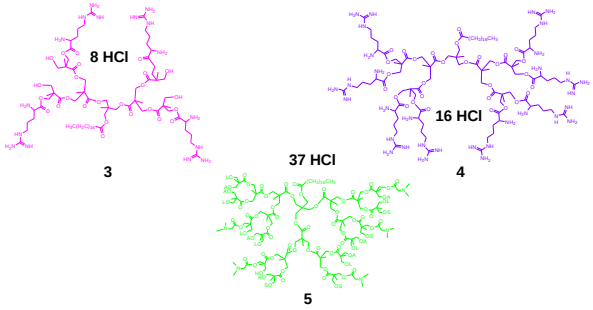

Fig. 2: *Amphiphilic dendrimers **3**-**5***

Once established through proper routine investigations, that these materials could work well as DDSs, they have been used to physically entrap two completely insoluble BCEs i.e. the thiocarbamate (O-TC) **6** [3] and Ellagic Acid (EA) **7** (Fig. 3) with the aim at improving their solubility and in parallel at protecting them from early degradation, at promoting their fast cellular up-take and thus reducing eventual systemic toxicity. Without resorting to toxic excipients and harmful solubilizing agents often used despite the resulting unpleasant side effects, five structurally different nanodispersions (DPXs) loaded with **6** [4] and two with **7** [5] were achieved and completely characterized to confirm their structure and to evaluate their potentiality in biomedical applications.

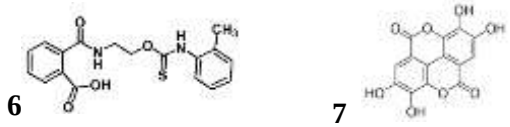

Fig. 3: *Structure of O-TC **6** (left)* and *of EA **7** (right)*

Firstly, FT-IR and NMR analysis were performed then, in relation to the loaded BCE, water and/or alcohol-solubility, drug loading capacity, mean size of particles and Z-potential, cytotoxicity or antioxidant power, buffer capacity etc, were taken into account and explored. In the present work an overview of the obtained results organized in tables, graphs and spectra has been provided.

REFERENCES:

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