

Cellulose derivative-based polymeric nanoparticles for *Garciniamangostana* extract delivery and cancer therapy

Pornpip Pan-in¹, Anthony J. Kim², Justin Hanes² and Supason Wanichwecharungruang³

¹Chulalongkorn University, Program in Biotechnology, Faculty of Science, Thailand

²The Johns Hopkins University School of Medicine, The Center for Nanomedicine, USA

³Chulalongkorn University, Department of Chemistry, Faculty of Science, Thailand

Cervical cancer is an important health problem for women worldwide. Although chemotherapeutic agents are a widely used in cancer treatments, they can lead to high toxicity and harmful side effects. To avoid side effects of chemotherapeutics, the use of natural phytochemicals such as Xanthone from *Garciniamangostana* extract (GME) has received considerable attention in cancer prevention and cancer therapeutics. However, GME's poor aqueous solubility and low bioavailability are the major obstacles toward its development. Encapsulation using polymeric nano carriers is one of the ways to overcome the problem of GME. Among the polymers suitable for encapsulation, cellulose derivative, ethyl cellulose (EC) and methylcellulose (MC), are non-toxic, stable, and have been widely used in pharmaceuticals. We prepared GME-encapsulated polymer-blend of EC and MC nanoparticles (nanoGME) using a solvent displacement method with high encapsulation efficiency and size around 250 nm. *In vitro* cytotoxicity assay showed effective anticancer activity of nanoGME in HeLa cells. Moreover, uptake of nanoGME by HeLa cells was higher than unencapsulated GME and nanoGME, which entered cells via clathrin-mediated endocytosis. As far as we know, this is the first report on the intracellular pathway of cellulose derivative nanoparticles. In summary, NanoGME successfully improved the bioavailability of GME in aqueous solution and enhanced cellular uptake.

Biography

Pornpip Pan-in is a Ph.D. student in Biotechnology program at the Faculty of Science, Chulalongkorn University. Pan-in's current Ph.D. thesis is in drug and natural product delivery for bacterial infection and cancer therapy under the supervision of Dr. Supason Wanichwecharungruang, a professor at Chulalongkorn University. She is currently a trainee at Johns Hopkins University investigating intracellular delivery of nanoparticles and gene therapy under Dr. Justin Hanes, a professor at Johns Hopkins University. She is also interested in the commercial application of her natural product delivery using nanoparticles research.

pornpip.pan.in@gmail.com