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Gum arabic-curcumin conjugate micelles with enhanced loading for curcumin delivery to hepatocarcinoma cells

Sarika Reghunadh[1] and Nirmala Rachel James[2]
[1]University of Utah, USA
[2]Indian Institute of Space Science and Technology (IIST), India

Curcumin is a natural hydrophobic polyphenol obtained from rhizome of the plant *Curcuma longa* or root turmeric. Curcumin possess anti-oxidant, anti-inflammatory, anti-microbial and anti-cancerous properties. Despite of its therapeutic efficacy and safety, curcumin has not been widely utilized for treatment owing to its less bioavailability. The reasons for reduced bioavailability of curcumin are poor absorption, rapid metabolism and fast elimination. In order to improve the therapeutic efficacy, bioavailability and to overcome the aforementioned shortcomings, curcumin should be protected from degradation and metabolism. In the present study, curcumin is conjugated to gum arabic, a highly water soluble polysaccharide to enhance the solubility and stability of curcumin. Gum arabic-curcumin (GA-Cur) conjugate is charcterised by 1H NMR, fluorescence and UV spectroscopy studies. GA-Cur conjugate self assembled to nano micelle owing the hydrophia-hydrophobic interactions in aqueous medium. Hydrodynamic diameter of the miceles were analysed by dynaminc light scattering. The micelles exhibited a size of 270±5 nm. Spherical morphology of the self assembled conjugates were evidenced by field emission scanning electron microscopy and transmission electron microscopy. The self assembly of the amphiphilic conjugate into micelle in aqueous medium significantly enhanced the solubility and stability of curcumin in physiological pH. The anticancer activity of the conjugate micelles are found to be higher in human hepatocellular carcinoma (HepG2) cells than in human breast carcinoma (MCF-7) cells. The conjugate exhibited enhanced accumulation and toxicity in HepG2 cells due to the targeting efficiency of the galactose groups present on gum arabic. This GA-Cur conjugate is a promising drug delivery system.

Biography

Sarika Reghunadh has completed her PhD from Indian Institute of Space Science and Technology, India and Post-doctoral studies from University of Utah, USA. She has published more than 12 papers in reputed journals. Her research interests includes polymeric nanomaterials and microspheres for drug delivery applications and polymer synthesis.

sarikapaithal@gmail.com