SYNTHESIS OF MESOPOROUS SILICA NANOPARTICLES FOR DELIVERING DOXORUBICIN AND EVALUATE THE IN VITRO DRUG RELEASE, CYTOTOXICITY, AND IMPROVED CELLULAR UPTAKE ON CANCER CELLS

M.Prabhakaran[1], Dr.R.Raj Kumar[2], Ms.Esaivani[3],
[2]Department of Chemistry, Karpaga Vinayaga College of Engineering and Technology, GST Road, Chinna Kolambakkam, Chengalpattu – 603308, Tamil Nadu, India.
Corresponding*: Esai Vani V (esaivanikrishnamoorthy@gmail.com)
Dr. Rajkumar S (rajkumarmku2014@gmail.com)

In this study, mesoporous silica nanoparticles (MSNPs) was synthesised and physically loaded with doxorubicin (DOX) to form DOX@MSNPs and cross-linked with calcium chloride for passive targeting drug delivery on Hela cancer cells. The porous morphology and mean size were investigated by TEM and SEM analysis. The hydrodynamic size of the DOX@MSNPs is 200 nm under DLS analysis. In vitro drug release profiles of DOX@MSNPs showed the maximum the drug release in pH 5.6 than 7.5 with sustainable release. The hemo compatibility of the DOX@MSNPs showed less than 3% haemolytic reaction with red blood cells on hemolysis assay. In vitro cytotoxicity of the DOX@MSNPs showed IC_{50} value at 1µg/mL against A549 cells. The cellular uptake of the A549 cells shows maximum drugs (IC_{50} values) reaches the nucleus through EPR effect. The results revealing the DOX@MSNPs had special advantages in enhancing effect of DOX towards A549 cells through EPR effects and thus confirming its unique contribution in passive targeted drug delivery.
Keywords: Mesoporous silica, nanoparticles, passive targeting, cancer therapy,EPR effects, drug delivery

GAUR GUM FUNCTIONALIZED AU@ZNO$_{(QDS)}$ HYBRID NANOPARTICLES FOR CT/FLUORESCENCE DUAL IMAGING ON CANCER CELLS

Karthika P[1], Vaishnavi S[1], Jayachithra S[1], Subashini M[1], Ezhumalai P[1], Esaivani V[2]* and Rajkumar S[2]*
[1]Department of biomedical engineering, Karpaga Vinayaga College of Engineering and Technology, GST Road, Chinna Kolambakkam, Chengalpattu – 603308, Tamil Nadu, India.
[2]Department of Chemistry, Karpaga Vinayaga College of Engineering and Technology, GST Road, Chinna Kolambakkam, Chengalpattu – 603308, Tamil Nadu, India.
Corresponding*: Esai Vani V (esaivanikrishnamoorthy@gmail.com)
Dr. Rajkumar S (rajkumarmku2014@gmail.com)

In this work, we synthesized the hybrid nanoparticles based on gold (Au) doped zinc oxide quantum dots ($ZnO_{(QDs)}$) (Au@$ZnO_{(QDs)}$) functionalized with guar gum (GG) to form (Au@$ZnO_{(QDs)}$-GG) NPs, where the integrated Au acts as CT scan imaging, and the $ZnO_{(QDs)}$ as fluorescence cell imaging functionalities for cancer diagnosis. In the Au@$ZnO_{(QDs)}$-GG NPs, GG biopolymer provide colloidal stability and increase the