

International Conference and Exhibition on

# NANOMEDICINE AND DRUG DELIVERY

May 29-31, 2017 Osaka, Japan

## Applications of flower-shaped polymer-ZnO nanocomposites for topical delivery of *Dendropanax morbifera* extract and ginsenoside Rh2

Josua Markus, Veronika Soshnikova, Yaxi Han, Zuly Elizabeth Jimenez Perez, Ramya Mathiyalagan, Yeon-Ju Kim and Deok Chun Yang  
Kyung Hee University, Republic of Korea

In this study, Zinc Oxide (ZnO) nanocomposites functionalized by Hyaluronic Acid (HA) or Carboxymethyl Chitosan (CMC) were prepared by co-precipitation method. Biocompatible HA and CMC were selected to provide steric stabilization, surface modifications for ginsenoside conjugation, and clinical benefits for topical drug delivery. Aqueous leaf extract of *Dendropanax morbifera* Léveillé was incorporated in the synthesis to enhance water stability, antioxidant activity, and impart skin-protective effects on ZnO nanocomposites. The resulting flower-shaped nanocomposites were further functionalized by ginsenoside Rh2 by cleavable ester bond via carbodiimide chemistry. The physicochemical behaviors of ginsenoside-conjugated HA/CMC-ZnONcs were characterized by UV-Vis spectroscopy, FE-TEM, XRD, FTIR, DLS, TGA, and DSC. The drug loading efficiency was evaluated by LC-MS. HA/CMC-ZnONcs demonstrated antioxidant activity against DPPH and ABTS+ radicals and enhanced moisture retention ability than free polymers. Comparative water solubility of ginsenoside Rh2 and Rh2-HA/CMC-ZnONcs showed that ginsenoside conjugation onto nanocomposites enhanced water dispersibility of ginsenoside in water. Overall, Rh2-HA/CMC-ZnONcs may be useful as nano drug carriers for topical delivery of *D. morbifera* extract and ginsenoside Rh2 to remedy skin disorders and prevent skin cancer.

### Biography

Josua Markus is a Master's student from the Graduate School of Biotechnology at Kyung Hee University, where he has been a full time graduate student since 2015. He obtained his BAsC in Chemical Engineering from University of Waterloo in 2014. His research interest lies in drug delivery system and nanobiotechnology. In recent years, he has focused his research on the development of polymer-metal hybrid nanocomposites for the efficient delivery of ginsenosides to improve the pharmacokinetics to cancer and skin cells. He is also engaged in conducting short-term research projects which involve the biological synthesis of multifunctional gold, silver, and zinc nanoparticles by plants and microorganisms as novel antimicrobial, antioxidant, and anticancer agents.

josuamarkus8@gmail.com

Notes: