Star-shaped drug carriers for doxorubicin with POEGMA and POEtOxMA brush-like shells: A structural, physical, and biological comparison.

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Details

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Abstract

The synthesis of amphiphilic star-shaped poly(ε-caprolactone)-block-poly(oligo(ethylene glycol)methacrylate)s ([PCL(18)-b-POEGMA](4)) and poly(ε-caprolactone)-block-poly(oligo(2-ethyl-2-oxazoline)methacrylate)s ([PCL(18)-b-POEtOxMA](4)) is presented. Unimolecular behavior in aqueous systems is observed with the tendency to form loose aggregates for both hydrophilic shell types. The comparison of OEGMA and OEtOxMA reveals that the molar mass of the macromonomer in the hydrophilic shell rather than the mere length is the crucial factor to form an efficiently stabilizing hydrophilic shell. A hydrophilic/lipophilic balance of 0.8 is shown to stabilize unimolecular micelles in water. An extensive in vitro biological evaluation shows neither blood nor cytotoxicity. The applicability of the polymers as drug delivery systems was proven by the encapsulation of the anticancer drug doxorubicin, whose cytotoxic effect was retarded in comparison to the free drug.

Involved units

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