Drug Des 2017, 6:5 (Suppl)
DOI: 10.4172/2169-0138-C1-020

Design of HDAC2 inhibitors based on molecular modeling

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Identification of the lead compounds and lead optimization for the histone deacetylase-2 (HDAC2) inhibition evinced great interest in cancer drug development. *HDAC2* belongs to Class I *HDAC* family and a promising target for inhibition in the treatment of various cancers, includes colon, gastric, cervical, prostate carcinoma, lung cancer, colorectal and hepatocellular carcinoma. In this work, we used pharmacophore, virtual screening and molecular docking to identify novel compounds for *HDAC2* protein. We identified total 30 inhibitors from three databases (NCI, Maybridge and ZINC) and selected compounds were subjected to molecular dynamic studies to check the stability of the complex. Finally selected few compounds are chosen to serve as best *HDAC2* inhibitors. Compound (S)-3-(1-benzyl-1H-imidazol-4-yl)-2-[((benzyloxy) carbonyl) amino] propanoic acid (NSC169121 OR Z-His(Bzl)-OH) was chosen for experimental antioxidant and anticancer studies. Antioxidant property of compound measured using DPPH free radical assay and the cytotoxicity of the compound measured in three human cancer cell lines such as human lung carcinoma cells, human breast carcinoma cells and prostate carcinoma cells using MTT (3-[4,5-dimethylthiazol-2-yl] 2,5-diphenyl tetrazolium bromide) assay. The IC50 of the compound measured and the activity of the compound is increased by combination of quercetin and antioxidant. This study successfully finds potential novel compounds for *HDAC2* inhibition and *in vitro* antioxidant and anticancer study of selected compound was found to have a reasonable IC50 value and the activity of the compound was enhanced by addition of quercetin.

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Parenteral dosage forms differ from all other pharmaceutical dosage forms

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Parenteral dosage forms differ from all other pharmaceutical dosage forms, because they are injected directly into body tissue through the primary protective systems of the human body; the skin and mucous membranes. They have many advantages like routes of administration, elimination of first pass effect and better absorption. They can be in a solution, suspension, emulsions, dry powders with freeze drying as well as microcapsules, nanoparticules or microemulsions. But there are some limitations for formulation development studies like drug stability, poor solubility, packaging, controlling the quality of these unique products, sterilization methods and evaluation of parenteral dosage forms issues. So,the main formulation development steps for new parenteral drug products And what about QbD development approach for parenteral dosage formsParenteral dosage forms represent excellent opportunities for life cycle management to the pharmaceutical companies. the future of parenteral dosage forms formulations. Sustained release drug delivery, such as depot formulations which are already available at the market, may be a good alternative.

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