Abstracts *(Poster Presentation)*

Development of Transferrin-Conjugated Lipid-Polymer Hybrid Nanoparticles for Alpha-Mangostin Delivery to Targeted Cancer Cells

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Abstract

Introduction: Alpha-mangostin has been reported to play a significant role in inhibiting tumour growth and metastasis. However, its therapeutic potential is limited by its poor aqueous solubility and rapid elimination *in vivo*. To overcome these limitations, we hypothesize that using tumour-targeted delivery system would result in a selective delivery to cancer cells and enhances its therapeutic efficacy.

Objectives: To prepare and characterize tumour-targeted delivery entrapping α-mangostin using transferrin-conjugated lipid-polymer hybrid nanoparticles (Tf-LPHN).

Methods: The LPHN entrapping α-mangostin was prepared by nanoprecipitation method and conjugated with transferrin using the thiol–maleimide 'click' reaction. The nanoparticles were optimized and characterized for their physical properties. The *in vitro* therapeutic efficacies were investigated in three cancer cell lines (MCF-7, A549 and B16-F10) that overexpress the transferrin receptors.

Results: The optimal formulation of Tf-LPHN had the particle size of 294.4 ± 0.7 nm and zeta potential of 43.7 ± 0.6 mV. The entrapment efficiency of α-mangostin in both Tf-LPHN and Ctrl-LPHN was relatively high (more than 77%). Tf-LPHN and Ctrl-LPHN exhibited a sustained release of the a-mangostin at pH 7.4 following an initial burst release (cumulative drug release by about 40% over 72 hours). The entrapment of α-mangostin in the Tf-LPHN led to an increase in cellular uptake and anti-proliferative activity of α-mangostin in MCF-7, A549, and B16-F10 cell lines by at least 1.3 to 1.7 times compared with drug solution.

Conclusions: These results are promising and support the use of this tumour-targeted delivery system to further improve therapeutic efficacy and tumour specificity of α-mangostin.

Keywords: Alpha-mangostin, Cancer, Lipid-polymer hybrid nanoparticles, Transferrin
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