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Cracking the chloroquine conundrum: the application of defective UiO-66 metal–organic framework materials to prevent the onset of heart defects-in vivo and in vitro

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In this study, we present a modulated synthesisnanocrystalline defective UiO-66 metal−organic framework as apotential chloroquine diphosphate (CQ) delivery system. Increas-ing the concentration of hydrochloric acid during the modulatedsynthesis resulted in a considerable increase of pore volume, whichenhanced the CQ loading in CQ@UiO-66 composites. Drugrelease tests for CQ@UiO-66 composites have confirmedprolonged CQ release in comparison with pure CQ. In vivo testson aDanio reiromodel organism have revealed that CQ releasedfrom CQ@UiO-66 25% showed lower toxicity and fewercardiotoxic effects manifested by cardiac malformations andarrhythmia in comparison to analogous doses of CQ. Cytotoxicitytests proved that the CQ loaded on the defective UiO-66 cargo resulted in increased viability of cardiac cells (H9C2) as compared toincubation with pure CQ. The experimental results presented here may be a step forward in the context of reducing thecardiotoxicity CQ.

Metryczka

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