

Synthesis, characterization, and evaluation of cytotoxic effects of novel hybrid steroidal heterocycles as peg based nanoparticles.

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Abstract

Anticancer agents featuring hybrid molecules can improve effectiveness and diminish drug resistance. The current study aimed to introduce newly synthesized heterocyclic steroids of promising anticancer effects loaded in polyethylene glycol (PEG)-based nanoparticles form. Several heterocyclic steroids (1-9) were synthesized via multicomponent reactions (MCRs) and confirmed via the analytical and spectral data. Compounds 1, 2, 3, 4, 5, 6, 7 and 9, were investigated individually in their free and PEG based nano-size hybrid forms as anticancer agents against three human cell lines: hepatocellular carcinoma cells (HepG2); breast cancer cells (MCF-7); and colon cancer cells (HCT116). The neutral red supravital dye uptake assay was employed. Compound 6 in its PEG based nano-size form exhibited the best cytotoxic effects against HepG2 and HCT116 cell lines, with IC₅₀ values of 2.44 $\mu\text{mol/l}$ and 2.59 $\mu\text{mol/l}$, respectively. In addition, it demonstrated a low IC₅₀ value against MCF-7 (3.46 $\mu\text{mol/l}$) cells. This study introduced promising anticancer agents acting through conversion into PEG-based nanoparticles.

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