Polyacetals as versatile drug delivery systems

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Abstract

Polymer therapeutics is a rapidly developing technology and can be considered amongst the most successful nanomedicines. Due to their intrinsic characteristics this class of pharmaceuticals can exhibit unique advantages: (i) they are able to get to places that other larger 'nanocarriers' cannot reach, (ii) they are more able to cross biological barriers and can display architecture specific intracellular trafficking and (ii) they allow a greater control on drug pharmacokinetics due to the use of bioresponsive chemical conjugation [1].

One of the research lines of our group is focused on the development of polyacetal-drug conjugates. These particular conjugates are of great interest because of their ability to include drugs having a diol functionality directly into the polymer backbone since polyacetals are prepared by reaction between divinyl ethers and diols. Besides, they can be functionalized in their lateral chain by other drug or dye molecules allowing the preparation of versatile polymer conjugates. One great advantage of these polymers over others is the degradation of the polymer backbone in the acidic environment of the lysosome or the extracellular fluid of some tumors, which triggers drug release thus eliminating the need for a biodegradable linker [2].

Polyacetals developed in our laboratory are mainly designed for applications in regenerative medicine for the treatment of spinal cord injury, and for projects related with cancer treatment, mainly prostate cancer. This presentation will focus on the application of these polymers to the treatment of prostate cancer and review the results obtained in our group with single drug polymers and combination therapy [3].

References

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